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Environmental Assessment
DOI-BLM-AZ-A030-2021-0006-EA

Imlay & Sullivan Tank Allotments
Grazing Permit Renewal

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BLM

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List of Acronyms

AGFD	Arizona Game and Fish Department
AMP	Allotment Management Plan
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
ESD	Ecological Site Description
FLPMA	Federal Land Policy and Management Act
FONSI	Finding of No Significant Impact
GCPNM	Grand Canyon-Parashant National Monument
IAT	Interdisciplinary Assessment Team
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
OHV	Off-Highway Vehicle
PNC	Potential Natural Community
PRIA	Public Rangelands Improvement Act
p.z.	Precipitation Zone
RRT	Range Resource Team
RMP	Resource Management Plan
S&G	Standards and Guidelines
USC	United States Code
USFWS	United States Fish & Wildlife Service
VRM	Visual Resource Management

Imlay and Sullivan Tank Allotments Grazing Permit Renewal
(DOI-BLM-AZ-A030-2021-0006-EA)

1.0 PURPOSE AND NEED

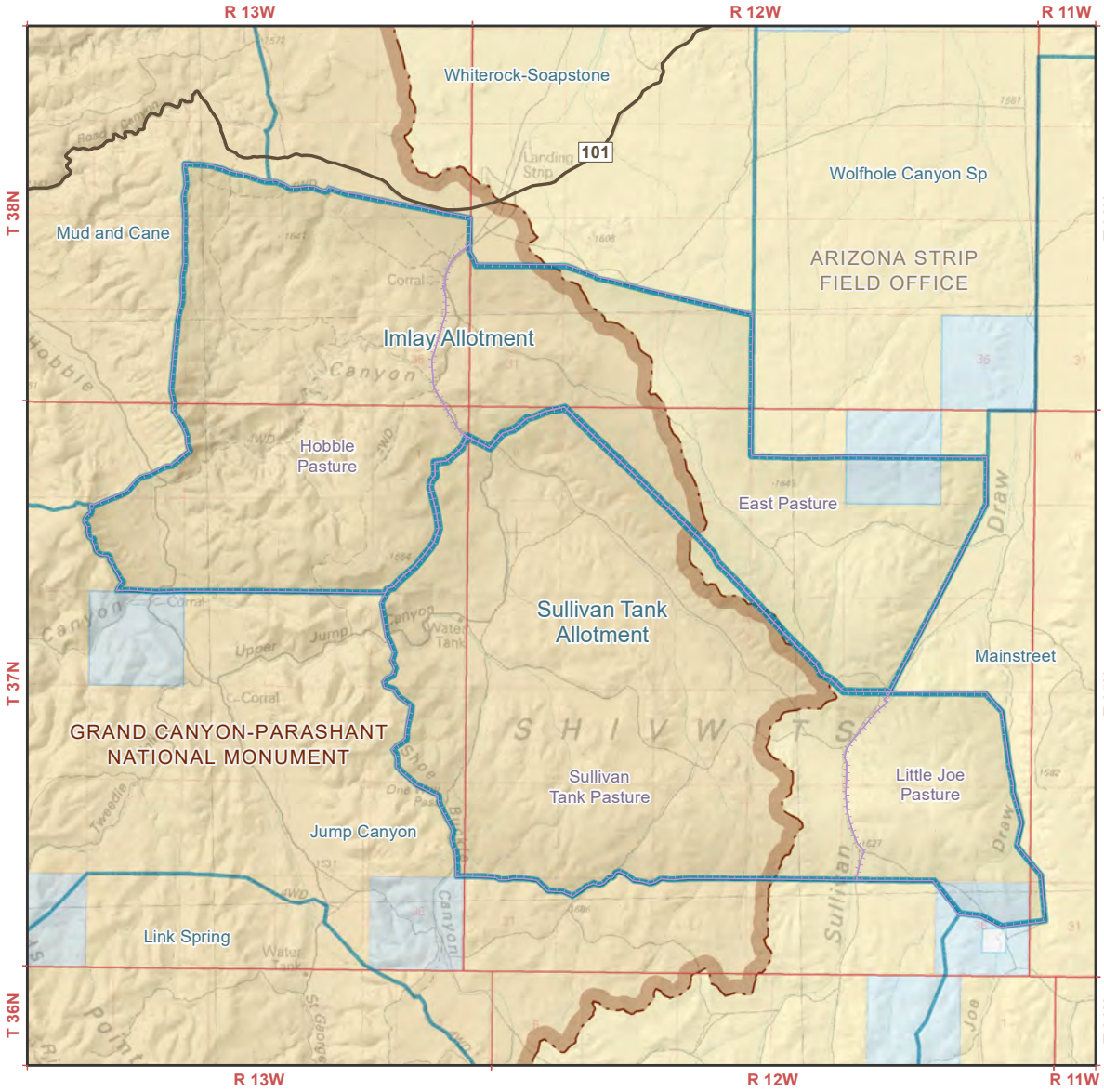
1.1 Introduction and Background

On August 15, 2005, the Bureau of Land Management (BLM), Grand Canyon-Parashant National Monument (GCPNM or Monument) completed an evaluation of rangeland conditions on the Imlay Allotment (AZ04817) and Sullivan Tank Allotment (AZ04816) (see Imlay and Sullivan Tank Allotments Location Map, Figure 1). A detailed discussion on rangeland health for these allotments can be found in Chapter 3, Section 3.2.3. The Interdisciplinary Assessment Team (IAT), during the land health evaluation process, determined that the Imlay Allotment and Sullivan Tank Allotment were making significant progress toward meeting all applicable standards for rangeland health (BLM 2005a). In 2019, an interdisciplinary team re-evaluated the allotment utilizing Interpreting Indicators of Rangeland Health, Version 4 (BLM 2005b), utilization, and trend monitoring data. The team determined that the allotments continue to make progress toward meeting the Arizona BLM Standards for Rangeland Health (Standards for Rangeland Health) (Appendix B).

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental consequences of the proposed grazing permit renewal, as well as alternative livestock management, for the Imlay and Sullivan Tank Allotments. 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, and whether changes to current management are necessary. This EA also serves as a tool to help the authorized officer make an informed decision that is in conformance with the GCPNM Resource Management Plan (RMP) (BLM 2008a). The action culminates an evaluation conducted on the allotments under the Standards for Rangeland Health (Appendix B). This EA analyzes current grazing management practices and assists the decision maker in determining if the action would maintain desirable conditions and continue to allow improvement of public land resources, or if changes in grazing management are necessary.

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, a Decision Record (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 RMP.

Figure 1. Imlay and Sullivan Tank Grazing Allotments Location Map



- Grazing Allotment
- Grazing Pasture within Renewal Allotments
- BLM National Monument
- Township and Range

Surface Management Agency

- Bureau of Land Management
- State
- Private

0 0.5 1 2 3 Miles

0 0.5 1 2 3 Kilometers

Map Produced by BLM Arizona Strip District
Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
Scale: 1:120,000 at 8.5x11 page output
Date: 11/24/2020

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.

1.2 Purpose and Need

A grazing permit renewal application has been received from John Jeffery and Tina B. Esplin, the current permittees, to renew the ten-year grazing permit on the Imlay Allotment (AZ04817) and Sullivan Tank Allotment (AZ04816). The need for the Proposed Action is for the permittees to be able to continue livestock grazing on the allotments through utilization of forage at proper use levels while being in compliance with or making significant progress towards meeting the Standards for Rangeland Health (Appendix B) and the RMP (BLM 2008a).

1.3 Purpose of the Proposed Action

The purpose of this EA is to process the term grazing permit on the Imlay Allotment (AZ04817) and Sullivan Tank Allotment (AZ04816) in accordance with applicable laws, regulations, and policies. Because the grazing permit for the Imlay Allotment and Sullivan Tank Allotment expired on 2/28/2017, the BLM renewed the permit for a ten-year period in the interim with the same terms and conditions pursuant to Section 402(c)(2) of the FLPMA as amended by Public Law No. 113-291, pending compliance with applicable laws and regulations. This action resulted in a new permit being issued while this EA is prepared to process the permit. The purpose of this EA is for an interdisciplinary team to analyze the site-specific environmental impacts of issuing a new livestock grazing permit on resources that may be affected in the Imlay Allotment and Sullivan Tank Allotments. 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; and ensuring that the allotment is achieving or making significant progress toward achievement of Standards for Rangeland Health and RMP objectives.

Livestock grazing is an accepted and valid use of the BLM range management program, as provided for by the TGA, FLPMA, and the Public Rangelands Improvement Act (PRIA), as amended. Regulations controlling livestock grazing on public lands found in 43 CFR 4100.0-2 The objective of these 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".

The BLM and National Park Service (NPS) interdisciplinary team has developed this EA for the purpose of analyzing the potential effects of livestock grazing on resources that may be affected across the allotments described in the Proposed Action. This approach is needed to ensure that management actions on public land conform to the appropriate land use plans, are site specific, and balance uses between different resource values. *The Fundamentals of Rangeland Health (43 CFR 4180) including, watersheds, ecological condition, water quality, and Threatened & Endangered Species habitat have been analyzed.* This assessment was conducted by the IAT which consisted of resource specialists from: BLM, Natural Resource Conservation Service (NRCS), Arizona Game and Fish Department (AGFD), and Mohave County Extension. The IAT was assisted by the Rangeland Resource Team (RRT), a diverse group of local residents formed and appointed under the Resource Advisory Council.

The RRT, IAT, permittees and other interested parties were invited to attend an issue scoping meeting for the Imlay Allotment on January 15, 2003, and a field visit on August 27, 2003. The issue scoping meeting for the Sullivan Tank Allotment was held on March 31, 2004, and a field visit on June 30, 2004. At the conclusion of the field visits, the group determined that the Imlay/Sullivan Tank Allotment Management Plan (AMP) area is making significant progress toward meeting the applicable standards for rangeland health. The Imlay and Sullivan Tank Allotments were combined under one AMP developed in 1988 and revised in 1990 (BLM 1990, BLM 2005a). Therefore, the two allotments were assessed together under the same Grazing Allotment Management Plan Assessment conducted in accordance with directions set forth in the Washington Office Instruction Memorandum No. 98-91 and Arizona State Instruction Memorandum No. 99-012 for implementation of Standards for Rangeland Health and Guidelines for Grazing Administration (Standards and Guides) (BLM 2005a). An allotment assessment report for the Imlay/Sullivan Tank AMP was completed on August 15, 2005 (BLM 2005a).

The GCPNM Manager is the authorized officer responsible for the decisions regarding management of public lands within these 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 will be deemed sufficient and will provide information for the authorized officer 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 will be prescribed for the Imlay Allotment and Sullivan Tank Allotment to ensure management objectives and Standards for Rangeland Health are achieved.

Grand Canyon-Parashant National Monument Proclamation

Proposed actions within the GCPNM are designed to also ensure the long-term protection of a wide variety of biological objects and a long rich human history, as guided by Presidential Proclamation 7265. This presidential proclamation explains that GCPNM was created because of its "outstanding objects of scientific and historic interest." The proclamation also states "shall continue to issue and administer grazing leases". The analysis of impacts to affected resources constitutes the analysis of impacts to Monument objects in this EA.

1.4 Conformance with BLM Land Use Plan(s)

The alternatives described in Chapter 2 of this EA are in conformance and consistent with the GCPNM RMP, approved January 29, 2008 (BLM 2008a). It has also been determined that the alternatives would not conflict with other decisions throughout the plan.

The following management decisions includes Desired Future Conditions (DFC), Management Actions (MA), and Land Use allocations (LA) from Table 2.12 GCPNM RMP regarding management of Livestock Grazing Management (GM), and Vegetation DFC. This list of decisions is not intended to be all inclusive, but a list of the most applicable decisions found in the RMP.

Livestock Grazing

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: On BLM-administered lands, all allotments will continue to be classified as available for grazing by livestock under the principal of multiple use and sustained yield, except where specifically noted.[1]

MA-GM-03: 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 on BLM and NPS-administered lands consistent with the appropriate enabling legislation. These guidelines address management practices at the grazing allotment management (AMP) level and are intended to maintain desirable conditions or improve undesirable rangeland conditions within reasonable time frames.[2]

MA-GM-04: 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 DFC's 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-05: 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 on BLM and NPS-administered lands and Vital Signs standards on NPS-administered lands. Appropriate and timely action will be implemented to deal with those areas not meeting the standards.

MA-GM-06: 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 (C), managed custodially to protect resource conditions and values; Maintain (M), managed to maintain current satisfactory resource conditions and are actively managed to ensure that the condition of resource values do not decline; and Improve (I), actively managed to improve unsatisfactory resource conditions.[3]

MA-GM-08: 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, utilization is set at 45%.

MA-GM-09: Any hay or other feed used in administering the livestock operation will be certified weed free.

[1] No restrictions are associated with the Imlay or Sullivan Tank Allotments.
[2] There are no NPS-administered lands within the Imlay or Sullivan Tank Allotments.
[3] The Imlay Allotment is currently classified as an Improve "I" allotment. The Sullivan Tank Allotment is a Maintain "M" allotment.

1.5 Relationship to Statutes, Regulations, or Other Plans

Numerous federal laws, regulations, and policies guide BLM management activities on public lands, with the most prominent laws being listed in this section. FLPMA (43 United States Code [U.S.C.] 1701), directs the BLM to manage public lands "in a manner that will protect the quality of scientific, scenic, historic, ecological, environmental, air and atmospheric, water resources, and archeological values." The BLM has prepared this EA for the Imlay and Sullivan Tank Allotments Grazing Permit Renewal in compliance with NEPA and FLPMA.

The statutes that govern public land rangeland management are the TGA of June 28, 1934, as amended (43 U.S.C. 315, 315a–315r); section 102 of the FLPMA of 1976 (43 U.S.C. 1740) as amended by the PRIA of 1978 (43 U.S.C. 1901 *et seq.*). The authority for renewing 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 Imlay Allotment and Sullivan Tank Allotment are mainly within the GCPNM (Figure 1). Of the Imlay Allotment about 69% of the allotment falls within the GCPNM and 31% is within the Arizona Strip Field Office (ASFO). On the Sullivan Tank Allotment about 75% is within the GCPNM and 25% is within the ASFO. The GCPNM is responsible for grazing management of both allotments (BLM 2008a). Designation of the Monument did not, in and of itself, require modification of the current grazing practices. The presidential proclamation states that "Laws, regulations, and policies followed by the BLM in issuing and administering grazing leases on all lands under its jurisdiction shall continue to apply…" (BLM 2008a) Under the Antiquities Act, the BLM must protect objects identified in the presidential proclamation that established the national Monument. Therefore, if the BLM determines that any Monument objects are harmed by current management then management (including permit terms and conditions) would be modified accordingly. The analysis of impacts to specific resources constitutes the analysis of impacts to Monument objects in this EA.

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 is consistent with the Fundamentals of Rangeland Health (43 CFR 4180.1) and Standards for Rangeland Health (Appendix B, BLM 1997), 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 for Rangeland Health were incorporated into the GCPNM RMP (BLM 2008a). Standards for Rangeland Health 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 GCPNM. The RMP identified public lands within the Imlay Allotment and Sullivan Tank Allotment as available for domestic livestock grazing (BLM 2008a). Where consistent with the goals and objectives of the RMP and Standards for Rangeland Health, allocation of forage for livestock use and the issuance of grazing permits to qualified applicants are provided for by the TGA and FLPMA.

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)).

Executive Order 13186 requires the BLM and other Federal agencies to work with the U.S. Fish and Wildlife Service (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 allotments. No take of any such species is anticipated**.**

The subject allotments are in Mohave County, Arizona. The Proposed Action is consistent with the Mohave County General Plan (revised most recently on September 15, 2015). While livestock grazing is not specifically addressed in the Mohave County General Plan, this action does not conflict with decisions contained within the Plan.

In addition, the Proposed Action and the alternatives would comply with the following laws and/or agency regulations, other plans and is consistent with applicable Federal and state laws, regulations, and plans to the maximum extent possible.

- The Antiquities Act of 1906
- Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755), as amended
- Taylor Grazing Act of 1934 (43 U.S.C. 315)
- The National Historic Preservation Act of 1966, as amended
- National Environmental Policy Act of 1969 (42 United States Code (USC) 4321 et seq)
- Clean Air Act of 1970 (42 U.S.C. 7401 et seq.)
- Endangered Species Act of 1973, as amended
- Federal Land Policy and Management Act of 1976 (43 [USC] 1707 et seq.)
- Public Rangelands Improvement Act of 1978 (43 U.S.C. 1901)
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001–3013; 104 Stat. 3048-3058)
- Arizona Water Quality Standards, Revised Statute Title 49, Chapter II

1.6 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. The RRT, IAT, permittees and other interested parties were invited to attend a scoping meeting for the Imlay Allotment on January 15, 2003, and a field visit on August 27, 2003. The scoping meeting for the Sullivan Tank Allotment was held on March 31, 2004, and a field visit on June 30, 2004. At the conclusion of the field visits, the group determined that the Imlay/Sullivan Tank AMP area is making significant progress toward meeting the applicable standards for rangeland health. Issues identified during the scoping process can be seen in the Standards for Rangeland Health and Guidelines for Grazing Administration Implementation Project: Allotment Assessment for Imlay/Sullivan Tank AMP (BLM 2005a). The allotments were revisited by an interdisciplinary team of resource specialists and the permittees in 2019 to update the assessment. Input from the BLM and NPS interdisciplinary team (IDT) can be found in Table 3.2 Elements/Resources of the Human Environment.

The issues identified through the scoping and IDT process are listed below:

- Livestock Grazing
- Vegetation, including Invasive, Non-Native Plant Species
- Wildlife

CHAPTER 2

2.0 DESCRIPTION OF ALTERNATIVES

2.1 Introduction

NEPA and its implementing regulations require that an agency rigorously explore and objectively evaluate a reasonable range of alternatives. Reasonable alternatives are those that meet the purpose of and need for action and that are feasible to implement, taking into consideration regulatory, technical, economic, environmental, and other factors. This EA focuses on the Proposed Action, No Action, and No Grazing Alternatives. The No Action Alternative is considered and analyzed to provide a baseline for comparing the impacts of the Proposed Action.

The grazing permittees submitted an application to renew the ten-year grazing permit with proposed changes. The BLM interdisciplinary team (IDT) 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 allotment is achieving (or progressing toward meeting) rangeland health standards – would be met. This EA analyzes three alternatives:

Alternative A (Proposed Action) - Combine allotments, change the season of use, and add horses.

Alternative B (No Action) – Permit renewal with no changes.

Alternative C (No Grazing).

2.2 Alternative A – Proposed Action. Combine Allotments, Change Season of Use, & Add Horses

The Proposed Action was developed in cooperation with the grazing permittees.

The Proposed Action is to renew the existing grazing permit for the Imlay Allotment and Sullivan Tank Allotment for a period of ten years. There would be no proposed change in the total number of AUMs [4] limited to the current active preference and suspended AUMs (Table 2.1). Proposed changes would combine the Imlay Allotment and Sullivan Tank Allotment into one allotment called Imlay and Sullivan Tank Allotment with four fenced pastures. Keeping the current Imlay Allotment number AZ04817 for the new combined allotment.

Under this alternative, the AUMs for each allotment would be combined (see Table 2.1). The current season of use for the Imlay Allotment is 10/1-5/31 and the Sullivan Tank Allotment is 10/16 - 6/15. The proposed season of use would extend the season for the proposed combined

[4] 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.

allotment. Taking the earliest date of 10/1 for the Imlay Allotment and the latest date of 6/15 for the Sullivan Tank Allotment. This would not increase total AUMs.

The Proposed Action includes allowing up to eight horses during the proposed season of use. Currently, horses are not authorized on either allotment. Horses would be rotated through the pastures with the cattle. When horses are grazed then a corresponding reduction in the number of cattle grazed would be made (See Table 2.1 for distribution of AUMs between livestock).

Table 2.1. Proposed Action – Combine Imlay & Sullivan Tank Allotments, Change Season of Use, and Add Horses.

Allotment Number	Allotment Name	Livestock Kind	Livestock Number	Season of Use	Percent Public Land[1]	Active AUMs	Suspended AUMs
AZ04817	Imlay & Sullivan Tank	Cattle	136	10/1 – 6/15	97%	1119	1164
AZ04817	Imlay & Sullivan Tank	Cattle	1	10/1 – 2/28	97%	5	0
AZ04817	Imlay & Sullivan Tank	Horses	8	10/1 – 6/15	97%	66	0
Total AUMs						1190	1164

[1]Percent public land is based on AUMs.

Combining the two allotments into one allotment would require the calculation of the percent public land for the combined allotment. The percent public land is based on AUMs on public land within each allotment. See Table 2.2 below, the Imlay Allotment currently has 95% public land, and the Sullivan Tank Allotment has 100% public land. Combining the two allotments would result in the new allotment having 97% public land see Table 2.1 above.

Allotment Management Status Category

The Imlay Allotment is currently an Improve "I" allotment. The Sullivan Tank Allotment is a Maintain "M" allotment. Combining the two allotments would put the management status to an Improve "I" for the combined allotment. For more information on management status categories see Section 3.4.1.

2.2.1 Grazing System

Within the combined allotment there would be four fenced pastures (Figure 1). Pasture movements would be based on reaching utilization levels and based on water availability. Utilization of key forage species would be limited to an average of 50 percent of the current year's growth. Livestock would start in the fall in the Sullivan Tank Pasture, the largest pasture, then in January, livestock would be moved to the Imlay-Hobble Pasture, in April livestock would be moved to Imlay-East Pasture. The Little Joe Pasture is the fourth pasture and is the smallest, it has not been used every year. When it is used, it is utilized as a holding pasture for bulls which would continue under this alternative. When 50 percent forage utilization is reached, livestock

would be moved to another pasture or off the allotment completely. The order of pasture rotation may change from year to year depending on forage conditions. The entire allotment would be rested from 6/16 – 9/30 every year to provide summer/early fall growing season rest.

In addition to the "Mandatory Terms and Conditions" and standard language on the last page of the grazing permit, the following terms and conditions would be added to the "Other Terms and Conditions" section on the new grazing permit for the Imlay and Sullivan Tank Allotment.

Other Terms and Conditions:

- Allowable use on key forage species is 50% on allotments with rotational grazing systems. When 50% forage utilization is reached, livestock will be moved to another pasture or off the allotment completely.

- Use of nutritional livestock supplements is allowed, including protein, minerals, and salt. However, any supplements used must be dispersed a minimum of ¼ mile from any known water sources, riparian areas, populations of special status plant species, winterfat dominated sites, and cultural or any other sensitive sites.

- The permittee would be allowed to use an actual use billing system. This privilege may be revoked, and the permittee placed on advanced billing if payment of bills and/or actual use reports are late. An actual use grazing report (Form 4130-5) must be submitted within 15 days after completing annual grazing use.

2.3 Alternative B – No Action. Permit Renewal with No Changes

The BLM would renew the existing grazing permit for the Imlay Allotment and Sullivan Tank Allotment for a period of ten years with no changes. There would be no proposed change in kind or number of livestock, or season of use for either allotment. The Imlay Allotment and Sullivan Tank Allotments would remain two separate allotments (Chapter 1, Figure 1). Livestock grazing would occur during the current season of use for each allotment, and with the number of AUM limited to the current active preference (Table 2.2). There would be no horses authorized to graze the allotment.

Table 2.2. Alternative B – Permit Renewal with No Changes

Allotment Numbers	Allotment Name	Livestock Kind	Livestock Number	Season of Use	Percent Public Land[5]	Active AUMs	Suspended AUMs
AZ04817	Imlay	Cattle	97	10/1 – 5/31	95%	734	646
AZ04816	Sullivan Tank	Cattle	57	10/16 – 6/15	100%	456	518
Total AUMs						1190	1164

[1]Percent public land is based on AUMs.

2.3.1 Grazing System

Currently, the two allotments are on the same grazing authorization. Each allotment has a different season of use. The Imlay Allotment current season of use is 10/1 – 5/31, the Sullivan Tank Allotment current season of use is 10/16 – 6/15, (Table 2.2). The allotments are adjacent to each other, and livestock are moved between the allotments through the different pastures. An AMP was initially developed in 1988 for the Imlay Allotment and was revised in 1990 when the Sullivan Tank Allotment was added (BLM 1990, BLM 2005a).

Each allotment has two fenced pastures (Chapter 1, Figure 1). The Imlay Allotment has the Imlay-Hobble Pasture and the Imlay-East Pasture. The Sullivan Tank Allotment has the Sullivan Tank Pasture and the Little Joe Pasture. Livestock start grazing in the fall in the Sullivan Tank Pasture, the largest pasture, in January livestock are moved to the Imlay-Hobble Pasture, then in April the livestock are moved to Imlay-East Pasture. The Little Joe Pasture is the fourth pasture and is the smallest, it has not been used every year. When it is used, it is utilized as a holding pasture for bulls. Pasture movements would be made based on reaching utilization levels of no more than 50 percent and on water availability. Utilization of key forage species would be limited to an average of 50 percent of the current year's growth. When 50 percent forage utilization is reached, livestock would move to another pasture or off the allotment completely. The order of pasture rotation may change from year to year. The Imlay Allotment is rested from grazing from 6/1 – 9/30 each year. While the Sullivan Tank Allotment is rested from grazing from 6/16 – 10/15 each year. This provides summer/early fall growing season rest, trampling, and planting of disseminated seed, seedling establishment, vigorous plant communities, and livestock production.

In addition to the "Mandatory Terms and Conditions" and standard language on the last page of the grazing permit, the following terms and conditions "Other Terms and Conditions" are on the current grazing permit for the Imlay Allotment and Sullivan Tank Allotment authorization.

Other Terms and Conditions – on the current permit:

- Grazing use will be in accordance with the Sullivan Tank/Imlay Allotment Management Plan (AMP) developed in 1988; and revised 1990.

- The season of use for the Imlay Allotment will be from October 1 thru June 15. Livestock may be moved into or out of the allotment 7 days after scheduled move dates outlined in the AMP, but not before October 1 or later than June 15.

- Billing for grazing use will be based on the actual use report, which is due on or before July 1 each year.

- Associated maintenance of facilities and improvements relevant to the grazing operation will be required and authorized.

- Desired Plant Community (DPC) and vegetation cover objectives as listed in the Standards & Guidelines (S & G) assessment will be monitored to determine trends. Monitoring utilization of upland key forage plant species over time on the allotment to ensure average utilization of key herbaceous forage species does not exceed 50%.

2.4 Monitoring and Adaptive Management

Both the No Action and the Proposed Action Alternatives include adaptive management, which provides options for management that may be needed to adjust decisions and actions to meet desired conditions as determined through monitoring. The BLM resource specialists would periodically monitor the allotment over the ten-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. If monitoring indicates that desired conditions are not being achieved and current livestock grazing practices are causing non-attainment of resource objectives, livestock management of the allotment would be modified in cooperation with the permittee(s).

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. An example of a situation that could call for adaptive management adjustments is drought conditions. 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.

2.5 Alternative C – No Grazing

Alternative C is to reissue a ten-year term grazing permit on the Imlay and Sullivan Tank Allotments with zero authorized AUMs for active preference – all AUMs would be suspended (i.e., livestock grazing would be deferred for the ten-year permit period). In ten years, the allotments would be re-evaluated. No new range improvement projects would be constructed, and no modifications would be made to existing projects.

CHAPTER 3

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

The purpose of this chapter is to describe the existing environment potentially affected by one of the alternatives to assist the reader in understanding the existing situation. An interdisciplinary team of resource specialists considered and analyzed the affected environment of this EA. Table 3.2 addresses the elements and resources of concern considered in the development of this EA; this table indicates whether the element or 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 identified and discussed in Section 3.4 include the relevant physical, social, and biological conditions that may be impacted with implementation of one of the alternatives and provides the baseline for comparing impacts described in Chapter 4.

3.2 General Setting

The Imlay and Sullivan Tank Allotments are located in northwestern Arizona approximately 30 miles south of St. George, Utah (Chapter 1, Figure 1). They are situated primarily within the GCPNM along the northeastern boundary and a small portion of the Arizona Strip Field Office (ASFO). Of the Imlay Allotment about 69% of the allotment falls within the GCPNM and 31% is within the ASFO. On the Sullivan Tank Allotment about 75% is within the GCPNM and 25% is within the ASFO. Both allotments are administered by GCPNM (BLM 2008a).

Imlay Allotment
Gila & Salt River Meridian, Mohave County, Arizona.
T. 37 N., R. 12 W.,
Sections: 1 thru 6, 9 thru 12, 14, and 15;
T. 37 N., R. 13 W.,
Sections: 1 thru 4, 8 thru 12;
T. 38 N., R. 12 W.,
Sections: 28 thru 33;
T. 38 N., R. 13 W.,
Sections: 21 thru 28, 33 thru 36.

Sullivan Tank Allotment
Gila & Salt River Meridian, Mohave County, Arizona.
T. 37 N., R. 11 W.,
Sections: 30 and 31;
T. 37 N., T. 12 W.,
Sections: 5 thru 9, 15 thru 33 and 36;
T. 37 N., R. 13 W.,
Sections: 1, 12, 13, 25 and 34.

3.2.1 Topography

The major topographic features within the allotments are Hobble Canyon, Sullivan Draw, and Shoebuckle Canyon. The allotments are made up of rolling hills of juniper trees and cliffrose with sagebrush draws. The allotment slopes slightly to the west and into Hobble Canyon. The elevation ranges from 4,400 feet in the western half near Black Knoll Pond to 6,000 feet in the southeastern part (BLM 2005a).

3.2.2 Climate

The project area falls mainly in the 12 – 14-inch precipitation zone with most precipitation occurring during the winter (38 – 40%), see Table 3.1 below. Precipitation generally comes as snow from December through February. Summer rains fall from June through September in most years, see Appendix E for the complete historic precipitation reports for the Mud Mountain (Appendix E, Table E.1) and Sullivan Tank (Table E.2) precipitation gauges. Temperatures average 15 - 20 °F in the winter, with summer temperatures ranging from 95 – 100 °F.

The Mud Mountain rain gauge (Appendix E, Table E.1) has been read from 1978 to 2020 and is located approximately three miles west of the project are in the nearby Mud and Cane Allotment at about 4140 ft. elevation. Over the last ten years (2010 – 2020) precipitation was below 90% of the long-term average for one of the last ten years and at or above normal for the remaining years. The highest precipitation received in the ten- year period was 20.75” or 150% in 2011 and the lowest was 11.50” or 83% in 2018. It should be noted that departures from normal are not unusual (Doswell 1997), and precipitation may be well above or well below the seasonal average (National Drought Mitigation Center 2015).

The Sullivan Tank rain gauge (Appendix E, Table E.2) has been read from 1978 to 2020 and is located in the eastern part of the Sullivan Tank Allotment on the fence line between the Sullivan Tank and Imlay Allotments, near the Sullivan Reservoir in Sullivan Draw, at about 5280 ft elevation. Over the last ten years (2009 – 2019), precipitation was below normal for two years. The other eight years were at or above normal. The highest precipitation during the last ten years was 15.25” or 124% in 2013 and the lowest was 7.50” or 61% in 2009. Data for 2020 is not complete, the fall 2020 reading was missing so no percent of normal was calculated for that year.

Table 3.1 Annual Precipitation Rates for Sullivan Tank and Imlay Allotment

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
Mud Mountain	14%	1.97	40%	5.57	18%	2.43	28%	3.85	13.83
Sullivan Tank	14%	1.66	38%	4.69	18%	2.18	30%	3.74	12.27

All precipitation readings are in inches.

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 Federal agencies to develop and maintain inventories of range conditions and trends on public rangelands and update inventories on a regular basis.

The BLM conducted field evaluations of rangeland health conditions on the Imlay Allotment in 2003 and Sullivan Tank Allotment in 2004. The Imlay and Sullivan Tank Allotments were combined under one allotment management plan (AMP) in 1990. Therefore, both allotments were addressed with one assessment. A Rangeland Health Assessment for the Imlay and Sullivan Tank Allotments was completed and signed in 2005 (BLM 2005a). Both allotments were making significant progress toward meeting the applicable standards for rangeland health. Both allotments were meeting Standard 1 – Upland Sites. There are no riparian-wetland sites (Standard 2) in either allotment. Under Standard 3 – Desired Resource Conditions, it was determined that desirable conditions were not met or were partially met at many sites due to previous land treatments, wildfire, drought, and sagebrush and pinyon-juniper encroachment. Although many DPC objectives were not met or were partially met, significant progress was being made toward achievement under the current livestock management. Livestock management was not the reason for not meeting all standards (BLM 2005a).

The allotments were revisited by an interdisciplinary team of resource specialists and the permittees in 2019 to update the assessment. That information combined with recent monitoring data shows that both allotments continue to make significant progress toward meeting the applicable standards for rangeland health (see Appendix C and D for monitoring data for each allotment). Both allotments continue to meet Standard 1 – Upland Sites. Both allotments continue to partially meet DPC objectives for the same reasons as stated above (Section 3.4.2.3 Desired Plant Community Objectives). Recovery continues to be slow from previous land treatments, wildfire, and drought. There have been additional wildfires since 2005 (see Section 3.4.2.2 Wildfire History, Tables 3.8 – 3.9) in both allotments that continue to slow progress toward recovery and meeting Standard 3 objectives at some key areas (Section 3.4.2.3 Desired Plant Community Objectives). There continues to be a need for vegetation treatments to address both sagebrush and pinion-juniper encroachment. Both evaluations were made in accordance with the applicable Standards for Rangeland Health (Appendix B).

Attempting to monitor 100% of any given rangeland is not always practical. Instead, representative study sites are selected based on their ability to predict 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 (Appendix A, Figure 2). Existing trend studies, ecological condition data, actual use, and utilization studies for the allotment was analyzed (see Section 3.4.1). The trend identified in the rangeland health assessment survey assessed erosion status, vegetative cover, vigor, species diversity, and location of the most palatable plants in relation to access to a grazing animal. Much of this is discussed in detail in Section 3.4.2, the Vegetation and Invasive, Non-Native Species section of Chapter 3, and data

used for summary and analysis found in Appendix C (Imlay Allotment monitoring) and Appendix D (Sullivan Tank Allotment monitoring).

The rangeland health assessments confirmed that the allotments were making significant progress toward meeting the applicable standards for rangeland health in 2005 and continues to make significant progress toward meeting standards in 2019.

3.3 Elements of 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 potentially be 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 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.

Table 3.2 Elements/Resources of the Human Environment
NP = not present in the area impacted by any of the alternative
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 (including Greenhouse Gas Emissions)	NI	The Imlay and Sullivan Tank 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. Although livestock congregating at waters can create fugitive dust, this dust creation is very localized and temporary. Thus, none of the alternatives would cause Class II standards to be exceeded. The alternatives would therefore not measurably impact air quality. Cattle grazing on public land (and elsewhere) eat vegetation that potentially stores carbon, and cattle do generate methane. In addition, livestock operations have the potential to generate 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 climate change as the amounts involved are well within margin of error in most current climate change models. 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. Given the minute proportions involved, 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	After review of GIS and the GCPNM RMP 2008, there are no Areas of Critical Environmental Concern within the Imlay and Sullivan Tank Allotments.
BLM or State Sensitive Plant Species	NI	While Utah agave (AZ Salvage restricted) is present within the project area, potentially changing the season of use and/or adding horses would not create or alter the negligible impact grazing would have on a plant that livestock do not find palatable.
Cultural Resources	NI	The proposed alternatives would have no adverse effect on cultural properties eligible for the National Register. No range improvements or other ground-disturbing activities are proposed. Impacts from cattle grazing can occur in areas of high cattle concentration or from rubbing against rock art panels and historic structures-none of which are known within the allotment.
Environmental Justice	NI	Minority, low-income populations, and disadvantaged groups may be present within the county and may use public lands within and around the Allotments. The alternatives would not cause any disproportionately high and adverse effects on minority or low-income populations, individually or collectively because there are no exposure pathways by which any population would come into contact to environmental or health hazards with chemical, biological, physical, or radiological effects.
Farmlands (Prime or Unique)	NP	Prime farmland is described as farmland with resources available to sustain high levels of production. In the southwest, it normally requires irrigation to make prime farmland. In general, prime farmland has a dependable water supply, a favorable temperature and growing season, acceptable levels of acidity or alkalinity, an acceptable content of salt and sodium, and few or

		no rocks. Based on these definitions, no prime or unique farmlands exist within the Allotments or anywhere within the Arizona Strip District, including GCPNM.
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. Continued properly managed livestock grazing use would not affect the function of the floodplains within the allotments.
Fuels / Fire Management	NI	There are no Fire Management/Fuels issues in the project area. Grazing actually reduces the fine fuel loading, which is the primary source for Fire spread, measured in Rate of Spread (ROS).
Geology / Mineral Resources / Energy Production	NI	Review of geologic minerals and potential energy productions via GIS and on foot recognizance reveal, several underlying "lenses" of gypsum deposits, a common occurrence in the Kaibab limestone formation which makes up the bulk of the project area. The Proposed Action would not have any impacts on these mineral deposits nor create additional obstacles to retrieve these minerals in the future. Energy production potential would remain unimpacted for future possibilities.
Invasive, Non-native Species	PI	Scotch Thistle, a noxious weed, is known to both the Imlay and Sullivan Tank Allotments. Scotch thistle is treated on a regular basis utilizing integrated weed management. Cheatgrass, an invasive plant, is present on the allotments. Cheatgrass is not on the Arizona Noxious Weed list, however it is a very invasive non-native annual grass species. Cheatgrass is ubiquitous and is only treated on a site-specific limited basis. Invasive plant treatments will occur, as necessary. This resource is further addressed in the Vegetation including Invasive, Non-native Plant Species sections in Chapters 3 and 4.
Lands / Access	NI	Access to public lands would not be altered or impaired by implementation of the alternatives. No other land issues have been identified in connection with the alternatives after reviewing the existing lands and realty information.
Lands with Wilderness characteristics	NI	The majority of the Imlay and Sullivan Tank Allotments have lands that meet criteria for wilderness characteristics of naturalness, opportunities for solitude, and opportunities for primitive and unconfined recreation that are managed to maintain these characteristics. Continued livestock grazing is not inconsistent with preserving these characteristics.

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.
Native American Religious Concerns	NI	The Proposed Action is not known to limit access to or ceremonial use of known American Indian sacred sites. As such, there would be no adverse impact.
Paleontology	NI	Recent paleontological inventories have documented abundant fossiliferous beds within the Harrisburg member of the Kaibab limestone formation, the dominate geologic strata in the proposed area. The Proposed Action would not damage these invertebrate fossils, nor create obstacles to access these paleontological sites.
Recreation	NI	The Imlay and Sullivan Tank Allotments are within the Shivwits Frontier Recreation Management Zone. The allotments have values for extreme, world class, deep wildlands exploration in remote and rugged Grand Canyon country. Visitors to the allotment 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. The alternatives are not expected to impact the availability of recreational opportunities within the project area.
Socio-economic Values	NI	The economic base of the Arizona Strip District including GCPNM is mainly ranching with a few gypsum/selenite and uranium mines (mining is outside GCPNM). 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 a historical and traditional use of the land to be maintained. The 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. Quantifiable additional or decreased economic impact to the local area would not be affected by any of the alternatives.
Soil Resources	NI	Recent on-site self-evaluation of soils in the proposed project area confirm the descriptions of the soil horizons, resistance to erosion, and

		compositions of topsoils. The Proposed Actions would not create additional impact from the ongoing current actions, as the current disturbed soils - due to repeated animal use and cattle operations - would not deviate/expand from their current vicinities. The Proposed Action would confine activities to already disturbed soils. Given this, the Proposed Action would not impact overall soil compaction, nor degrade soil retention, nor create new erosional features. The Proposed Action would be confined to prior disturbed areas, of which these areas comprise a minute portion of the Proposed Action project area.
Threatened, Endangered or Candidate Plant Species	NP	No Threatened, Endangered or Candidate Plant Species are known to occur within the project area according to USFWS as of December 1, 2020.
Threatened, Endangered or Candidate Animal Species	NI	The California condor is the only known federally listed animal species that may occur within this allotment – condors may occasionally fly over or feed in this allotment 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. 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 allotment, they have not been observed doing so. There is no evidence that rangeland health on this allotment is limiting or restricting condor population growth. Thus, no effect to this species is expected from any of the alternatives.
Vegetation	PI	Grazing has a direct impact on vegetation resulting from livestock eating and trampling plants within the allotments. This issue is therefore analyzed in detail later in the EA.
Visual Resources	NI	The Imlay and Sullivan Tank Allotments are designated as both VRM Class II and Class III. The objective for Class II is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form,

		line, color, and texture found in the predominant natural features of the characteristic landscape. 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. Continuing livestock grazing as proposed would not affect visual resources because no new range improvements are proposed, so the existing character of the landscape would not change.
Wastes (hazardous or solid)	NP	No known hazardous or solid waste issues occur in the allotment, and the alternatives would not produce hazardous or solid waste. While motorized vehicles (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	Water quality in both the surface water recharge as well as the underlying aquifer would have no discernable impacts given the Proposed Actions. Floodplains and natural drainages would be unimpeded allowing for no disruption in the current topographical drainage. Soil surfaces would still maintain their current porosity and provide recharge to the primary aquifer. Water chemistry would be unaltered given that no soluble substances would be introduced by the Proposed Action.
Wetlands / Riparian Zones	NP	A review of GIS shows no springs or spring developments in either allotment. There are no classified wetland or riparian zones within either allotment.
Wild and Scenic Rivers	NP	A review of GIS shows that 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.

Wilderness	NP	After review of GIS and the GCPNM RMP 2008, there is no designated wilderness within these allotments.
Wild Horses and Burros	NP	There are no wild horses or burros, or herd management areas, within or adjacent to the Imlay and Sullivan Tank Allotments (BLM 2008a) following a review of GIS and the RMP.
Wildlife (including sensitive species and migratory birds)	PI	Grazing has a direct impact on wildlife habitat resulting from livestock eating and trampling plants within the allotment. This issue is therefore analyzed in detail later in this EA.
Woodland / Forestry	NI	Pinyon/juniper woodlands occur on the allotments but are not largely impacted by livestock grazing based on the lack of regular use. No forestry (timber) resources occur on this allotment.

3.4 Resources Brought Forward for Analysis

3.4.1 Livestock Grazing

The analysis area for livestock grazing is the Imlay and Sullivan Tank Allotments (Chapter1, Figure 1).

A grazing permit is issued for livestock forage produced annually on public lands and is allotted on an AUM basis. The BLM does not control adjacent private lands owned by the permit holders. 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 the affected permittee to identify and prescribe actions to be taken that would return the allotment to compliance.

The Imlay Allotment is currently categorized as a Management Status "Improve" (I) allotment. The GCPNM RMP (BLM 2008a) defines improve allotments as those in which:

a. Present range condition is unsatisfactory.
b. Allotment has high to moderate resource production potential and is producing at low to moderate levels.
c. Serious resource-use conflicts/controversy exists.
d. Opportunities exist for positive economic return from public investments.
e. Present management appears unsatisfactory.
f. Other criteria appropriate to the Environmental Statement area.

The Sullivan Tank Allotment is current categorized as an "Maintain" (M) allotment (BLM 2008a).

a. Present range condition is satisfactory.

b. Allotments have high or moderate resource potential and are producing near their potential (or trend is moving in the direction.)
c. No serious resource-use conflicts/controversy exist.
d. Opportunities may exist for positive economic return from public investments.
e. Present management is satisfactory.
f. Other criteria appropriate to the Environmental Statement area.

Land ownership in the Imlay Allotment consists primarily of federal land with some State land included (see Table 3.3) (Appendix A, Figure 2). Active grazing preference is 734 AUMs, with 646 suspended AUMs (see Section 2.3, Table 2.2). Land ownership in the Sullivan Tank Allotment is mostly federal land with some private land included (see Table 3.3). Active grazing preference is 456 AUMs, 518 suspended AUMs (Section 2.3, Table 2.2). The current grazing system is described in Section 2.3.1 Alternative B – No Action. Each allotment has two fenced pastures. Livestock are moved through three pastures, the fourth is not used every year but is used to keep bulls from the herd during non-breeding times.

Table 3.3 Land Ownership (from Rangeland Administration System (RAS) database*)

Ownership	Imlay Allotment	Sullivan Tank Allotment
Federal	15,736	13,811
State	324	0
Private	0	237
Total	16,060	14,048

*data analysis is primarily conducted utilizing Global Information System (GIS).
There is sometimes a slight discrepancy in the GIS acreage totals when compared to RAS.
The BLM is in the process of addressing and resolving these discrepancies.

Actual Use

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, and billing for grazing on public lands. The actual use within the Imlay Allotment has ranged from 65 – 90% of permitted use in the past decade (2010 – 2020) with an average for that period of 78%. Actual use for the Sullivan Tank Allotment ranged from 32 – 81% of permitted use during 2010 – 2020 with an average for that period of 66%. Non-use may reflect seasonally dry periods, drought years, or annual operation fluctuations. Actual use tables can be found in Appendix C Table C.1 Imlay Allotment Actual Use and Appendix D Table D.1 Sullivan Tank Actual Use.

Utilization

Utilization is defined as the proportion of the current year's forage production that is consumed or removed by grazing animals (both livestock and wildlife). The Grazed-Class Method was used to collect the data (Section 4.4 Monitoring) at four key areas in each allotment (See Appendix A. Figure 2). Average utilization levels of key forage species for these allotments should not exceed 50% (BLM 2008a). Utilization and compliance checks are conducted throughout the grazing season. Average utilization for the Imlay Allotment (1991 – 2020) ranges from no use to 42%. Utilization data by key area and year is available in Appendix C –

Utilization Tables C.2 – C.5 for the Imlay Allotment. Appendix D – Utilization Tables D.2 – D.5 shows utilization from 1991 - 2020 for the Sullivan Tank Allotment. Average utilization ranges from no use to 24%. Average utilization did not exceed 50% on any of the key areas in either allotment from 1991 to 2020.

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.

Trend monitoring was conducted at four key areas in each allotment. Data was collected using the Pace-Frequency method (Section 4.4 Monitoring). This method of monitoring measures the percent of bare ground, litter, rock, and live vegetation/basal cover. In addition, it measures the occurrence frequency of plant species. There are two pastures within the Imlay Allotment, the Imlay-East Pasture and the Imlay-Hobble Pasture. There are two key areas in each pasture (See Appendix A. Figure 2). There are two pastures in the Sullivan Tank Allotment, the Sullivan Tank and the Little Joe Pasture. Key areas are in the Little Joe Draw, Sullivan Draw, Post Office, and Cox Pond areas within the allotment. There is one key area in the Little Joe Pasture, the smallest pasture, and the other three key areas are in the Sullivan Tank Pasture.

The trend index, which combines percent frequency of key forage species, percent litter, and percent live vegetation (basal cover) into one numerical value. Three trend studies for the Imlay Allotment were established in 1982. A fourth study was established in 2019. See Table 3.4 Imlay Allotment Updated Rangeland Health Data Summary for the overall trend at each key area. The overall trend for Key Area #1 is static, for Key Areas #2 and #3 is upward. Key Area #4 was established and read in 2019 and has been read once so there is no trend to date. Trend is determined by comparing two or more readings over time. Typically, trend studies are read every 5 years, see 4.4 Monitoring for more information on monitoring methods. Trend data tables and overall trend tables for the Imlay Allotment can be seen at Appendix C, Tables C.6 – C.13. The four trend studies for the Sullivan Tank Allotment were established in 1981. See Table 3.5 Sullivan Tank Allotment Updated Rangeland Health Data Summary. Overall trend for all four key areas is upward. Trend data tables and overall trend tables for the Sullivan Tank Allotment can be seen Appendix D, Tables D.6 – D.13.

Ecological Site Inventory

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 Natural Resources Conservation Service.

Determination of seral stage is based on the composition of a site. The concept of seral stage is based on the concept of succession or movement of an ecological site towards a climax plant community or potential natural community (PNC). Succession continues until an event such as a major disturbance including fire, overgrazing, and other natural or manmade disturbances sets the site back to an earlier sere or state. 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 four key areas in each allotment have been classified as to seral stage based on plant composition when compared to the site potential (Appendix A, Figure 2). Site potential is based on soils, elevation, climate, etc. See Table 3.4 for the Ecological Site and Ecological Condition for each of the four key areas in the Imlay Allotment. Key Areas #1 and #3 are early seral and Key Areas #2 and #4 are in mid-seral ecological condition. Table 3.5 shows the Ecological Site and Ecological Condition for the four key areas in the Sullivan Tank Allotment. Key Areas #1, #2, and #4 are in Mid-seral ecological condition. Key Area #3 is in early seral. Appendix C Tables C.14 – C.17 Ecological Site Inventory and Ecological Condition data for the Imlay Allotment and Appendix D Tables D.14 – D.17 data for the Sullivan Tank Allotment.

Table 3.4 Imlay Allotment Updated Rangeland Health Data Summary

Key Area	Ecological Site	Ecological Condition	Overall Trend
Imlay Key Area #1 (Imlay-East Pasture)	Loamy Upland 10 -14" p.z. (R035XC313AZ)	Early Seral	Static
Imlay Key Area #2 – Middle (Imlay-Hobble Pasture)	Limestone / Sandstone Upland 10 – 14" p.z. (R035XC319AZ)	Mid-Seral	Upward
Imlay Key Area #3 - West (Imlay-Hobble Pasture)	Shallow Upland 10 – 14" p.z. Warm (R035XC331AZ)	Early Seral	Upward
Imlay Key Area #4 (Imlay-East Pasture)	Limestone / Sandstone Upland 10 – 14" p.z. (R035XC319AZ)	Mid-Seral	No Trend*

*There has only been one reading so there is no trend for Key Area # 4. Key Area # 4 was established in 2019. Based on the most recent monitoring data collected in 2019.

Table 3.5 Sullivan Tank Allotment Updated Rangeland Health Data Summary

Key Area	Ecological Site	Ecological Condition	Overall Trend
Sullivan Tank Key Area # 1 Little Joe Draw (Little Joe Pasture)	Loamy Upland 10 – 14" precipitation zone (p.z.) (R035XC313AZ)	Mid-Seral	Upward
Sullivan Tank Key Area # 2 Sullivan Draw (Sullivan Tank Pasture)	Loamy Upland 10 - 14" p.z. (R035XC313AZ)	Mid-Seral	Upward
Sullivan Tank Key Area # 3 Post Office (Sullivan Tank Pasture)	Sedimentary Cliffs 10 – 14" p.z. (R035XC302AZ)	Early Seral	Upward

Sullivan Tank Key Area # 4 Cox Pond (Sullivan Tank Pasture)	Limestone / Sandstone Upland 10 – 14" p.z. (R035XC319AZ)	Mid-Seral	Upward

Based on the most recent monitoring data collected in 2019.

The Desired Plant Community (DPC) is covered in Section 3.4.2.3 later in this chapter. The DPC are management objectives that have been proposed in the RMP to manage for a variety of seral stages rather than just Late Seral or PNC. These objectives include increased diversity, provide forage for various wildlife and livestock, and even aesthetics.

3.4.1.1 Range Improvements

Both allotments contain a number of existing structural range improvements as shown in Appendix F Tables F.1 – F.3 for the Imlay Allotment and Tables F.4 – F.6 for the Sullivan Tank Allotment (Appendix A, Figure 2). These range improvements consist of corrals, cattleguards, fences, reservoirs, catchments, troughs, and pipelines. No new structural range improvements are proposed for either allotment under any of the alternatives. Any range improvements proposed in the future would be considered through a separate NEPA process. Only maintenance of current range improvements would be allowed through an existing cooperative agreement.

3.4.2 Vegetation Including Invasive, Non-Native Plant Species

Vegetation within the allotments falls broadly under the Mojave Transition and Colorado Plateau floristic provinces. In both allotments, concentrated in the Little Joe pasture and the southern half of the Hobble pasture, Mojave Transition shrubs such as *Coleogyne ramosissima* (blackbrush) and *Ephedra* spp. (Mormon tea) intergrade into *Atriplex* spp. (saltbrush) and *Artemisia* spp. (sagebrush), both of which can be considered simultaneously Mojave Transitional and Colorado Plateau plants. These shrubs in turn form a patchy mosaic throughout the remaining area of the allotments with *Juniperus osteosperma* (juniper) and *Pinus edulis* (two-needle pinyon or pinyon) woodlands. The current zonation of dominant shrub or tree areas roughly corresponds to the expected Ecological Site Description (ESD) polygons available from USDA Soil Survey (Appendix A, Figure 3). Variations exist due in part to previous vegetation treatments (Section 3.4.2.1), wildfires (Section 3.4.2.2) and invasive non-native plant species (Section 3.4.2.4).

In general, monitoring during 2019 found a much lower species diversity than the best-case scenario based on ESDs. Many of the anticipated species for a particular ESD in the allotments were each expected to compose 0-4% of the vegetative ecosystem (Appendix C and D), as such measured species diversity on these sites may simply represent a large number of anticipated species simply occurring at the 0% end of their expected range. Additionally, sampling in small areas, such as key areas, can easily miss minor individual species, hence the emphasis on key species and their monitoring in Pace Frequency Trend Monitoring (BLM 1999b) and Desired Plant Community Objectives. Each allotment's more specific vegetative key species and generalized cover status and goals, crossing between the different dominant woody vegetation zones, are found in the Desired Plant Community Objectives discussion (Section 3.4.2.3) and in Appendices C and D.

3.4.2.1 Historic Vegetation Treatments

Both allotments have a history of vegetation treatments including chaining, mechanical, prescribed burns, seeding, and chemical treatments (Appendix A, Figure 4). Treatment information, including the presence of a key area within the treatment, is included in Tables 3.6 - 3.7.

Table 3.6 Imlay Allotment - Vegetation Treatments and Monitoring Key Area overlap.

Treatment Name or Description	Treatment Type	Year	Acres (approximate)	Includes Key Area
Imlay Chaining	mechanical	1955	676	Imlay Key Area 1, 4
Prescribed burn and seed	prescribed fire	1995	unknown	Imlay Key Area 1
Imlay/Sullivan Prescribed Burn #2	prescribed fire	1998	615	Imlay Key Area 4
Wolfhole Sage Eradication	mechanical	1955	25	none
Imlay Airstrip brush control	chemical	1967	145	none
Whiterock-Soapstone	chemical	1996	3	none
Imlay/Sullivan Prescribed Burn	prescribed fire	1996	474	none

Table 3.7 Sullivan Tank Allotment – Vegetation Treatments and Monitoring Key Area overlap.

Treatment Name or Description	Treatment Type	Year	Acres (approximate)	Includes Key Area
Imlay/Sullivan Prescribed Burn #2	prescribed fire	1998	4,050	Sullivan Tank Key Area 1, 4
Imlay/Sullivan Prescribed Burn	prescribed fire	1999	155	none

3.4.2.2 Wildfire History 1980 – 2020

A history of wildfires in both allotments has influenced the current conditions in both allotments (Appendix A, Figure 4). The Imlay Allotment is about 15,605 GIS acres of that about 5,368 GIS acres have burned between 1980 – 2020. Meaning that about 34% of the allotment has been burned by wildfires. Wildfire History shows the approximate acres burned by named wildfires totaling about 8,631 GIS acres over the period of 1980 – 2020 (See Table 3.8). Approximately 61% of the area burned has burned two or more times during this period. The Sullivan Tank Allotment is about 14,031 GIS acres of that about 3,473 GIS acres have burned between1980 – 2020. Approximately 25% of the allotment has been burned by wildfires. See Table 3.9 Wildfire History shows that a total of 6,037 GIS acres has been burned by named wildfires of 1980 – 2020. Approximately 74% of the burned area has burned two or more times.

Table 3.8 Imlay Allotment Wildfire History with GIS Acres (1980 – 2020) (BLM GIS).

Fire Name	Fire Year	Acres	Includes Key Area
Thunder	1998	77	none

Beaver	1999	3,073	none
Tweedy Complex	2005	237	none
Buckle	2006	16	none
Hobble Complex	2012	5,228	Imlay Key Area 3
Total Acres Burned		8,631	

Some acres have burned more than once.
Acreages are based on fire perimeters generated shortly after fire occurrence and may reflect areas where fire activity did not consume all vegetation and inaccuracies in GPS measurements at the time of data collection.

Table 3.9 Sullivan Tank Allotment Wildfire History with GIS Acres (1980 – 2020) (BLM GIS).

Fire Name	Fire Year	Acres	Includes Key Area
One Way	1996	780 acres	none
Beaver	1999	624 acres	Sullivan Tank Key Area 3
Tweedy Complex	2005	1,185 acres	Sullivan Tank Key Area 3
Sullivan-Clark	2007	355 acres	none
1059	2007	11 acres	none
Hobble Complex	2012	2,960 acres	Sullivan Tank Key Area 3
Tweeds	2014	104 acres	none
Shoe Buckle	2019	18 acres	none
Total Acres Burned		6,037 acres	

Some acres have burned more than once.

3.4.2.3 Desired Plant Community Objectives

Desired Plant Community (DPC) objectives were developed that would ensure the biodiversity, health, and sustainability of wildlife species indigenous to the area; protection of ecological functions (including hydrological processes); and sustainability of diverse vegetative communities. These objectives are quantified in part from resource condition objectives described in the GCPNM RMP (BLM 2008a). In addition, ecological site descriptions from the NRCS were used to determine the soil and vegetation attributes that are within the site potential for the key area. The Desired Plant Community objectives for each allotment are found in the allotment evaluations (BLM 2005a). The objectives take into account that the plant communities found on an ecological site are naturally variable.

Composition and production vary with location, aspect, and the natural variability of the soils. Plant populations also fluctuate due to factors such as drought and wet periods. The ranges for vegetation attributes are achievable given the current state of the plant community and the ecological site potentials. While DPCs were established for forbs, it should be noted that their composition is highly variable and is influenced by spring and summer precipitation. These objectives are expressed in species composition by weight (CBW). These objectives are set according to the ecological site guide and current composition at the site based on the most recent monitoring data.

Imlay Allotment
See DPC Objectives Determination Tables, Appendix C, Tables C.19 – C.22. Below is a summary with the DPC Objectives for each key area and if the objectives are met based on the

most recent monitoring data. See Appendix A, Figure 3 for map of key area locations.

Imlay Key Area #1 (Imlay-East Pasture)
(Data table in Appendix C Table C.19 based on 2019 monitoring)
Ecological Site: Loamy Upland 10 -14" p.z. (R035XC313AZ)

- Increase *Sitanion hystrix* to between the range of 5 to 10% CBW
- Increase *Oryzopsis hymenoides* to between the range of 5 to 10% CBW
- Increase *Hilaria jamesii* to between the range of 10 to 15% CBW
- Increase *Agropyron smithii* to between the range of 1 to 5% CBW
- Maintain *Artemisia tridentata* to between the range of 0 to 10% CBW
- Maintain *Juniperus osteosperma* to between the range of 0 to 5% CBW
- Maintaining forbs to between the range of 1 to 5% or above CBW
- Maintain ground cover above 50%
- Increase live vegetation cover (basal cover) to between 3 and 8% on perennial vegetation.
- Increase canopy cover to between the range of 10 to 30% on perennial vegetation.

Based on 2019 monitoring, DPC objectives were partially met at this key area. Ground cover was not met with 37% which is less than the objective of greater than 50%. Live basal vegetation cover exceeds the objective with 11%. The shrub and tree objectives were both at zero CBW but that fits within the range of 0 – 10% for *Artemisia tridentata,* and 0 – 5% for *Juniperus osteosperma* so those objectives were met. Grasses did not meet the objective with *Hilaria jamesii* at 8 %, which was just below the objective of 10%. The forbs objective was exceeded by a large amount of *Sphaeralcea* sp. (globemallow), an early seral forb.

Rationale: The DPC objectives (BLM 2005a) were to manage the site for a mosaic of early and mid-seral stage plant communities. The key species listed are the species recognized to be important for forage, watershed, and cover, and are components of the ecological site. This site was burned using a prescribed fire during 1995 and was seeded. However, due to drought the seeding was not successful (BLM 2005a). As a result of the treatment, the site changed from a predominately shrub community to forb dominate community with some native grasses. There is currently no *Artemisia tridentata* (shrub) or *Juniperus osteosperma* (tree) recorded by the monitoring at the key area, due to the recovery from fire in 1995. The desired plant community allows for a range of 0 – 10% for *Artemisia tridentata* and 0 – 5% for *Juniperus osteosperma*. Over time, it is expected that these plants would slowly re-establish themselves.

Having a large composition of *Sphaeralcea* sp. is an early seral species and is often seen during recovery from disturbance, including fire in this ecological site. *Sphaeralcea* sp. is excellent to fair forage for wildlife and cattle. Without the shrubs competing for resources, the grasses have the potential to increase in composition (BLM 2005a). This key area was chained in 1955 (Table 3.6). The key area is currently early seral ecological condition with static overall trend (Table 3.4 Imlay Allotment Updated Rangeland Health Data Summary).

Imlay Key Area #2 – Middle (Imlay-Hobble Pasture)
(Data table in Appendix C Table C.20 based on 2019 monitoring)
Limestone / Sandstone Upland 10 – 14" p.z. (R035XC319AZ)

- Increase *Sitanion hystrix* to between the range of 5 to 10% CBW

- Increase *Oryzopsis hymenoides* to between the range of 5 to 10% CBW
- Increase *Hilaria jamesii* to between the range of 5 to 15% CBW
- Increase *Agropyron smithii* to between the range of 10 to 20% CBW
- Decrease *Artemisia tridentata* CBW from 63% to between the range of 1 to 15%
- Maintain *Juniperus osteosperma* to between the range of 2 to 5% CBW
- Maintaining the forbs to between the range of 5 to 10% or above CBW
- Maintain ground cover above 65%
- Maintain live vegetation cover (basal cover) to between 5 and 10% on perennial vegetation.
- Maintain canopy cover to between range of 25 to 35% on perennial vegetation.

The objectives for this key area are partially met. The DPC objective for ground cover is met. Live basal vegetation cover is not met with 2%, below the objective of 5 – 10%. The objective for grasses is not met with *Sitanion hystrix* at 2%, below the objective of 5%. The DPC objective for *Artemisia tridentata* (sagebrush) was to reduce current composition from 64% (in 2003) down to 1 – 15% (BLM 2005a). The current composition of sagebrush in 2019 was 90% (Appendix C, Table C.21) with few other plant species present. Sagebrush at Key Area #2 has been above the desired 1 – 15% since the monitoring point was established in 1982 and has ranged between 64 – 90% (Table C.21). It is unlikely that a large decrease in sagebrush would occur without some type of vegetation treatment. The objective for forbs was met with a combined 6% of *Sphaeralcea* and other perennial forbs.

Rationale: The DPC objectives (BLM 2005a) are to manage the site for a mosaic of early and mid-seral stage plant communities. This key area is dominated by *Artemisia tridentata* (sagebrush). There is no record of chemical, mechanical, or prescribed burn treatments or wildfire in the key area during the period 1980 – 2020 (Table 3.6 and 3.8). During the evaluation, the team looked at the site and determined that the potential exists to achieve the DPCs, because of the site's capability. However, attainment of DPCs would only be possible if vegetation treatments are implemented to reduce sagebrush and increase grasses and forbs (BLM 2005a). Due to the low amount of perennial grasses and forbs post treatment seeding and rest maybe required (BLM 2005a). The key area is currently in mid-seral condition with upward overall trend (Table 3.4).

<u>Imlay Key Area #3 – West (Imlay-Hobble Pasture)</u>
(Data table in Appendix C Table C.22 based on 2019 monitoring)
Ecological Site: Shallow Upland 10 – 14" p.z. Warm (R035XC331AZ)

- Maintain *Sitanion hystrix* to between the range of 5 to 10% CBW
- Maintain *Oryzopsis hymenoides* to between the range of 1 to 5% CBW
- Maintain *Hilaria jamesii* to between the range of 1 to 10% CBW
- Maintaining *Artemisia tridentata* to between the range of 15 to 25% CBW
- Maintaining *Juniperus osteosperma* to between the range of 15 to 20% CBW
- Maintaining the forbs to between the range of 1 to 5% CBW or above
- Maintain ground cover above 55%
- Increase live vegetation cover (basal cover) to between 3 and 8% on perennial vegetation.
- Maintain canopy cover at range of 25 to 35% on perennial vegetation.

Objectives were partially met at Key Area # 3. The objective for ground cover was met with 57%. The objective for shrubs, *Artemisia tridentata,* slightly exceeds the objective by 1% with 26% current composition. The objective for the perennial grasses was met with 1% for *Hilaria jamesii*. The objective for *Sitanion hystrix* was exceeded with 16%. The objective for *Oryzopsis hymenoides* was not met. The objective for perennial forbs was not met. The current composition for trees (*Juniperus osteosperma)* is not met with 14% just 1% below the objective. Live basal vegetation cover did not meet the objective but was 1% below with 2%.

Rationale: The key area is to be managed for late seral plant community (BLM 2005a). It is currently in early seral ecological condition with upward overall trend (Table 3.4, Imlay Allotment Updated Rangeland Health Data Summary above). This area was burned by the Hobble Complex wildfire in 2012 (Table 3.8). It does not appear that the key area itself was burned but the area nearby was burned. There is no record of chemical, mechanical, or prescribed burn treatments in the area of Imlay Key Area #3.

Imlay Key Area #4 (Imlay-East Pasture)
This key area was established in 2019, however, DPC Objectives have not been established. This key area was chained in 1955 and had the Imlay/Sullivan Prescribed Burn #2 in 1998 (Table 3.6). There is no record of wildfire at this key area. The key area is in mid-seral ecological condition and trend has not been established because the key areas have only been read once (Table 3.4).

Sullivan Tank Allotment
See DPC Objectives Determination Tables, Appendix D, Tables D.19 – D.22. Below is a summary with the DPC Objectives for each key area and whether the objectives are met or not met based on the most recent monitoring data. See Appendix A, Figure 3 for map of key area locations.

Sullivan Tank Key Area #1, Little Joe Draw (Little Joe Pasture)
(Data table in Appendix D Table D.19 based on 2019 monitoring)
Ecological Site: Loamy Upland 10 – 14" p.z. (R035XC313AZ)

- Increase *Sitanion hystrix* to between the range of 5 to 10% CBW
- Increase *Oryzopsis hymenoides* to between the range of 5 to 10% CBW
- Maintain *Hilaria jamesii* to between the range of 30 to 50% CBW
- Maintain *Sporobolus cryptandrus* to between the range of 1 to 3% CBW
- Maintain *Artemisia tridentata* to between the range of 0-15% CBW
- Maintaining forbs to between the range of 5 to 10 percent CBW
- Maintain ground cover above 65%
- Maintain basal cover to between 5 to 10% on perennial vegetation
- Increase canopy cover to between the range of 25 to 35% on perennial vegetation

DPC objectives are partially met at this key area. Ground cover met and exceeded the objective with 72%. The objective for live basal vegetation cover was not met with 4% which is just below the objective of 5 – 10%. The objective for shrubs, *Artemisia tridentata,* was met with 12%. The objective for perennial grasses were partially met with *Hilaria jamesii* with 51% which exceeds but the objective for other grass species were not met. The objective for perennial forbs were exceeded with *Sphaeralcea sp.* at 36%. *Sphaeralcea sp.* is an early seral species.

Rationale: Currently Sullivan Tank Key Area #1 is in mid-seral ecological condition with upward overall trend (Table 3.5). This key area is to be managed for a mosaic of early and mid-seral stage plant communities (BLM 2005a). This site was burned during, Imlay/Sullivan Prescribed Burn # 2 in 1998 and was seeded. Due to drought, the seeding did not establish. As a result of the treatment the site changed from a predominately shrub community to forb community with native grasses (BLM 2005a). Without the shrubs competing for resources, the grasses and forbs have the potential to increase. Currently, *Artemisia tridentata* (12% CBW) is within the objective for shrubs. There is no record of other mechanical, chemical, or vegetation treatments or wildfires.

Sullivan Tank Key Area #2, Sullivan Draw (Sullivan Tank Pasture)
(Data table in Appendix D Table D.20 based on 2019 monitoring)
Ecological Site: Loamy Upland 10 - 14" p.z. (R035XC313AZ)

- Increase *Sitanion hystrix* to between the range of 5 to 10% CBW
- Increase *Oryzopsis hymenoides* to between the range of 5 to 10% CBW
- Maintain *Hilaria jamesii* to between the range of 25 to 35% CBW
- Increase *Bouteloua gracilis* to between the range of 1 to 5% CBW
- Reduce *Artemisia tridentata* to between the range of 5 to 10% CBW
- Maintaining forbs to between the range of 5 to 10 percent CBW
- Maintain ground cover above 65%
- Maintain basal cover to between 5 and 10% on perennial vegetation
- Maintain canopy cover to between the range of 25 to 35% on perennial vegetation

DPC objectives are partially met at this key area. The ground cover objective was not met with 64% CBW. It was just below the objective of >65%. The live basal vegetation cover objective was met with 6%. The shrub objective exceeded the objective with 43% *Artemisia tridentata,* well over the objective of 5 – 10%. This key area is dominated by shrubs. The perennial grass objective was partially met with *Sitanion hystrix* at 36% which exceeds its objective of 5 – 10%. The objectives for other perennial grass species were not met. *Hilaria jamesii* had 15% CBW but did not meet the objective of 25 – 35%. *Oryzopsis hymenoides* was present with 1% CBW but did not meet the objective of 5 - 10%. Other species of perennial grasses were present *Agropyron smithii* with 2% CBW, and *Sporobolus cryptandrus* with 3%. The objective for forbs were not met.

Rational: This key area is to be managed for a mosaic of early and mid-seral stage plant communities (BLM 2005a). Currently, Sullivan Tank Key Area # 2 is in mid-seral ecological condition with an upward overall trend (Table 3.5). *Artemisia tridentata* on this site is at 43% (CBW), which exceeds the objective (objective is 5 – 10% CBW). Because of shrub expansion, which out competes other desirable grass and forb species, the key area is partially meeting objectives. However, attainment of DPC would only be possible if vegetation treatment is implemented to reduce shrubs and increase grasses and forbs (BLM 2005a). There is no record of mechanical, chemical, prescribed burn or other vegetation treatments or wildfires on this key area during the period of 1980 – 2020 (Table 3.7 and Table 3.9).

Sullivan Tank Key Area #3, Post Office (Sullivan Tank Pasture)
(Data table in Appendix D Table D.21 based on 2019 monitoring)

Ecological Site: Sedimentary Cliffs 10 – 14" p.z. (R035XC302AZ)

- Increase *Sitanion hystrix* to between the range of 5 to 10% CBW
- Increase *Oryzopsis hymenoides* to between the range of 5 to 10% CBW
- Increase *Poa fendleriana* to between the range of 3 to 7% CBW
- Increase *Hilaria jamesii* to between the range of 3 to 7% CBW
- Maintain *Artemisia tridentata* to between the range of 5 to 15% CBW
- Maintain *Cowania mexicana* to between the range of 5 to 10% CBW
- Maintaining forbs to between the range of 5 to 10 percent CBW
- Maintain ground cover above 80%
- Maintain basal cover to between 5 and 10% on perennial vegetation
- Maintain canopy cover to between the range of 25 to 35% on perennial vegetation

DPC objectives are partially met at this key area. The objective for ground cover was not met. The current ground cover is 77% which is 3% below the objective of >80%. The live basal vegetation cover objective was not met. The shrub objective was not met at 2% CBW of *Artemisia tridentata*. There was no *Cowania mexicana* recorded on the transect. Other shrubs like *Fallugia paradoxa* at 30% CBW, and *Gutierrezia sarothrae* with 26% CBW, were recorded. *Fallugia paradoxa* responds to fire by resprouting and can be a pioneer species. The objective for perennial grasses were partially met with *Oryzopsis hymenoides* which meets the objective with 5% but the objective for other grass species was not met. *Hilaria jamesii* was at 2% just below the objective of 3 – 7%. *Sitanion hystrix* was at 3% CBW which is below the objective of 5 – 10% CBW. Other species of early seral perennial grasses were present *Aristida sp*. 6% CBW, and *Sporobolus cryptandrus* with 24% CBW. The objective for forbs was not met. This is likely due to the repeated fires that have occurred in this area.

Rational**:** This key area is to be managed for a mosaic of early and mid-seral stage plant communities (BLM 2005a). Currently Sullivan Tank Key Area # 3 is in early seral ecological condition with an upward overall trend (Table 3.5). This key area has had a history of wildfires starting with the Beaver Fire in 1999, the Tweedy Complex Fire 2005, and the Hobble Complex Fire 2012 (Table 3.9). For a more complete list of wildfires and acreages on the Sullivan Tank Allotment during the period of 1980 – 2020, see Table 3.9. Some areas have been burned more than once during the period (Appendix A, Figure 3) As a result of the repeated wildfires, the area was set back to early stages of plant succession.

Sullivan Tank Key Area #4, Cox Pond (Sullivan Tank Pasture)

(Data table in Appendix D Table D.22 based on 2019 monitoring)

Ecological Site: Limestone / Sandstone Upland 10 – 14" p.z. (R035XC319AZ)

- Maintain *Sitanion hystrix* to between the range of 5 to 10% CBW
- Increase *Oryzopsis hymenoides* to between the range of 5 to 10% CBW
- Increase *Poa fendleriana* to between the range of 1 to 5% CBW
- Maintain *Hilaria jamesii* to between the range of 40 to 50% CBW
- Maintain *Artemisia tridentata* to between the range of 1-15% CBW
- Maintain *Juniperus osteosperma* to between the range of 1-3% CBW
- Maintaining forbs to between the range of 5 to 10 percent CBW
- Maintain ground cover above 65%
- Maintain basal cover to between 5 and 10% on perennial vegetation
- Maintain canopy cover to between the range of 35 to 45% on perennial vegetation

DPC objectives are partially met at this key area. The ground cover objective was met with 72% but the objective for live basal vegetation cover was not met with 4%, just below the objective of 5 – 10% CBW. The shrub objective was met with *Artemisia tridentata* with 4%. The objective for trees were not met. The objective for perennial grasses were partially met. *Oryzopsis hymenoides, Poa fendleriana,* and *Sitanion hystrix* met the objectives for each species. The objective for *Hilaria jamesii* was not met. Other species of perennial grasses were present *Sporobolus cryptandrus* with 2% and *Stipa comata* with 3%. The objective for forbs were not met by *Lotus longebracteatus* at 2% but was exceeded by *Sphaeralcea sp.* with 32%. *Sphaeralcea sp*. is an early seral species that frequently comes in after disturbances like fire.

Rational: This key area is to be managed for a mosaic of early and mid-seral stage plant communities (BLM 2005a). This area burned during 1995 (BLM 2005a) and again in 1998 during the Imlay/Sullivan Prescribed Burn # 2. The area was seeded after the fire, but due to drought, the seeding treatment was not successful. The area has gradually progressed through the plant community successional stages and, at this point, is in a mid-seral stage with an upward overall trend (Table 3.5). There is no record of mechanical, chemical, other vegetation treatments on this key area (Table 3.7).

Based on the 2019 monitoring DPC objectives were partially met at all the key areas in both allotments. DPC Objective Tables for the Imlay Allotment Appendix C, Tables C.19 – C.22. DPC Objective Tables for the Sullivan Tank Allotment Appendix D, Tables D.19 – D.22. A map of the key area locations for each allotment in Appendix A, Figure 3.

3.4.2.4 Invasive, Non-Native Species

Invasive, non-native plant species are known to occur in both allotments. During surveys and trend monitoring in 2019 and 2020, seven invasive non-native plant species were found (Table 3.10). These species can be found across the entire BLM Arizona Strip District. Only one species, *Bromus tectorum*, has been present since 1988. Some species were detected only in 2020, due to the intensive noxious and invasive plant inventory conducted that year.

Table 3.10. Invasive plant species found within the Imlay and Sullivan Tank allotments. Species were detected using both opportunistic and long-term monitoring methods.

Invasive Plant Species	Detection Method	Location	Year Detected
Bromus tectorum (cheatgrass)	2020 noxious and invasive plant inventory, Pace frequency trend monitoring	Imlay-Hobble Pasture, Imlay-East Pasture, Sullivan Tank Pasture, Little Joe Pasture	1988, 2003, 2004, 2014, 2019, 2020
Ceratocephala testiculata (curveseed butterwort)	2020 noxious and invasive plant inventory	Imlay-East Pasture	2020
Chorispora tenella (crossflower or purple mustard)	2020 noxious and invasive plant inventory	Imlay-East Pasture	2020
Convolvulus arvensis (field bindweed)	2020 noxious and invasive plant inventory	Imlay-East Pasture	2020
Onopordum acanthium (Scotch thistle)	2020 noxious and invasive plant inventory, rancher and staff reporting	Imlay-Hobble Pasture, Imlay-East Pasture, Sullivan Tank Pasture, Little Joe Pasture	2001, 2007, 2019, 2020
Salsola spp. (Russian thistle or tumbleweed)	2020 noxious and invasive plant inventory, Pace frequency trend monitoring	Imlay-East Pasture, Sullivan Tank Pasture, Little Joe Pasture	2014, 2019, 2020
Erodium cicutarium (storksbill)	Pace frequency trend monitoring	Imlay-East Pasture, Sullivan Tank Pasture	2004, 2009, 2019

Two species of particular interest in the area are *Bromus tectorum* and *Onopordum acanthium*. *Bromus tectorum*, or cheatgrass, occurs in all pastures with varying frequency. In 2019, cheatgrass occurred relatively rarely in Imlay-Hobble Pasture on the western side of the Imlay Allotment while it is nearly ubiquitous in Little Joe Pasture on the eastern side of the Sullivan Tank Allotment. *Onopordum acanthium*, or Scotch thistle, occurs in patches in both allotments. It is primarily associated with road disturbance corridors within the allotments. Localized herbicide application over the last several years has reduced the occurrence of this invasive plant.

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

3.4.3.1 Big Game

Both of the allotments are in the AGFD's Game Management Unit (GMU) 13B. This GMU is famous for producing large antlered "trophy" class mule deer bucks. The mule deer population is managed under alternative management guidelines which focus on the harvest of older age class, mature bucks. Mule deer exist at low densities throughout the unit in all habitat types and good numbers of deer can typically be found in the higher elevations, generally over 4,000 feet (AGFD & BLM 2015).

Mule deer 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 small openings provide forage and feeding areas. Deer eat a wide variety of plants including browse, forbs, and grasses. Deer are especially reliant on shrubs for forage during critical winter months. Fawn production is closely tied to the abundance of succulent, green forage during the spring and summer months.

AGFD has categorized habitat characteristics for big game species within the state. Habitat categories are based on several factors such as topography, forage and cover, availability of water, and limiting factors such as prohibitive fencing. The allotments together are categorized by AGFD as 99% yearlong habitat and 1% summer habitat for mule deer.

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 as Birds of Conservation Concern (BCC) 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 on the allotments are summarized in Table 3.11.

Table 3.11. USFWS Birds of Conservation Concern Found in the Allotments.

Species	Habitat Type in the Project Area
Ferruginous Hawk	Open grassland or shrubland with isolated trees (typically juniper) for nesting. (*BLM Sensitive, see section 3.4.3.3*)
Golden Eagle	Habitat generalist, but usually forages in open country for small mammals and carrion. Large cliff faces are used for nesting. (*BLM Sensitive, see section 3.4.3.3*)
Peregrine Falcon	Habitat generalist, but usually associated with canyons (especially near water) where they hunt for other bird species. Cliff faces are used for nesting. (*BLM Sensitive, see section 3.4.3.3*)

Species	Habitat Type in the Project Area
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.
Burrowing Owl	Sparsely vegetated grassland or shrubland with existing burrows excavated by badgers, rabbits, or ground squirrels. (*BLM Sensitive, see section 3.4.3.3*)
Gray Vireo	Found nearly exclusively in pinyon-juniper woodlands during the breeding season. Fairly common on the Arizona Strip.
Pinyon Jay	Associated with pinyon-juniper woodlands and nearby open country such as sagebrush or saltbush shrublands. Prefers dense stands of pinyon-juniper for nesting. (*BLM Sensitive, see section 3.4.3.3*)
Juniper Titmouse	Year-round resident of pinyon-juniper woodlands. Common on the Arizona Strip.
Bendire's Thrasher	Favors open habitat with scattered junipers, cliffrose, and sagebrush. An uncommon breeder on the Arizona Strip.
Brewer's Sparrow	Breeds in sagebrush shrublands but can be found in a variety of open habitats and riparian areas during migration and winter. Typically, only nests on the Arizona Strip during years of high precipitation, otherwise breeding occurs to the north. Fairly common in large migrating flocks in spring and fall, otherwise uncommon on the Arizona Strip.
Black-chinned Sparrow	Breeds in the chaparral habitat type within rocky canyons, especially where cliffrose is present. Fairly common on the west side of the Arizona Strip within its limited habitat type.

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 five 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 presented in Chapter 2 are displayed in Table 3.12.

Table 3.12. Sensitive Species Associated with the allotments

Species	Potential for Occurrence
Peregrine falcon (*Falco peregrinus*)	potential
Ferruginous hawk (*Buteo regalis*)	potential
Western burrowing owl (*Athene cunicularia hypugea*)	potential
Golden eagle (*Aquila chrysaetos*)	potential
Pinyon jay (*Gymnorhinus cyanocephalus*)	potential
Monarch Butterfly (*Danaus plexippus*)	potential

Five additional sensitive species may also occur within the allotment. However, it has been determined by BLM wildlife biologists that these species would not be affected by actions proposed in this EA based on the nature of the proposed action. These species are, therefore, not addressed further in this document. Table 3.13 lists the sensitive species that will not be discussed in further detail, along with the rationale for their exclusion from further analysis.

Table 3.13. Sensitive Species Excluded from Further Analysis

Species	Rationale for Excluding from Further Analysis
Allen's big-eared bat *Idionycteris phyllotis*	Roost sites such as caves and abandoned mineshafts are inaccessible to livestock and impacts from grazing would not alter prey species (insects) populations or distribution. No measurable impacts (changes from the existing condition) would be expected.
Townsend's big-eared bat *Corynorhinus townsendii*	Roost sites such as caves and abandoned mineshafts are inaccessible to livestock and impacts from grazing would not alter prey species (insects) populations or distribution. No measurable impacts (changes from the existing condition) would be expected.
California leaf-nosed bat *Macrotus californicus*	Roost sites such as boulder piles, caves, and abandoned mineshafts are inaccessible to livestock and impacts from grazing would not alter prey species (insects) populations or distribution. This species is primarily found in Sonoran desert scrub south of the Mogollon Plateau and is unlikely to occur in the project area. No measurable impacts (changes from the existing condition) would be expected.
Greater western mastiff bat *Eumops perotis californicus*	Roost sites such as rock crevices are inaccessible to livestock and impacts from grazing would not alter prey species (insects) populations or distribution. No measurable impacts (changes from the existing condition) would be expected.
Spotted bat *Euderma maculatum*	Roost sites such as crevices in cliff faces are inaccessible to livestock and impacts from grazing would not alter prey species (insects) populations or distribution. No measurable impacts (changes from the existing condition) would be expected.

Peregrine Falcon (*Falco peregrinus*)

Habitat and Range Requirements. Peregrine falcons utilize areas that range in elevation from 400 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 2002).

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 2002).

Project Area Evaluation. Potential nesting habitat is found along the steep cliff faces of Diamond Butte and the Hurricane Cliffs to the east and along the Grand Wash Cliffs to the west of the allotments. Peregrine falcons may occur in the allotments during foraging flights.

Ferruginous Hawk (*Buteo regalis*)

Habitat and Range Requirements. 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 often occurs in isolated trees or utility poles surrounded by open areas (Olendorff 1993). 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.

Project Area Evaluation. Suitable habitat for the ferruginous hawk is present on both allotments. Although nesting habitat is available, no nest sites are known to occur within the allotments.

Burrowing Owl (*Athene cunicularia hypogea*)

Habitat and Range Requirements. 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. Moderate grazing can have a beneficial impact on burrowing owl habitat by keeping grasses and forbs low (MacCracken et al. 1985) but the control of burrowing rodent colonies in grazed areas is believed to be a significant factor in the burrowing owl's decline (Desmond and Savidge 1996). Burrowing owls are infrequently encountered on the Arizona Strip likely due to the lack of prairie dog or other large rodent colonies.

Project Area Evaluation. Suitable habitat for the burrowing owl is present on the allotments. Although nesting habitat is available, no nest sites are known to occur within the allotments.

Golden Eagle (*Aquila chrysaetos*)

Habitat and Range Requirements. 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.

Project Area Evaluation. Potential nest sites occur along the cliff faces of Diamond Butte and the Hurricane Cliffs to the east and along the Grand Wash Cliffs to the west of the allotments. Eagles likely utilize the allotments for hunting and scavenging. The presence of water

developments may attract small mammals, such as black-tailed jackrabbits, which are prey species for golden eagle.

Pinyon Jay (*Gymnorhinus cyanocephalus*)

Habitat and Range Requirements. 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 (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).

Project Area Evaluation. Open-structure pinyon-juniper woodlands are found in the allotments and likely support foraging opportunities for pinyon jays.

Monarch Butterfly (*Danaus plexippus*)

Habitat and Range Requirements. 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 listing was warranted but precluded by higher priority actions to amend the Lists of Endangered and Threatened Wildlife and Plants (USFWS 2020).

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).

Project Area Evaluation. Monarchs may breed in low numbers within the allotment, 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 those analyzed in this EA.

CHAPTER 4

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

The potential consequences or effects of each alternative are discussed in this chapter. Only 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 considered effects to the component and determined that 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.

Impacts are defined as modifications to the existing condition of the environment and/or probable future condition that would be brought about by implementation of one of the alternatives. Impacts can be direct or indirect; direct impacts are those effects that are caused by the action or alternative and occur at the same time and place, while indirect effects are those effects that are caused by or would result from an alternative and are later in time but that are still reasonably certain to occur. Cumulative effects are generally assessed using the environmental impacts of past, present, or reasonably foreseeable future actions within the project areas.

4.2 Direct and Indirect Impacts

4.2.1 Livestock Grazing

The impact analysis area for livestock grazing is the Imlay and Sullivan Tank Allotments.

4.2.1.1 Direct and Indirect Impacts of Alternative A – Proposed Action. Combine Allotments, Change Season of Use, and Add Horses

The Proposed Action would directly affect the grazing permittee on the Imlay and Sullivan Tank Allotments by renewing the ten-year term grazing permit with new terms and conditions. The action would issue a new term grazing permit that would combine the Imlay and Sullivan Tank Allotments into one allotment with a single season of use 10/1 - 6/15, and four fenced pastures. This would allow the permittee to more easily rotate livestock between the four pastures within the combined allotment. When 50% forage utilization is reached, livestock would be moved to another pasture or off the allotment completely. There would be no change in the total number of AUMs authorized. The current active AUMs for each allotment (see Table 2.2 Alternative B) would be combined as would the suspended AUMs for each allotment (see Table 2.1 Alternative A). The current permit has a slightly different season of use for each allotment see Table 2.2 under Alterative B. The proposed season of use would result in an extended season of use for each allotment, taking the 10/1 earliest on date from the Imlay Allotment and the 6/15 latest off date from the Sullivan Tank Allotment. This would provide the longest season of use but does not increase total AUMs. Under the Proposed Action the new combined allotment would be rested from grazing from 6/16 – 9/30 each year. This would allow the vegetation to grow and set seed without grazing pressure. Grazing in the fall resumes after seed shatter. These changes

would improve long-term livestock management on the combined allotment. Permit renewal would provide some degree of stability for the permittee's livestock operation. Permit renewal would also 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 (Appendix B) and the GCPNM RMP (BLM 2008a), and respond to applications to fully process and renew permits to graze livestock on public land.

The addition of up to eight horses to the authorization allows the permittee the flexibility to graze domestic saddle horses with the livestock while they are on the allotment, to allow them to be easily used in livestock management. Horses would be rotated through pastures as they do the cattle, moved with the cattle, during the proposed season of use 10/1 – 6/15. No additional AUMs would be authorized on the allotment to graze horses. When horses are grazed then a corresponding reduction in number of cattle grazed would be made. See Vegetation Section 4.2.2.1 below for discussion of impacts of grazing horses versus cattle.

Based on recent monitoring the Imlay (Appendix C) and Sullivan Tank (Appendix D) Allotments continue to make progress toward meeting the standards for rangeland health (Section 3.2.3 Land Health Evaluation). Grazing authorized under Alternative A, the combined allotment would be expected to continue making progress toward meeting the standards for rangeland health.

4.2.1.2 Direct and Indirect Impacts of Alternative B – No Action. Permit Renewal with No Changes

The No Action Alternative would affect the livestock grazing permittee on the Imlay and Sullivan Tank Allotments by renewing the ten-year term grazing permit with no changes to the grazing permit. This action would maintain the current level of livestock grazing authorized for the permittee for 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 (Table 2.2). The No Action Alternative would leave the two allotments separate and horses would not be authorized to graze on either allotment. The season of use for each allotment would not change, it would remain different for each allotment (Table 2.2). Allowable use on key forage species would remain at 50% for each allotment. The Imlay Allotment is rested from grazing from 6/1 – 9/30 each year. While the Sullivan Tank Allotment is rested from grazing from 6/16 – 10/15 each year. There would be no change in the current terms and conditions. Permit renewal would partially 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, and to respond to the application to fully process and renew the permit to graze livestock on public land. However, this alternative would not provide the permittee with the flexibility and improved operation management as they have requested.

Based on recent monitoring the Imlay (Appendix C) and Sullivan Tank (Appendix D) Allotments continue to make progress toward meeting the standards for rangeland health (Section 3.2.3 Land Health Evaluation). Grazing authorized under Alternative B, with no changes, the separate allotments are expected to continue making progress toward meeting the standards for rangeland health.

4.2.1.3 Direct and Indirect Impacts of Alternative C- No Grazing

This alternative would negatively affect the livestock grazing permittee on the Imlay and Sullivan Tank Allotments by not authorizing any active preference under the term grazing permits. The action would cancel the current level of livestock grazing numbers and season of use authorized. This would not provide current or future use, stability, and compatibility for the permittee's livestock operation because they would not be authorized to use the allotment. This would force them to seek alternate arrangements for their livestock, such as leasing private pasture or obtaining a different federal grazing permit on a different allotment which would be challenging, and potentially economically not feasible. It would most likely put this livestock operation 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 (Appendix B), as well as the GCPNM RMP (BLM 2008a), and the need to respond to applications to fully process and renew permits to graze livestock on public land.

4.2.2 Vegetation Including Invasive, Non-Native Plant Species

4.2.2.1 Direct and Indirect Impacts of Alternative A – Proposed Action. Combine Allotments, Change Season of Use, and Add Horses

Alternative A effectively changes two aspects of previous grazing effects on vegetation. One, exchanging up to eight cows for up to eight horses may potentially change the type or species of vegetation targeted by livestock. The second extends the season of use either 15 days earlier or 15 days later, depending on allotment, than the current season of use, effectively adding a total of 30 days to the season of use on the combined allotment as compared to the individual allotments.

Horses tend to feed on grasses and grass-like plants more often than cattle. However, they have been found to shift their diet to include higher proportions of forbs, a diet similar to cattle, and leguminous plants, such as *Prosopis* spp. (mesquite) in response to limited access to grasses (Scasta 2016). The effect of exchanging eight cows for eight horses would be minimal. While horses may in fact target grass and grass-like plant species more than cattle in these allotments, the small number of horses and tendency to shift grazing preferences based on available plant species suggest that horses would act similarly to cattle on species composition within the allotments.

Horses have also been found to consume 20-65% (by volume) more forage per animal than a similarly sized cow (Scasta 2016). While this would suggest that horses could contribute to overgrazing in an area, the Proposed Action accounts and mitigates for this potential impact (Section 2.3.1 Grazing System and Section - Utilization of key forage species would be limited to an average of 50 percent of the current year's growth. When 50 percent forage utilization is reached, livestock would move to another pasture or off the allotment completely. Section 2.4 Adaptive Management discusses the allowable usage levels and monitoring.

Shifting the season of use to October 1 through June 15 while adding no AUMs, is a minor impact, at most. Both allotments have largely the same vegetation types. Some minor variations exist over a small area, but the vegetation in this area would respond similarly to the rest of the vegetation within the allotments. The allotments would be allowed to rest during perhaps the most critical time in the growing year in the area, monsoon season from June 15 to September 30 (NWS 2021). During that time, native plants will flower, seed, and disperse. While these processes occur throughout the year, depending on plant species, the core occurrence time would continue to be protected.

Effectively, there are no other impacts different than what is described in Section 4.2.2.2 - Direct and Indirect Impacts of Alternative B – No Action. Permit Renewal with No Changes. Refer to that section for the remaining direct and indirect impact analysis of Alternative A.

4.2.2.2 Direct and Indirect Impacts of Alternative B – No Action. Permit Renewal with No Changes

Under this alternative, the impacts of grazing on vegetation seen during the previous grazing permit would continue for an additional ten years. The Sullivan Tank allotment most likely would continue to show an upward trend, while the Imlay allotment would continue in a static or upward trend depending on pasture, toward attaining the prescribed DPCs. Any large-scale changes in vegetation would be through wildfire or vegetation treatments. As mentioned in the proposed action, no vegetation treatments are proposed.

Within burned areas where *Sphaeralcea* sp. is a primary component of the vegetative community, globemallow would likely slowly decline as the sites recover from the residual effects of fires in the 1990s (Callison 1985). Grazing levels would not change, therefore the globemallow dominated portions of the allotments would be unlikely to shift due to a continuation of the current grazing permit but rather ecosystem shifts would be governed primarily by time since large scale disturbance (fire) and other factors such as available seedbank and climatic variability.

Invasive plant management on GCPNM works with the permittees to allow for the treatment of spatially confined non-native plants such as Scotch thistle. Under Alternative B, this would not likely change. Widespread non-native plants such as *Bromus* spp. would continue occurring across the allotments. Given the local dominance of this plant in multiple areas, it is expected to continue spreading into areas where it has not yet been detected, regardless of the use of the allotment by cattle. It is possible that the invasive non-native plant species detected in the 2020 survey could be spread beyond roadways by continued use of the allotments for grazing, however, these species do not depend solely on cattle to spread seed and vegetative materials. Monitoring for new invasive plant populations is ongoing at GCPNM and treatment is part of existing BLM Arizona Strip District policy.

4.2.2.3 Direct and Indirect Impacts of Alternative C- No Grazing

Under this alternative, the grazing permit would be withdrawn for ten years. As with Alternative B – No Action, vegetation would likely continue an upward trend toward DPC objectives on the Sullivan Tank allotment and a static or upward trend on the Imlay allotment, depending on

pasture. Shifts in species dominance, such as the current localized *Sphaeralcea* sp., would be determined primarily through impacts from wildfire, climatic conditions, and past landscape disturbance.

It is unknown if Alternative C would have a beneficial impact on vegetation. Numerous studies have found positive effects, negative effects, and no effects when managed grazing was removed. Positive outcomes appear to be based on current vegetative community characteristics, history of the area, and the presence and density of invasive non-native plant species (Davies 2014). Un-grazed plants may seed more than currently, increasing the seedbank and increasing the rate at which the allotments DPC trend increases. This reproductive increase, however, would be highly dependent on climatic condition influencing the adult plant's development and health.

It was noted in the 2005 Land Health Evaluation that some areas would likely require treatment to meet DPCs and increase the amount of grass and grass-like species within the area. Removal of grazing would not substitute for treatment. It may have no effect or even a slight negative effect (Davies 2014).

Alternative C would have a negligible impact on invasive species. As was noted in Section 4.2.2.2, invasive plant management is ongoing and would not be curtailed by this alternative. Removal of grazing would not change in any substantial way the occurrence or distribution of invasive non-native plants in the allotments.

4.2.3 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 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. However, the livestock grazing proposed in Alternatives A and B would limit utilization to 50% in the project area, which would help maintain vegetative condition, and therefore wildlife habitat components.

Direct and Indirect Impacts of Alternative A – Proposed Action. Combine Allotments, Change Season of Use, and Add Horses

Alternative A would renew the ten-year term grazing permit with some changes to the existing grazing system. The new permit would combine the allotments into one allotment with four fenced pastures. The new permit would have a slightly different season of use. The proposed season of use resulted from extending the season of use for each allotment. Taking the October 1 earliest on date from the Imlay Allotment and the latest June 15 off date from the Sullivan Tank Allotment. The other difference between the new proposed permit and the existing permit would be that eight horses would be grazed in place of eight cows.

Big Game
Combining the allotments into one and replacing some cows with horses would have no greater impact on mule deer. The proposed change in the season of use would result in slightly more negative impacts due to a longer presence of livestock. The presence of livestock and the trailing of livestock between use areas could displace some wildlife from preferred habitats and/or water sources. However, this displacement would only be temporary. It is expected that livestock grazing proposed under this alternative would minimally affect habitat for mule deer, and ecological condition of that habitat would be maintained. Since utilization on vegetation would be limited to 50%, competition for forage between livestock and deer should be minimal. The Proposed Action would therefore not affect meeting habitat (i.e., forage) objectives for mule deer.

Migratory Birds
Combining the allotments into one and replacing some cows with horses would have no greater impact on migratory birds. The proposed change in the season of use would result in slightly more negative impacts due to a longer presence of livestock. Properly managed livestock grazing is designed to cause minimal impacts to rangeland resources, including wildlife habitat. Managing the allotments to achieve DPC objectives and implementation of the proposed utilization levels would result in maintaining the ecological condition of the allotment. The presence of livestock and the trailing of livestock between use areas could result in temporary disturbance to migratory birds due to human activity and noise. Implementation of the Proposed Action may only result in minor impacts to any species of migratory bird known or suspected to occur on the allotment. No take of any migratory bird species is anticipated.

Sensitive Species

Peregrine Falcon and Golden Eagle
Combining the allotments into one and replacing some cows with horses would have no greater impact on peregrine falcons or golden eagles. The proposed change in the season of use would result in slightly more negative impacts due to a longer presence of livestock. Nesting peregrine falcons or golden eagles would not be impacted by livestock within the allotments because there is no nesting habitat within the allotments. Prey species for peregrine falcons, such as mourning doves and band-tailed pigeons, 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. Vegetation in the allotments is sufficient to provide food and shelter requirements for populations of prey species for the peregrine falcon. Managing the allotments to achieve DPC objectives and implementation of the proposed utilization level would result in maintaining or improving the ecological condition of the allotments. Implementation of the Proposed Action is not likely to impact peregrine falcon or golden eagle habitat or nesting success.

Ferruginous Hawk
Combining the allotments into one and replacing eight cows with eight horses would have no greater impact on ferruginous hawks. The proposed change in the season of use would result in slightly more negative impacts due to a longer presence of livestock. Nesting sites and habitat for ferruginous hawk prey species have the potential to be impacted by livestock grazing within the allotments. Isolated nest trees used by this species could be impacted through rubbing of the

trunk or by damaging the root system from congregations of cattle seeking shade. Habitat for prey species, such as black-tailed jackrabbits, could be adversely impacted if overutilization occurs. However, the effects of moderate grazing can be negligible to slightly beneficial for many prey species (Olendorff 1993). Vegetation in the allotments is sufficient to provide food and shelter requirements for populations of prey species for the ferruginous hawk. Managing the allotments to achieve DPC objectives and implementation of the proposed utilization level would result in maintaining or improving the ecological condition of the allotment. Ferruginous hawks are sensitive to disturbance near the nest site. However, no nesting has been documented in these allotments so impacts to nesting are unlikely and would not lead to a trend toward listing.

Burrowing Owl
Combining the allotments into one and replacing some cows with horses would have no greater impact on burrowing owls. The proposed change in the season of use would result in slightly more negative impacts due to a longer presence of livestock. 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 can do well in moderately grazed areas. Occupied burrows in other allotments on the Arizona Strip frequently have cows nearby during monitoring visits (Langston, personal obs.). Prey species are numerous in the allotments and include small mammals, insects, reptiles, and amphibians. Vegetation in the allotments is sufficient to provide food and shelter requirements for populations of prey species for the burrowing owl. Disturbance to nest sites from livestock management operations may occur but this species is known to tolerate moderate levels of disturbance. Implementation of the Proposed Action is not likely to have major impacts to burrowing owl habitat or nesting success in the allotments.

Pinyon Jay
Combining the allotments into one and replacing some cows with horses would have no greater impact on pinyon jays. The proposed change in the season of use would result in slightly more negative impacts due to a longer presence of livestock. Livestock grazing on the allotments is not likely to impact pinyon jay nesting or foraging. Pinyon jays nest in trees within dense pinyon-juniper forests which typically have less forage available for livestock. Pinyon jays rely heavily on pinyon nuts as a food source which are not consumed by livestock. Some minor, short-term disturbance from livestock management operations may impact nesting pinyon jays but this would be expected to be negligible.

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 allotments.

4.2.3.1 Direct and Indirect Impacts of Alternative B – No Action. Permit Renewal with No Changes

Direct and indirect effects under this alternative would be similar to those described under Alternative A for big game, migratory birds, or sensitive species. Impacts described under Alternative A related to changes in the season of use would not occur under this alternative.

4.2.3.2 Direct and Indirect Impacts of Alternative C – 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. Since this alternative would result in the least grazing on vegetation, plants would have the maximum amount of energy compounds in their stems for survival and reproduction; plant communities would continue to provide more than sufficient forage and shelter for wildlife. There would be no conflicts between wildlife and livestock for water within the allotments and no disturbance from livestock operations. In addition, nesting sites for birds would not be impacted by livestock within the allotments.

Impacts to wildlife would primarily be beneficial in the form of increased vegetation for forage and cover and no disturbance from livestock operations. Removal of grazing could also involve not maintaining or even the removal of range improvements which could result in temporary disturbance to wildlife from human activity. Removal of water developments could also result in less water available to wildlife. No take of any migratory bird species would be anticipated from implementation of this alternative.

4.3 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 is intended to qualify and quantify the impacts to the environment that result from the incremental impact of the 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. Specific actions that have occurred, are occurring, or are likely to occur in the reasonably foreseeable future include:

- ***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 – livestock grazing has occurred in the area for 150+ years. The Imlay and Sullivan Tank 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. Cumulative impacts to livestock grazing are discussed in Section 4.3.1.

4.3.1 Cumulative Impacts to Livestock Grazing

The cumulative impact analysis area for livestock grazing is the Imlay and Sullivan Tank Allotments.

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 actions such as 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 Imlay and Sullivan Tank Allotments have been analyzed under the “Direct and Indirect Effects” section 4.2.1 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 allotment, as described above. 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. This additive impact may affect wildlife habitat or corridors and the greater ecosystems by altering vegetation associations or decreasing water quality. 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 renewal of livestock grazing permits did not identify any issues directly related to livestock grazing beyond those already discussed above. 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.

4.3.2 Cumulative Impacts to Vegetation Including Invasive, Non-Native Plant Species

The cumulative impact analysis area is the Imlay and Sullivan Tank allotments plus a one-mile buffer zone around the allotment boundaries.

The three alternatives considered in this document represent a negligible impact on the vegetation community and composition both within the Imlay and Sullivan Tank allotments and the surrounding cumulative impact analysis area. The primary impacts, in decreasing importance, to vegetation are climatic variability, previous overgrazing prior to the managed grazing system currently in use, wildfires and prescribed fire. Each of these has been discussed previously in this document. A 10-year grazing permit, with or without horses, or the denial of the permit would not be included on the primary impact list. Stipulations within the permit provide a mechanism to keep grazing from adversely interacting with climatic variability, such as drought, that could negatively impact the vegetative community. Similarly, the permit is written to prevent overgrazing. No prescribed fire treatments have been proposed for this area in the reasonably foreseeable future.

Invasive plant management within the analysis area is ongoing. Alternatives A and B generally aid in this effort because casual observations of invasive non-native plants by existing permittees can be a valuable tool in reducing and removing these undesirable plants from the landscape. Removal of grazing would impair this tool, instead relying primarily on staff. Ultimately, none of the alternatives would adversely affect invasive plant management or greatly aid the dispersal of invasive plants. Since there are no known novel invasive plants within the allotments, nothing proposed within this document would change the invasive plant species known in the cumulative impact analysis area.

4.3.3 Cumulative Impacts to Wildlife

The cumulative impact analysis area for wildlife species is the Imlay and Sullivan Tank Allotments. Actions that contribute cumulatively to the overall disturbance to wildlife and wildlife habitat include livestock grazing, recreation activities, and wildfire.

Past livestock grazing resulted in the degradation of wildlife habitat from overgrazing and the introduction of invasive plant species. Livestock grazing in the region has evolved and changed considerably since the 1860s. At the turn of the previous century, large herds of livestock grazed in uncontrolled open range, causing changes in plant, soil, and water relationships. In response, livestock grazing reform began in 1934 with 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. Grazing continues in the analysis area, and is managed such that ecological condition of the area is good and all land health standards are being met or are progressing toward being met.

Recreational pursuits, particularly OHV use, have caused disturbance to most all species and their habitats. 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 area. Impacts vary by species and by the location, level of use, and speed of travel over the road.

Wildfire has in the past and would likely continue to play a large role in the quality of habitat in the analysis area. Burned areas are slow to recover and the disturbance often results in an increase in non-native annual grasses. These non-native plants are often the fine fuels that carry the fire making burned areas more likely to burn again in the future.

It is anticipated that the action alternatives would continue to have incremental cumulative impacts to wildlife, particularly when added to other past, present, and reasonably foreseeable activities in the area.

4.4 Monitoring

Long Term: Long term monitoring studies are scheduled to be read at the key areas by the University of Arizona every five years (Appendix A, Figure 3). Frequency, cover, and composition data are collected using the pace frequency and dry-weight-rank (DWR) methods to measure achievement of standards for rangeland health and detect changes in resource conditions. This data is also used to determine whether the allotment is meeting the DPC Objectives established for each key area. DWR method of data collection would be used to monitor species composition. In addition, Pace Frequency and Step-Point studies would be used at each key area to detect changes of individual species and vegetative cover, which indicates a trend and status of basal and foliar cover. The DWR and pace frequency study methods are described in *Sampling Vegetation Attributes*, Interagency Technical Reference 1734-4 (BLM 1999b).

Short Term: Livestock use on key forage plants is determined annually 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). All monitoring data would be used to evaluate current management of the allotments and assist the BLM in making management decisions that help achieve vegetation objectives. Other information to be collected and compiled is precipitation, actual use, etc. All monitoring data would be used to evaluate current management and assist BLM in making management decisions that helps achieve vegetation objectives on the allotment.

Annual allotment compliance would be included in monitoring of this allotment. Compliance monitoring would assure terms and conditions of the permit are being met. Compliance checks would also monitor any special conditions or mitigation included in Cooperative Agreements, Section 4 Permits, or other grazing regulations.

The monitoring addressed above is sufficient to identify changes in vegetation because of livestock grazing activities. In addition to those methods described, there are efforts in place to inventory for noxious weed establishment, as well as monitor treated areas for treatment effectiveness. Known weed sites would be retreated as needed.

CHAPTER 5

5.0 CONSULTATION AND COORDINATION

Public involvement for the Imlay and Sullivan Tank Allotments Grazing Permit Renewal process began with a scoping meeting for the Imlay Allotment on 1/15/2003 and for the Sullivan Tank Allotment on 3/31/2004, followed by a field visit to the Imlay Allotment on 8/7/2004 and the Sullivan Tank Allotment on 6/30/2004. The evaluation was conducted by an interdisciplinary assessment team of BLM resource specialists assisted by the rangeland resources Team appointed by the Arizona Resource Advisory Council. The BLM completed an evaluation of rangeland health conditions on the Imlay and Sullivan Tank Allotments on 8/15/2005 (BLM 2005a). The allotments were revisited by an interdisciplinary team of resource specialists and the permittees in 2019 to update the assessment.

A preliminary EA was posted on the BLM ePlanning web page on March 24, 2021, for public review; a notice of public comment period letter was sent to those persons and groups listed on the Arizona Strip District Office interested publics mailing list notifying them of the availability of the EA for a 30-day review and comment period. Substantive comments received during development of the EA are summarized in Appendix G Table G.1 along with a response to each comment. Non-BLM Agency reviewers were also involved in the internal reviewed as noted in Table 5.2.

5.1 List of Preparers and Reviewers

Table 5.1 List of BLM Preparers/Reviewers

Name	Title	Responsible for the Following Program(s)
Mark Wimmer	Monument Manager	Authorizing Officer
Jannice Cutler	Rangeland Management Specialist	Project Lead, Grazing Administration/Vegetation
Gloria Benson	Tribal Liaison	Native American Religious Concerns
Amber Hughes	Planning & Environmental Coordinator	NEPA Compliance
Eathan McIntyre	Physical Scientist	Soil/Water/Air/Geology
Kendra Thomas	Lands and Realty Specialist	Lands/Realty
Jeff Young	Wildlife Biologist	Special Status Animals, Wildlife
Jennifer Fox	Ecologist	Vegetation/Special Status Plants, Invasive, Non-Native Species
Greg Page	Outdoor Recreation Planner	Wilderness, Recreation, Visual Resources
David Van Alfen	Archaeologist	Cultural Resources
Patrick Fleming	Fire & Fuels	Fire & Fuels

Table 5.2 Non-BLM Agency Reviewers

Name	Title	Agency/Organization
Luke Thompson	Field Supervisor	Arizona Game and Fish Department
Rob Nelson	Arizona Game & Fish	Habitat Evaluation and Lands Program Manager
Peter Bungart	Hualapai Tribe	Senior Archaeologist
Daniel Bulletts	Kaibab Paiute Tribe	Environmental Program Director

CHAPTER 6

6.0 REFERENCES

Arizona Game and Fish Department (AGFD). 2002. *Falco peregrinus anatum* Peregrine falcon. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, Arizona.

Arizona Game and Fish Department and U.S. Department of the Interior, Bureau of Land Management (AGFD and BLM). 2015. Arizona Strip Interdisciplinary Mule Deer Management Plan 2015-2019. 49 pp.

Balda, R.P. and G.C. Bateman. 1971. Flocking and Annual Cycle of the Piñon Jay (*Gymnorhinus cyanocephalus*). The Condor 73:287-302.

Brower, L. P., L.S. Fink, and P. Walford. 2006. Fueling the fall migration of the monarch butterfly. Integrative and Comparative Biology, 46(6):1123–1142.

Callison, J., Brotherson, J. D., & Bowns, J. E. 1985. The effects of fire on the blackbrush (*Coleogyne ramosissima*) community of southwestern Utah. Journal of Range Management, 38(6), 535-538.

Davies, K. W., Vavra, M., Schultz, B. and N. Rimbey. 2014. Implications of Longer Term Rest from Grazing in the Sagebrush Steppe. Journal of Rangeland Applications 1:14-34.

Desmond, M.J. and J.A. Savidge. 1996. Factors Influencing Burrowing Owl (*Speotyto cunicularia*) Nest Densities and Numbers in Western Nebraska. American Midland Naturalist 136(1):143-148.

Doswell, C. 1997. Misconceptions about what is "normal" for the atmosphere. *Cooperative Institute for Mesoscale Meteorological Studies,* National Severe Storms Laboratory, Norman, Oklahoma.

Eakle, W.L. and T.G. Grubb. 1986. Prey Remains from Golden Eagle Nests in Central Arizona. *Western Birds* 17:87-89.

Jepsen, S., D.F. Schweitzer, B. Young, N. Sears, M. Ormes, and S.H. Black. 2015. Conservation status and ecology of the Monarch butterfly in the United States. Arlington, VA: NatureServe and Portland, OR: The Xerces Society for Invertebrate Conservation. 28 p.

Latta, M.J., C.J. Beardmore, and T.E. Corman. 1999. Arizona Partners in Flight Bird Conservation Plan. Version 1.0. Nongame and Endangered Wildlife Program Technical Report 142. Arizona Game and Fish Department, Phoenix, Arizona.

National Drought Mitigation Center. 2015. From "*Understanding Weather Normals*" by Jack Williams, USAToday.com; NDMC "Drought Indices". Accessed at:

http://drought.unl.edu/ranchplan/DroughtBasics/WeatherDrought/WhatisNormalPrecipitation.aspx. Accessed April 20, 2015.

National Weather Service. 2021. Northern Arizona Monsoon Season. Accessed at: https://www.weather.gov/fgz/Monsoon. Accessed February 12, 2021.

MacCracken, J.G., D.W. Uresk, and R.M. Hansen. 1985. Vegetation and Soils of Burrowing Owl Nest Sites in Conata Basin, South Dakota. The Condor 87(1):152-154.

Olendorff, R.R. 1993. Status, biology, and management of ferruginous hawks: A review. Raptor Res. and Tech. Asst. Cen., Spec. Rep. U.S. Dept. Interior, Bur. Land Management, Boise, ID. 84 pp.

Scasta, J. D., Beck, J. L. and Angwin, C. J. 2016. Meta-Analysis of Diet Composition and Potential Conflict of Wild Horses with Livestock and Wild Ungulates on Western Rangelands of North America. Rangeland Ecology & Management 69:310-318.

Stotz, N.G. and R.P. Balda. 1995. Cache and Recovery Behavior of Wild Pinyon Jays in Northern Arizona. The Southwestern Naturalist 40:180-184.

U.S. Department of Agriculture (USDA). 2015. Pollinator-Friendly Best Management Practices for Federal Lands. 52 pp.

U.S. Department of the Interior, Bureau of Land Management (BLM). 1990. *Imlay and Sullivan Tank Allotments Allotment Management Plan.* Developed in 1988 and revised in 1990. Unpublished report on file at the Grand Canyon-Parashant National Monument, St. George, Utah.

U.S. Department of the Interior, Bureau of Land Management (BLM). 1997. *Arizona Standards for Rangeland Health and Guidelines for Grazing Administration.* United States Department of the Interior, Bureau of Land Management, Arizona State Office.

U.S. Department of the Interior, Bureau of Land Management (BLM). 1999a. *Utilization Studies and Residual Measurements*, Technical Reference 1734-3. Written by: Coulloudon, B., K. Eshelman, J. Gianola, N. Habich, L. Hughes, C. Johnson, M. Pellant, P. Podborny, A. Rasmussen, B. Robles, P. Shaver, J. Spehar, J. Willoughby. Denver, CO. BLM/RS/ST-96/004+1730. Pp 174.

U.S. Department of the Interior, Bureau of Land Management (BLM). 1999b. *Sampling Vegetation Attributes*, Technical Reference 1734-4. Written by: Coulloudon, B., K. Eshelman, J. Gianola, N. Habich, L. Hughes, C. Johnson, M. Pellant, P. Podborny, A. Rasmussen, B. Robles, P. Shaver, J. Spehar, J. Willoughby. Denver, CO. BLM/RS/ST-96/004+1730. Pp 171.

U.S. Department of the Interior, Bureau of Land Management (BLM). 2001. *Ecological Site Inventory*, Technical Reference 1734-7. Written by: Habich, E.F. Denver, CO. BLM/ST/ST-01/003+1734. pp. 112.

U.S. Department of the Interior, Bureau of Land Management (BLM). 2005a. *Standards for Rangeland Health and Guidelines for Grazing Administration Implementation Project: Allotment Assessment for Imlay/Sullivan Tank AMP 4817/4816.* Unpublished report on file at the Grand Canyon-Parashant National Monument, St. George, Utah.

U.S. Department of the Interior, Bureau of Land Management (BLM). 2005b. *Interpreting Indicators of Rangeland Health, Version 4*, Technical Reference 1734-6. Written by: Pellant, M., P. Shaver, D.A. Pyke, and J.E. Herrick. Denver, CO. BLM/ST/ST-01/003+1734. Pp. 112.

U.S. Department of the Interior, Bureau of Land Management (BLM). 2008a. *Grand Canyon-Parashant National Monument Resource Management Plan (RMP).* Bureau of Land Management, St. George, Utah.

U.S. Department of the Interior, Bureau of Land Management (BLM). 2008b. National *Environmental Policy Act.* BLM Handbook H-1790-1. Bureau of Land Management, Washington D.C.

U.S. Department of the Interior. Bureau of Land Management (BLM) and U.S. Fish and Wildlife Service (USFWS). 2010. Memorandum of Understanding (MOU) between the U.S. Department of the Interior Bureau of Land Management and the U. S. Fish and Wildlife Service to Promote the Conservation of Migratory Birds. Washington D.C. 13 pp.

U.S. Fish and Wildlife Service (USFWS). 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp.
Online version available at <http://www.fws.gov/migratorybirds/>]

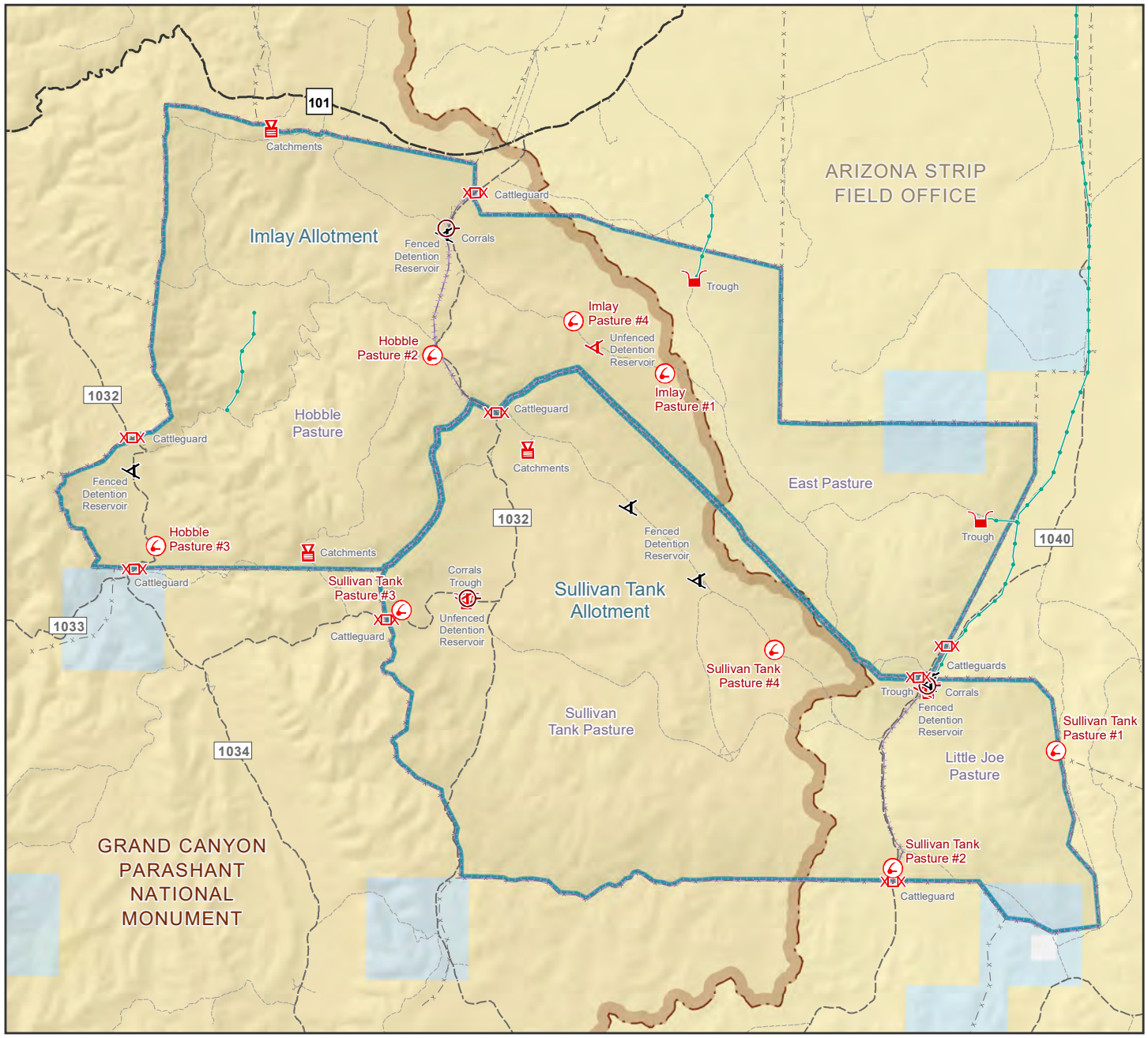
U.S. Department of the Interior, U.S. Fish and Wildlife Service (USFWS). 2020. Endangered and Threatened Wildlife and Plants; 12-Month Finding for the Monarch Butterfly. 85 FR 81813.

University of Arizona, College of Agriculture and Life Sciences – Arizona Cooperative Extension. 2010. *Rangeland Monitoring: Selecting Key Areas*. Written by: Jeff Schalau, Associate Agent, Agriculture & Natural Resources. Originally published in 2001, revised January 2010.

Wiggins, D.A. 2005. Pinyon Jay (*Gymnorhinus cyanocephalus*): a Technical Conservation Assessment. [Online]. USDA Forest Service, Rocky Mountain Region.

Appendix A, Figure 2 - Imlay and Sullivan Tank Allotments Range Improvements and Key Areas

Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office and Grand-Canyon Parashant National Monument



Grazing Allotment

Grazing Pasture within Renewal Allotments

Range Study Sites

Key Area

Range Development Point

Catchments (3)

Unfenced Detention Reservoir (3)

Fenced Detention Reservoir (6)

Trough (4)

Corrals and Loading Chutes (3)

Cattleguard (8)

Range Development Line

Fence

Pipeline

BLM National Monument

Surface Management Agency

Bureau of Land Management

State

Private

Arizona Strip Routes

Primary Road Unpaved

Secondary Road Unpaved

Tertiary Road Unpaved

0 0.5 1 2 3 4 5 Miles

0 0.5 1 2 3 4 5 Kilometers

Map Produced by BLM Arizona Strip District
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Coordinate System: NAD 1983 UTM Zone 12N
Reference System: U.S. PLSS GSRB&M
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Date: 2/11/2021

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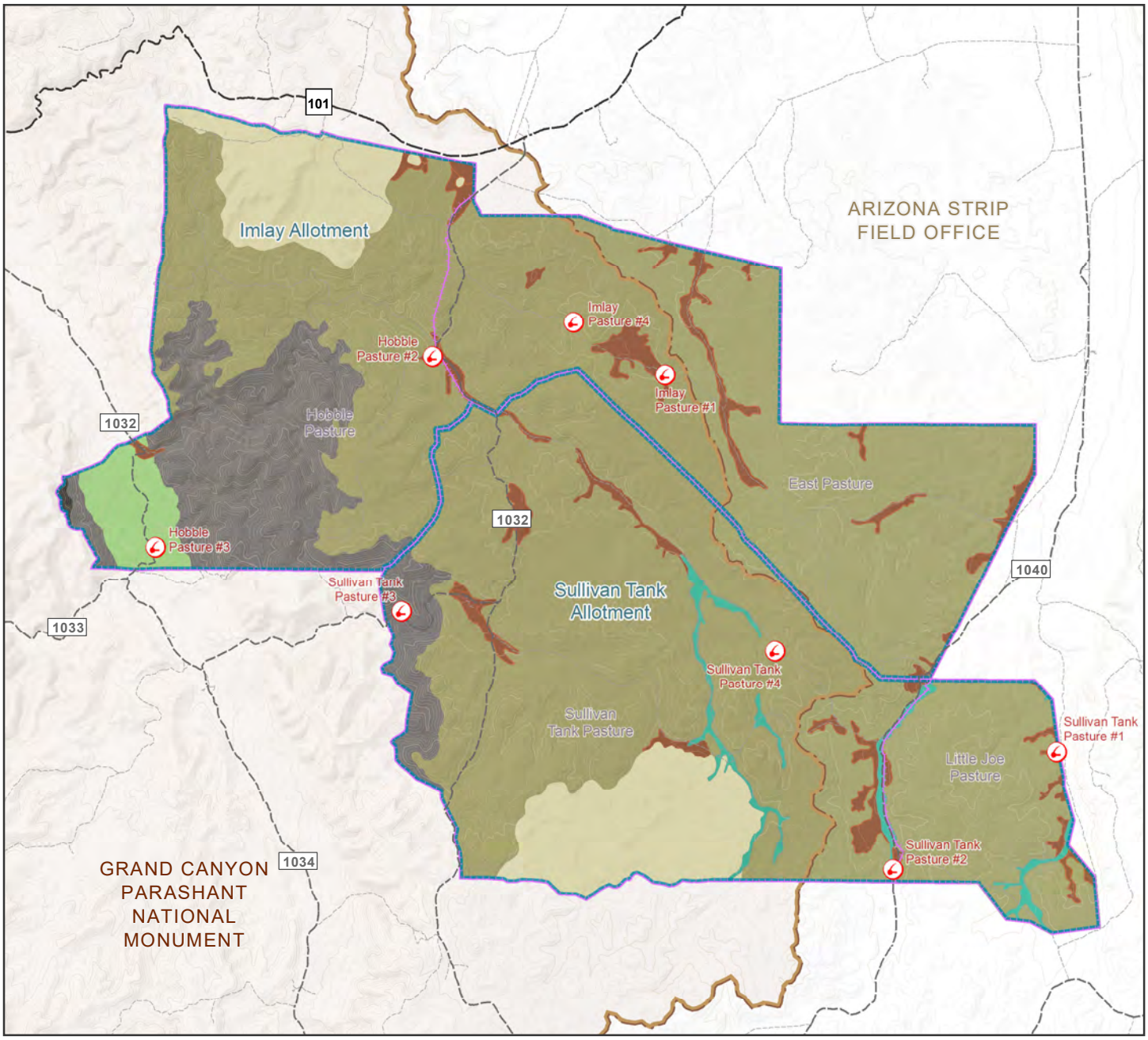
Appendix A Figure 3 - Imlay and Sullivan Tank Allotments Ecological Site Description with Key Areas

Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office and Grand-Canyon Parashant National Monument



- Grazing Allotment
- Grazing Pasture within Renewal Allotments

Range Study Sites

- Key Area

Arizona Strip Routes

- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- BLM National Monument

Contours

- Index (200 ft interval)
- Intermediate (40 ft interval)

Ecological Site Description

- Limestone Hills 13-17" p.z. (PIED, JUOS)
- Limestone/Sandstone Upland 10-14" p.z.
- Loamy Upland 10-14" p.z.
- Shallow Upland 10-14" p.z. Warm
- Loamy Wash 10-14" p.z.
- Sedimentary Cliffs 10-14" p.z.
- Basalt Slopes 10-14" p.z. Calcareous

0 0.5 1 2 3 4 5 Miles

0 0.5 1 2 3 4 5 Kilometers

Map Produced by BLM Arizona Strip District
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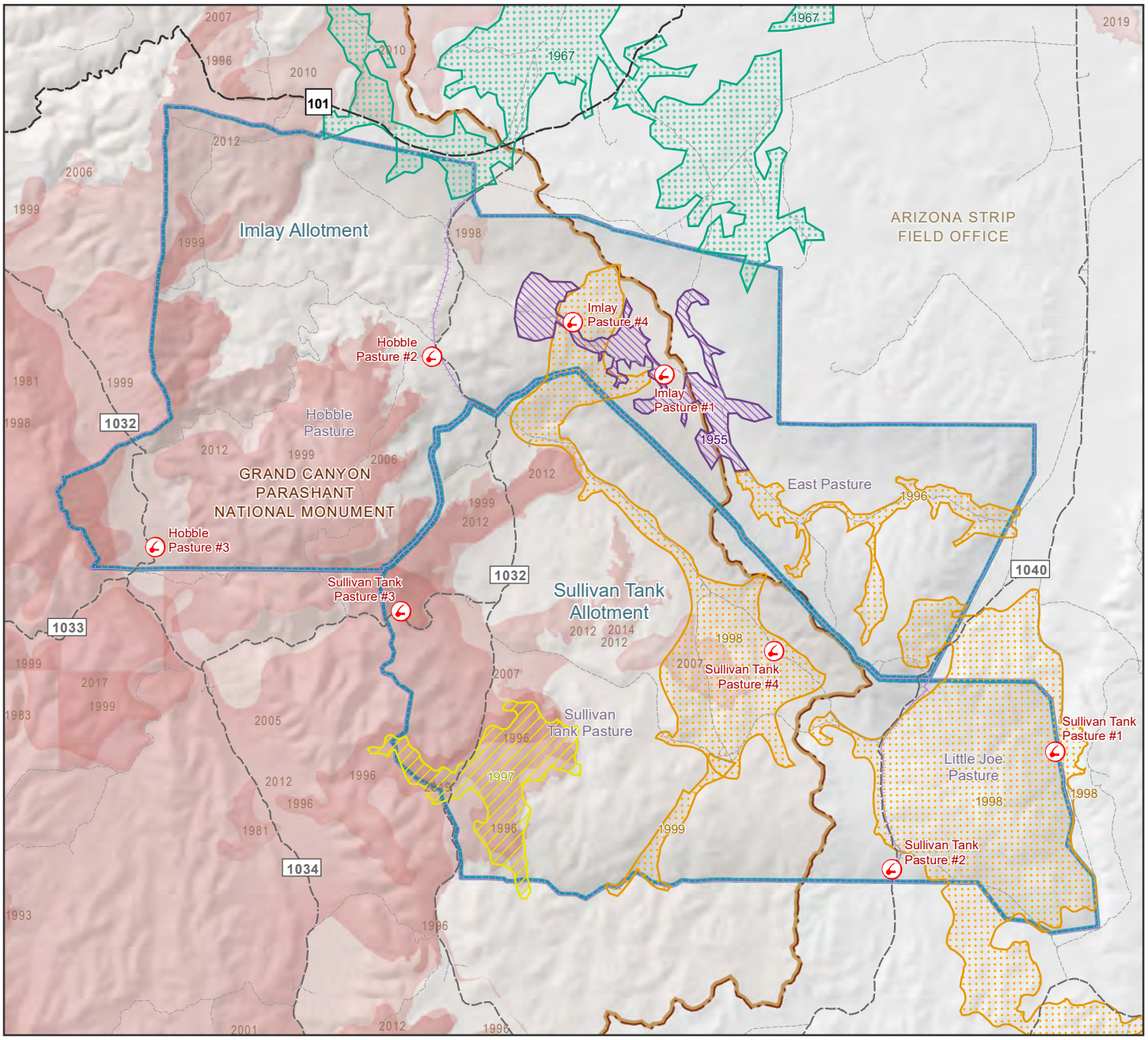
Appendix A, Figure 4 - Imlay and Sullivan Tank Allotments Wildfire History and Historic Vegetation Treatments

Bureau of Land Management - Arizona Strip District - Arizona Strip Field Office and Grand-Canyon Parashant National Monument



- Grazing Allotment
- Grazing Pasture within Renewal Allotments
- Key Area

Arizona Strip Routes

- Primary Road Unpaved
- Secondary Road Unpaved
- Tertiary Road Unpaved
- BLM National Monument

- Historic Wildfire Perimeter

Darker fire perimeter shading indicates an area has burned more than once

Vegetation Treatments

- Prescribed Burn
- Mechanical Treatment
- Chemical Treatment
- Reseeds / Planting

0 0.5 1 2 3 4 5 Miles

0 0.5 1 2 3 4 5 Kilometers

Map Produced by BLM Arizona Strip District
File: Map_AppX_Fire_Treatments_Imlay_SullivanTank_GPR_2021.mxd
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Date: 2/16/2021

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APPENDIX B – Arizona Standards for Rangeland Health and Guidelines for Grazing Administration (BLM 1997).

INTRODUCTION

The Department of the Interior's final rule for Grazing Administration, issued on February 22, 1995, and effective August 21, 1995, requires that Bureau of Land Management (BLM) State Directors develop State or regional standards and guidelines for grazing administration in consultation with BLM Resource Advisory Councils (RAC), other agencies and the public. The final rule provides those fallback standards and guidelines be implemented, if State standards and guidelines are not developed by February 12, 1997. Arizona Standards and Guidelines and the final rule apply to grazing administration on public lands as indicated by the following quotation from the Federal Register, Volume 60, Number 35, page 9955.

> "The fundamentals of rangeland health, guiding principles for standards and the fallback standards address ecological components that are affected by all uses of public rangelands, not just livestock grazing. However, the scope of this final rule, and therefore the fundamentals of rangeland health of §4180.1, and the standards and guidelines to be made effective under §4180.2, are limited to grazing administration."

Although the process of developing standards and guidelines applies to grazing administration, present rangeland health is the result of the interaction of many factors in addition to grazing by livestock. Other contributing factors may include, but are not limited to, past land uses, land use restrictions, recreation, wildlife, rights-of-way, wild horses and burros, mining, fire, weather, and insects and disease.

With the commitment of BLM to ecosystem and interdisciplinary resource management, the standards for rangeland health as developed in this current process will be incorporated into management goals and objectives. The standards and guidelines for rangeland health for grazing administration, however, are not the only considerations in resolving resource issues.

The following quotations from the Federal Register, Vol. 60, No. 35, page 9956, February 22, 1995, describe the purpose of standards and guidelines and their implementation:

> "The guiding principles for standards and guidelines require that State or regional standards and guidelines address the basic components of healthy rangelands. The Department believes that by implementing grazing-related actions that are consistent with the fundamentals of §4180.1 and the guiding principles of §4180.2, the long-term health of public rangelands can be ensured.
>
> "Standards and guidelines will be implemented through terms and conditions of grazing permits, leases, and other authorizations, grazing-related portions of activity plans (including Allotment Management Plans), and through range improvement-related activities.

"The Department anticipates that in most cases the standards and guidelines themselves will not be terms and conditions of various authorizations but that the terms and conditions will reflect the standards and guidelines.

"The Department intends that assessments and corrective actions will be undertaken in priority order as determined by BLM.

"The Department will use a variety of data including monitoring records, assessments, and knowledge of the locale to assist in making the "significant progress" determination. It is anticipated that in many cases it will take numerous grazing seasons to determine direction and magnitude of trend. However, actions will be taken to establish significant progress toward conformance as soon as sufficient data are available to make informed changes in grazing practices."

FUNDAMENTALS AND DEFINITION OF RANGELAND HEALTH

The Grazing Administration Regulations, at §4180.1 (43 Code of Federal Regulation [CFR] 4180.1), Federal Register Vol. 60, No. 35, pg. 9970, direct that the authorized officer ensures that the following conditions of rangeland health exist:

(a) Watersheds are in, or are making significant progress toward, properly functioning physical condition, including their upland, riparian-wetland, and aquatic components; soil and plant conditions support infiltration, soil moisture storage, and the release of water that are in balance with climate and landform and maintain or improve water quality, water quantity, and timing and duration of flow.

(b) Ecological processes, including the hydrologic cycle, nutrient cycle, and energy flow, are maintained, or there is significant progress toward their attainment, in order to support healthy biotic populations and communities.

(c) Water quality complies with State water quality standards and achieves, or is making significant progress toward achieving, established BLM management objectives such as meeting wildlife needs.

(d) Habitats are, or are making significant progress toward being, restored or maintained for Federal threatened and endangered species, Federal Proposed, Category 1 and 2 Federal candidate and other special status species.

These fundamentals focus on sustaining productivity of a rangeland rather than its uses. Emphasizing the physical and biological functioning of ecosystems to determine rangeland health is consistent with the definition of rangeland health as proposed by the Committee on Rangeland Classification, Board of Agriculture, National Research Council (Rangeland Health, 1994, pg. 4 and 5). This Committee defined Rangeland Health ". . .as the degree to which the integrity of the soil and the ecological processes of rangeland ecosystems are sustained." This committee emphasized ". . .the degree of integrity of the soil and ecological processes that are

most important in sustaining the capacity of rangelands to satisfy values and produce commodities." The Committee also recommended that "The determination of whether a rangeland is healthy, at risk, or unhealthy should be based on the evaluation of three criteria: degree of soil stability and watershed function, integrity of nutrient cycles and energy flow, and presence of functioning mechanisms" (Rangeland Health, 1994, pg. 97-98).

Standards describe conditions necessary to encourage proper functioning of ecological processes on specific ecological sites. An ecological site is the logical and practical ecosystem unit upon which to base an interpretation of rangeland health. Ecological site is defined as:

". . . a kind of land with specific physical characteristics which differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its response to management" (Journal of Range Management, 48:279, 1995). Ecological sites result from the interaction of climate, soils, and landform (slope, topographic position). The importance of this concept is that the "health" of different kinds of rangeland must be judged by standards specific to the potential of the ecological site. Acceptable erosion rates, water quality, productivity of plants and animals, and other features are different on each ecological site.

Since there is wide variation of ecological sites in Arizona, standards and guidelines covering these sites must be general. To make standards and guidelines too specific would reduce the ability of BLM and interested publics to select specific objectives, monitoring strategies, and grazing permit terms and conditions appropriate to specific landforms.

Ecological sites have the potential to support several different plant communities. Existing communities are the result of the combination of historical and recent uses and natural events. Management actions may be used to modify plant communities on a site. The desired plant community for a site is defined as follows: "Of the several plant communities that may occupy a site, the one that has been identified through a management plan to best meet the plan's objectives for the site. It must protect the site as a minimum." (Journal of Range Management, 48:279, 1995.)

Fundamentals (a) and (b) define physical and biological components of rangeland health and are consistent with the definition of rangeland health as defined by the Committee on Rangeland Classification, Board on Agriculture, National Research Council, as discussed in the paragraph above. These fundamentals provide the basis for sustainable rangelands.

Fundamentals (c) and (d) emphasize compliance with existing laws and regulation and, therefore, define social and political components of rangeland health. Compliance with Fundamentals (c) and (d) is accomplished by managing to attain a specific plant community and associated wildlife species present on ecological sites. These desired plant communities are determined in the BLM planning process, or, where the desired plant community is not identified, a community may be selected that will meet the conditions of Fundamentals (a) and (b) and also adhere to laws and regulations. Arizona Standard 3 is written to comply with Fundamentals (c) and (d) and provide a logical combination of Standards and Guidelines for planning and management purposes.

STANDARD AND GUIDELINE DEFINITIONS

Standards are goals for the desired condition of the biological and physical components and characteristics of rangelands. Standards:

(1) are measurable and attainable; and

(2) comply with various Federal and State statutes, policies, and directives applicable to BLM Rangelands.

Guidelines are management approaches, methods, and practices that are intended to achieve a standard. Guidelines:

(1) typically identify and prescribe methods of influencing or controlling specific public land uses;

(2) are developed and applied consistent with the desired condition and within site capability; and

(3) may be adjusted over time.

IMPLEMENTING STANDARDS AND GUIDELINES

The authorized officer will review existing permitted livestock use, allotment management plans, or other activity plans which identify terms and conditions for management on public land. 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 significant progress toward meeting, the standards and are in conformance with the guidelines. The review will be interdisciplinary and conducted under existing rules which provide for cooperation, coordination, and consultation with affected individuals, federal, state, and local agencies, tribal governments, private landowners, and interested publics.

This review will use a variety of data, including monitoring records, assessments, and knowledge of the locale to assist in making the significant progress determination. Significance will be determined on a case-by-case basis, considering site potential, site condition, weather and financial commitment. It is anticipated there will be cases where numerous years will be needed to determine direction and magnitude of trend.

Upon completion of review, the authorized officer shall take appropriate action as soon as practicable but no later than the start of the next grazing year upon determining that the existing grazing management practices or level of use on public land are significant factors contributing to failure to achieve the standards and conform with the guidelines that are made effective under 43 CFR 4180.2. Appropriate action means implementing actions that will result in significant progress toward fulfillment of the standards and significant progress toward conformance with guidelines.

Livestock grazing will continue where significant progress toward meeting standards is being made. Additional activities and practices would not be needed on such allotments. Where new activities or practices are required to assure significant progress toward meeting standards, livestock grazing use can continue contingent upon determinations from monitoring data that the implemented actions are effective in making significant progress toward meeting the standards. In some cases, additional action may be needed as determined by monitoring data over time.

New plans will incorporate an interdisciplinary team approach (Arizona BLM Interdisciplinary Resource Management Handbook, April 1995). The terms and conditions for permitted grazing in these areas will be developed to comply with the goals and objectives of these plans which will be consistent with the standards and guidelines.

ARIZONA STANDARDS AND GUIDELINES

Arizona Standards and Guidelines (S&G) for grazing administration have been developed through a collaborative process involving the Bureau of Land Management State S&G Team and the Arizona Resource Advisory Council. Together, through meetings, conference calls, correspondence, and Open Houses with the public, the BLM State Team and RAC prepared Standards and Guidelines to address the minimum requirements outlined in the grazing regulations. The Standards and Guidelines, criteria for meeting Standards, and indicators are an integrated document that conforms to the fundamentals of rangeland health and the requirements of the regulations when taken as a whole.

Upland sites, riparian-wetland areas, and desired resource conditions are each addressed by a standard and associated guidelines.

Standard 1: Upland Sites

Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate and landform (ecological site).

Criteria for meeting Standard 1:
Soil conditions support proper functioning of hydrologic, energy, and nutrient cycles. Many factors interact to maintain stable soils and healthy soil conditions, including appropriate amounts of vegetative cover, litter, and soil porosity and organic matter. Under proper functioning conditions, rates of soil loss and infiltration are consistent with the potential of the site.

Ground cover in the form of plants, litter or rock 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.

Signs of accelerated erosion are minimal or diminishing for the ecological site as determined by monitoring over an established period of time.

As indicated by such factors as:

Ground Cover	Signs of erosion
litter	flow pattern
live vegetation, amount and type (e.g.,	gullies
grass, shrubs, trees, etc.)	rills
rock	plant pedestaling

Exceptions and exemptions (where applicable): none

Guidelines:
1-1. Management activities will maintain or promote ground cover that will provide for infiltration, permeability, soil moisture storage, and soil stability appropriate for the ecological sites within management units. The ground cover should maintain soil organisms and plants and animals to support the hydrologic and nutrient cycles, and energy flow. Ground cover and signs of erosion are surrogate measures for hydrologic and nutrient cycles and energy flow.

1-2. When grazing practices alone are not likely to restore areas of low infiltration or permeability, land management treatments may be designed and implemented to attain improvement.

Standard 2: Riparian-Wetland Sites

Riparian-wetland areas are in properly functioning condition.

Criteria for meeting Standard 2:

Stream channel morphology and functions are appropriate for proper functioning condition for existing climate, landform, and channel reach characteristics. Riparian-wetland areas are functioning properly when adequate vegetation, land form, or large woody debris is present to dissipate stream energy associated with high water flows.

Riparian-wetland functioning condition assessments are based on examination of hydrologic, vegetative, soil and erosion-deposition factors. BLM has developed a standard checklist to address these factors and make functional assessments. Riparian-wetland areas are functioning properly as indicated by the results of the application of the appropriate checklist.

The checklist for riparian areas is in Technical Reference 1737-9 "Process for Assessing Proper Functioning Condition." The checklist for wetlands is in Technical Reference 1737-11 "Process for Assessing Proper Functioning Condition for Lentic Riparian-Wetland Areas."

As indicated by such factors as:

Gradient
Width/depth ratio
Channel roughness and sinuosity of stream channel
Bank stabilization
Reduced erosion
Captured sediment
Ground-water recharge
Dissipation of energy by vegetation

Exceptions and exemptions (where applicable):

Dirt tanks, wells, and other water facilities constructed or placed at a location for the purpose of providing water for livestock and/or wildlife and which have not been determined through local planning efforts to provide for riparian or wetland habitat are exempt.

Water impoundments permitted for construction, mining, or other similar activities are exempt.

Guidelines:

2-1. Management practices maintain or promote sufficient vegetation to maintain, improve or restore riparian-wetland functions of energy dissipation, sediment capture, groundwater recharge and stream bank stability, thus promoting stream channel morphology (e.g., gradient, width/depth ratio, channel roughness and sinuosity) and functions appropriate to climate and landform.

2-2. New facilities are located away from riparian-wetland areas if they conflict with achieving or maintaining riparian-wetland function. Existing facilities are used in a way that does not conflict with riparian-wetland functions or are relocated or modified when incompatible with riparian-wetland functions.

2-3. The development of springs and seeps or other projects affecting water and associated resources shall be designed to protect ecological functions and processes.

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.

Desired plant community objectives will be developed to assure that soil conditions and ecosystem function described in Standards 1 and 2 are met. They detail a site-specific plant community, which when obtained, will assure rangeland health, State water quality standards, and habitat for endangered, threatened, and sensitive species. Thus, desired plant community objectives will be used as an indicator of ecosystem function and rangeland health.

As indicated by such factors as:

Composition
Structure
Distribution

Exceptions and exemptions (where applicable):

Ecological sites or stream reaches on which a change in existing vegetation is physically, biologically, or economically impractical.

Guidelines:

3-1. 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 are appropriate for use where native species (a) are not available, (b) are not economically feasible, (c) cannot achieve ecological objectives as well as non-native species, and/or (d) cannot compete with already established non-native species.

3-2. Conservation of Federal threatened or endangered, proposed, candidate, and other special status species is promoted by the maintenance or restoration of their habitats.

3-3. Management practices maintain, restore, or enhance water quality in conformance with State or Federal standards.

3-4. Intensity, season and frequency of use, and distribution of grazing use should provide for growth and reproduction of those plant species needed to reach desired plant community objectives.

3-5. Grazing on designated ephemeral (annual and perennial) rangeland may be authorized if the following conditions are met:

ephemeral vegetation is present in draws, washes, and under shrubs and has grown to useable levels at the time grazing begins;

sufficient surface and subsurface soil moisture exists for continued plant growth;

serviceable waters are capable of providing for proper grazing distribution;

sufficient annual vegetation will remain on site to satisfy other resource concerns, (i.e., watershed, wildlife, wild horses and burros); and

monitoring is conducted during grazing to determine if objectives are being met.

3-6. Management practices will target those populations of noxious weeds which can be controlled or eliminated by approved methods.

3-7. Management practices to achieve desired plant communities will consider protection and conservation of known cultural resources, including historical sites, and prehistoric sites and plants of significance to Native American peoples.

APPENDIX C - Land Health Evaluation Update for the Imlay Allotment

The Imlay Allotment land health evaluation was completed in 2005 (BLM 2005a). That evaluation showed that the allotment was making progress towards meeting the applicable standards for rangeland health (Section 3.2.3). This update re-evaluates the allotment based on analysis of additional monitoring data that has been collected since the original evaluation was completed.

Imlay Allotment Updated Monitoring Data

Actual Use

Actual use as reported by the permittee annually. Total active preference for the allotment is 734 AUMs. Average annual AUMs used, during the ten-years 2010 – 2020, was 573 which is 78% of the total available. AUMs used ranged from 65% in 2013 to 90% in 2012.

Table C.1. Imlay Allotment Actual Use

Grazing Year	AUMs Used	Total Active AUMs Available	Percent Active AUMs Used
2010	484	734	66%
2011	492	734	67%
2012	658	734	90%
2013	480	734	65%
2014	482	734	66%
2015	526	734	72%
2016	642	734	87%
2017	627	734	85%
2018	656	734	89%
2019	624	734	85%
2020	630	734	86%
Average	573		78%

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). The Grazed-Class Method was used to collect the data (Section 4.4 Monitoring). Utilization is read at or around key areas. Average utilization levels of key forage species for this allotment should not exceed 50% (BLM 2008a). Utilization data from 1991 – 2020 has been compiled in the following tables. Tables C.2 - C.5 show percent utilization of key forage species by year read at each of the four 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 at a specific key area. No average utilization readings above 50% were recorded at any of the four key areas in the Imlay Allotment.

Utilization on key species has ranged from 0 – 58%, with most readings below 40%, which allows the species to maintain themselves in drought, even with grazing. There was one reading

at Key Area #1 in 2016 on *Sporobolus cryptandrus* (a perennial grass) at 50%, and one reading at Key Area #2 in 2016 on *Sitanion hystrix* (perennial grass) at 58%. In addition, livestock are removed from the allotment by 5/31 each year (Table 2.2), allowing for growing season rest.

Table C.2. Utilization, Imlay Key Area #1 (Imlay-East Pasture)

Percent utilization of key species at Key Area #1 by year.											
Species	**1991**	**1992**	**1993**	**1994**	**1998**	**2000**	**2003**	**2016**	**2018**	**2019**	**2020**
Grasses											
Agropyron smithii *								38	7	20	38
Hilaria jamesii *	41	34	38	3	4	20	2	10	6	17	23
Oryzopsis hymenoides *	43	41	41	10	20	32	0	18	7	24	33
Sitanion hystrix *	47	45	45	6	30	31	0	3	8	16	12
Sporobolus cryptandrus *	30	47	32	3	3	28	0	50	17		
Average Percent Utilization by Year	41	42	40	7	18	29	2	16	8	19	28

*Key species

Table C.3. Utilization, Imlay Key Area #2 – Middle (Imlay-Hobble Pasture)

Percent utilization of key species at Key Area #2 by year.											
Species	**1992**	**1993**	**1994**	**1998**	**1999**	**2000**	**2003**	**2016**	**2018**	**2019**	**2020**
Grasses											
Agropyron sp.	44	25	19								
Hilaria jamesii *	36	33	17	20	18	24	2	39	8	13	24
Oryzopsis hymenoides *	36	43	32	30	27	30		41	9	13	25
Sitanion hystrix *	43	30	23	35	24	36	0	58	8	10	10
Sporobolus cryptandrus *				27	13	43					
Average Percent Utilization by Year	39	34	23	27	21	32	2	41	8	12	20

*Key species

Table C.4. Utilization, Imlay Key Area #3 – West (Imlay-Hobble Pasture)

Percent utilization of key species at Key Area #3 by year.											
Species	**1993**	**1994**	**1995**	**1998**	**1999**	**2000**	**2003**	**2016**	**2018**	**2019**	**2020**
Grasses											
Hilaria jamesii *	41	30	16	27	23	17	0	24	12	11	17
Oryzopsis hymenoides *	39	18	13	30	25	33	0	35	21	1	13
Sitanion hystrix *	38	18	17	29	29	28	0	7	12	3	10
Average Percent Utilization by Year	39	21	16	29	26	27	0	18	14	5	12

*Key species

Table C.5. Utilization, Imlay Key Area #4 (Imlay-East Pasture).

Percent utilization of key species at Key Area #4 by year.	
Species	**2020**
Grasses	
Hilaria jamesii *	17
Oryzopsis hymenoides *	26
Sitanion hystrix *	0
Stipa comata	10
Average Percent Utilization by Year	14

*Key species
This key area was established in 2019.

Trend

Trend monitoring was conducted at four key areas in the Imlay Allotment. There are two pastures within the Imlay Allotment, the Imlay-East Pasture and the Imlay-Hobble Pasture. There are two key areas in each pasture (See Appendix A, Figure 3).

Data was collected using the Pace-Frequency method (Section 4.4 Monitoring). This method of monitoring measures the percent of bare ground, litter, rock and live vegetation/basal cover. In additional, it measures the occurrence frequency of plant species. Key Areas #1, #2, and #3 were established in 1982. Key Area #4 was established and read in 2019.

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 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. Detailed tables for each key area with data by year and species is available below in Tables C.6 - C.13. 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 (Upland Sites) of the Arizona Standards for Rangeland Health (Appendix B, BLM 1997). Overall trend at a key area is the direction of change in frequency observed between the initial reading (base year) and the current reading, as depicted by the arrows, i.e., (↗) up, (↘) down, and (→) no apparent static or static. The threshold for a change in trend is +/- 10 percent.

Table C.6. Trend Data, Imlay Key Area #1 (Imlay-East Pasture)

Imlay Key Area # 1 Percent Frequency								
Species	**1982**	**1985**	**1988**	**1992**	**2003**	**2009**	**2014**	**2019**
Woody Species								
Artemisia tridentata	57	72	62	76			6	
Gutierrezia sarothrae	1	3	25	26		4	26	41
Juniperus osteosperma		1	2	2				
Grasses -Perennial								
Agropyron cristatum							1	
Agropyron smithii *	1	3	2	3				
Hilaria jamesii *	13	27	15	20	12	29	43	22
Oryzopsis hymenoides *	2	17	6	6		1		
Sitanion hystrix *	11	36	11	12	1	1	11	
Sporobolus cryptandrus *		18	10	11	1	3	2	5
Forbs – Perennial/Biennial								
Allium	1		1					1
Aster arenosus							1	1
Penstemon		1	4	5	2	1	2	
Sphaeralcea		18	5	5	5	41	74	67
Annuals								
Annual forb #1					3			
Annual forb(s)					81	41	1	65
Bromus tectorum							20	27
Eriogonum deflexum					92	42		1
Euphorbia					69		74	83
Portulaca oleracea							2	
Unclassified								
Aster						1		
Mentzelia						44		2

*Key species

Table C.7. Overall Trend, Imlay Key Area #1 (Imlay-East Pasture)

Imlay Key Area #1				
Year	**Percent Frequency of Key Species**	**Percent Live Basal Vegetation**	**Percent Litter**	**Total**
1982	27	3	31	61
1985	101	3	19	123
1988	44	6	25	75
1992	51	6	19	76
2003	16	1	50	67
2009	34	6	7	47
2014	55	4	49	108
2019	27	11	26	64
Overall Trend for Imlay Key Area #1: (→) Static				

The trend for Key Area # 1 was static from 1982 as compared to 2019. Data from 2019 showed no change in the percent frequency of key species. A slight increase in percentage of live basal vegetation. A slight decrease on percent litter. The total reading is just over a 3 percent increase which us within the +/- 10% change threshold for static overall trend.

Table C.8. Trend Data, Imlay Key Area #2 – Middle (Imlay-Hobble Pasture)

Imlay Key Area # 2 Percent Frequency										
Species	**1982**	**1984**	**1985**	**1989**	**1992**	**1997**	**2003**	**2009**	**2014**	**2019**
Woody Species										
Artemisia tridentata	75	71	87	80	73	78	64	68	72	89
Eriogonum – shrub #1				1	2	4				
Gutierrezia sarothrae	1	4	1	5	6	8		1	2	1
Juniperus osteosperma		1			1				1	2
Opuntia							1			
Opuntia - Cholla										1
Grasses - Perennial										
Agropyron smithii *	4	9	8	9	10	8		2	2	1
Hilaria jamesii *	7	11	10	18	20	24	1	3	5	
Oryzopsis hymenoides *	1	3	9	6	7	6		1		
Sitanion hystrix *	17	31	34	29	30	17	2	6	15	8
Sporobolus cryptandrus *			1						1	1
Forbs – Perennial/Biennial										
Hymenopappus filifolius								1		
Perennial forb(s)						2				3
Phlox longifolia								5	1	
Sphaeralcea		2		3	6	9		2	8	7
Annuals										
Annual forb(s)		5		4			67	16		39
Bromus tectorum									1	
Euphorbia									19	8
Helianthus annuus										1

*Key species

Table C.9. Overall Trend, Imlay Key Area #2 – Middle (Imlay-Hobble Pasture)

Imlay Key Area #2				
Year	**Percent Frequency of Key Species**	**Percent Live Basal Vegetation**	**Percent Litter**	**Total**
1982	29	5	41	75
1984	54	5	49	108
1985	62	5	41	108
1989	62	3	35	100
1992	67	4	32	103
1997	55	5	37	97
2003	3	3	49	55
2009	12	2	51	65
2014	23	1	57	81
2019	10	2	74	86
Overall Trend for Imlay Key Area #2: (↗) Upward				

The trend for Key Area # 2 was upward from 1982 to 2019. Data from 2019 showed a decrease in the percent frequency of key species. A decrease in live basal vegetation. A large increase in percent litter. Overall, there was an increase of 11% since 1982.

Table C.10. Trend Data, Imlay Key Area #3 – West (Imlay-Hobble Pasture)

Imlay Key Area # 3 Percent Frequency									
Species	**1982**	**1985**	**1988**	**1992**	**1997**	**2003**	**2009**	**2014**	**2019**
Woody Species									
Artemisia tridentata	32	53	51	52	63	32	25	22	35
Atriplex canescens								1	
Berberis fremontii		1	1	2	2	1		1	2
Chrysothamnus viscidiflorus						2	20		
Coleogyne ramosissima	8					2		3	3
Cowania mexicana *	1	1	1	2	3		2		1
Ephedra nevadensis			1	2	3		1		
Eriogonum microthecum							1		
Gutierrezia sarothrae	18	37	30	27	31	2	14	32	37
Juniperus osteosperma	14	7	3	3	2	13	15	11	15
Lycium andersonii		4							
Lycium pallidum			2	3	2	10	7	5	13
Opuntia								1	
Pinus edulis								1	
Purshia tridentata			2	2			4		
Stanleya pinnata								1	
Viguiera deltoidea var. parishii						1			
Grasses - Perennial									
Aristida						1			
Aristida longiseta								1	
Hilaria jamesii *		2	3	4	6	2	3	2	5
Oryzopsis hymenoides *	1	4	6	7	9		1	3	1
Poa fendleriana *									2
Sitanion hystrix *	6	19	14	15	17	10	27	44	44
Forbs – Perennial/Biennial									
Lomatium dissectum									2
Perennial forb #1		10	3			6			
Perennial forb(s)		8	2	2	3	1			
Phlox longifolia							9		
Sphaeralcea		3	2	4	8	1	4	1	4
Annuals									
Annual forb #2						2			
Annual forb(s)						53	8	2	20
Annual grass(es)						1			
Bromus tectorum			8			43		5	11
Cordylanthus parviflorus									22
Eriogonum deflexum									2
Euphorbia						6		1	8
Helianthus annuus									1
Heliomeris multiflora									5
Unclassified									
Aster	1		2	2	3				
Astragalus						2			
Phlox						10			2

*Key species

Table C.11. Overall Trend, Imlay Key Area #3 – West (Imlay-Hobble Pasture)

Imlay Key Area #3				
Year	**Percent Frequency of Key Species**	**Percent Live Basal Vegetation**	**Percent Litter**	**Total**
1982	8	4	31	43
1985	26	2	47	75
1988	24	4	38	66
1992	28	4	35	67
1997	35	6	40	81
2003	12	2	48	62
2009	33	2	41	76
2014	49	1	43	93
2019	53	2	46	101
Overall Trend for Imlay Key Area #3: (↗) Upward				

The trend for Key Area # 3 was upward from 1982 to 2019. Data from 2019 showed an increase in the percent frequency of key species. A decrease in live basal vegetation. An increase in percent litter. Overall, there is a large increase of 58% since 1982.

Table C.12. Trend Data, Imlay Key Area #4 (Imlay-East Pasture)

Imlay Key Area # 4 Percent Frequency	
Species	**2019**
Woody Species	
Eriogonum ovalifolium	1
Gutierrezia sarothrae	13
Opuntia whipplei	1
Grasses - Perennial	
Aristida longiseta	8
Hilaria jamesii *	31
Oryzopsis hymenoides *	5
Sitanion hystrix *	5
Sporobolus cryptandrus *	8
Stipa comata	22
Forbs – Perennial/Biennial	
Aster arenosus	17
Calochortus	1
Phlox austromontana	1
Phlox longifolia	1
Sphaeralcea	76
Annuals	
Annual forb(s)	7
Bromus tectorum	88
Erigeron concinnus	1
Erodium cicutarium	13
Euphorbia	20
Unclassified	
Astragalus	1

*Key species. This key area was established and read in 2019.

Table C.13. Overall Trend, Imlay Key Area #4 (Imlay-East Pasture)

Imlay Key Area #4				
Year	**Percent Frequency of Key Species**	**Percent Live Basal Vegetation**	**Percent Litter**	**Total**
2019	49	5	40	94
Overall Trend for Imlay Key Area #4: Only one reading - no trend yet.				

This key area was established in 2019, there has been only one reading at this key area so there is not enough data to determine a trend yet.

Ecological Site Inventory

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 kind and amount 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 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 2005b and BLM 2001). This differs from “historic climax plant community” in that an 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 (Section 3.4.2.3 DPC).

The “Dry Weight Rank” vegetative sampling method is used to determine species composition (4.4 Monitoring). 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

Natural Resources Conservation Service.

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 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.

Table C.14. Imlay Key Area #1 (Imlay-East Pasture). Ecological Site Inventory Data – Ecological Condition.

Imlay Key Area # 1 Ecological Site: Loamy Upland 10 -14" p.z. (R035XC313AZ) Site was previously classified as Shallow Loamy 10 – 14" p.z. in 2005 Land Health Evaluation. Most recent monitoring data collected in 2019.			
Plant Species	**Current Composition**	**Site Guide Composition**	**Current Score****
Shrubs and Trees (15 – 20%)			
Dominant Shrubs		10 – 19%	
Artemisia tridentata ssp. *wyomingensis*		10 – 12%	
Atriplex canescens		10 – 12%	
Other Shrubs		10 – 14%	
Ephedra		2 – 8%	
Gutierrezia sarothrae	29%	2 - 4%	4%
Lycium		2 – 4%	
Mahonia trifoliolata		0 – 2%	
Opuntia		2 – 4%	
Yucca		2 – 4%	
Trees		0 – 5%	
Juniperus		0 – 5%	
Pinus edulis		0 – 5%	
Grasses (70 – 80%)			
Dominant Perennial Grasses		53 – 58%	
Agropyron smithii		24 – 29%	
Bouteloua gracilis		24 – 29%	
Hilaria jamesii	8%	12%	8%
Oryzopsis hymenoides		17 – 19%	
Other Grasses		19 – 24%	
Annual Grass		0 – 1%	
Perennial Grass		0 – 3%	

Aristida purpurea var. *fendleriana*		0 – 3%	
Muhlenbergia torreyi		0 – 3%	
Poa fendleriana		8%	
Sitanion hystrix		8%	
Sporobolus cryptandrus	3%	0 – 3%	3%
Stipa comata		8%	
Fobs (5 – 10%)			
Annual forbs		0 – 4%	
Perennial forbs		0 – 4%	
Allium	T		T
Aster arenosus	T		T
Eriogonum		0 – 4%	
Lupinus		0 – 4%	
Senecio		0 – 4%	
Sphaeralcea	59%	0 – 4%	4%
Imlay Key Area # 1 Ecological Condition: Total of Current Score = 19% of the expected potential natural community (Early Seral).			

*Key species used to judge utilization levels by cattle.
**Current Score = lower of either Column 2 (current composition) or Column 5 (site guide composition).
T = trace (less than 1%)

Table C.15. Imlay Key Area #2 – Middle (Imlay-Hobble Pasture). Ecological Site Inventory Data – Ecological Condition.

Imlay Key Area # 2 Ecological Site: Limestone / Sandstone Upland 10 – 14" p.z. (R035XC319AZ) Site was previously classified as Loamy Upland 10 – 14" p.z. in 2005 Land Health Evaluation. Most recent monitoring data collected in 2019.			
Plant Species	**Current Composition**	**Site Guide Composition**	**Current Score****
Shrubs			
Occasional Native Short Shrubs		1 – 4%	
Chrysothamnus depressus		0 – 1%	
Eriogonum fasciculatum		0 – 1%	
Gutierrezia sarothrae	T	0 – 3%	
Menodora scabra		0 – 1%	
Penstemon caespitosus var. *desertipicti*		0 – 1%	
Petradoria pumila		0 – 1%	
Psilostrophe cooperi		0 – 1%	
Senecio flaccidus		0 – 1%	

Stanleya pinnata		0 – 1%	
Dominant Native Mid Shrubs		20 - 23%	
Artemisia tridentata ssp. *wyomingensis*	90%	20 - 23%	23%
Common Native Mid Shrubs		1 – 6%	
Atriplex canescens		1 – 4%	
Ephedra nevadensis		1 – 4%	
Ephedra viridis		1 – 4%	
Common Native Short Shrubs		1 – 4%	
Chrysothamnus viscidiflorus		1 – 3%	
Krascheninnikovia lanata		1 – 3%	
Occasional Native Tall Shrubs		1 – 3%	
Mahonia fremontii		0 – 3%	
Purshia stansburiana		0 – 3%	
Occasional Native Mid Shrubs		0 – 4%	
Artemisia nova		0 – 2%	
Chrysothamnus greenei		0 -2%	
Coleogyne ramosissima		0 – 2%	
Ephedra cutleri		0 – 2%	
Eriogonum corymbosum		0 - 2%	
Ericameria nauseosa		0 – 2%	
Fallugia paradoxa		0 – 2%	
Lycium andersonii		0 – 2%	
Lycium pallidum		0 – 2%	
Quercus turbinella		0 – 2%	
Rhus trilobata		0 – 2%	
Shepherdia rotundifolia		0 – 2%	
Occasional Native Agave-Yucca Like		0 – 2%	
Agave utahensis		0 - 1%	
Yucca baccata		0 – 1%	
Occasional Native Cacti		0 – 2%	
Echinocereus engelmannii		0 – 1%	

Echinocereus triglochidiatus		0 – 1%	
Opuntia engelmannii		0 – 1%	
Opuntia erinacea var. *erinacea*		0 – 1%	
Opuntia polyacantha		0 – 1%	
Opuntia whipplei		0 – 1%	
Tree		1 – 8%	
Juniperus osteosperma	T	1 – 8%	
Pinus edulis		1 – 8%	
Grasses			
Common Native Summer Perennial Shortgrasses		27 – 35%	
Bouteloua gracilis		14 – 15%	
Hilaria jamesii		1 – 15%	
Occasional Native Summer Perennial Mid Grasses		0 – 3%	
Perennial Grass		0 – 3%	
Bouteloua curtipendula		0 – 3%	
Bouteloua eriopoda		0 – 3%	
Muhlenbergia porteri		0 – 1%	
Sporobolus cryptandrus	T	0 – 3%	
Occasional Native Summer Perennial Short Grasses		0 – 1%	
Perennial Grass		0 – 1%	
Muhlenbergia torreyi		0 – 1%	
Scleropogon brevifolius		0 – 1%	
Common Native Spring Perennial Mid Grasses		10 – 14%	
Aristida		3 – 6%	
Oryzopsis hymenoides		1 – 6%	
Stipa comata		3 – 6%	
Stipa neomexicana		3 – 6%	
Common Native Early Spring Perennial Short Grasses		8%	

Sitanion hystrix	2%	8%	2%
Occasional Native Spring Perennial Mid Grasses		0 – 1%	
Perennial Grass		0 – 1%	
Koeleria macrantha		0 – 1%	
Poa fendleriana		0 – 1%	
Stipa speciosa		0 – 1%	
Tridens muticus		0 – 1%	
Occasional Native Annual Grasses		0 – 1%	
Annual Grasses		0 – 1%	
Bouteloua barbata		0 – 1%	
Vulpia octoflora		0 – 1%	
Forbs			
Occasional Native Spring Perennial Short Forbs		1 – 4%	
Perennial Forbs	2%	0 – 1%	1%
Allium		0 – 1%	
Arabis		0 – 1%	
Astragalus humistratus		0 – 1%	
Astragalus subcinereus		0 – 1%	
Calochortus flexuosus		0 – 1%	
Calochortus nuttallii		0 – 1%	
Comandra umbellata subsp. *pallida*		0 – 1%	
Cymopterus		0 – 1%	
Delphinium parishii		0 – 1%	
Eriogonum caespitosum		0 – 1%	
Eriogonum inflatum		0 – 1%	
Lepidium		0 – 1%	
Lesquerella		0 – 1%	
Linum lewisii		0 – 1%	
Phlox hoodii		0 – 1%	
Phlox longifolia		0 – 1%	
Sphaeralcea	4%	0 – 1%	1%
Townsendia exscapa		0 – 1%	
Zigadenus paniculatus		0 – 1%	

Occasional Native Summer Perennial Short Forbs		0 – 3%	
Perennial Forb		0 – 1%	
Castilleja		0 – 1%	
Chaetopappa ericoides		0 – 1%	
Erigeron pumilus		0 – 1%	
Hymenopappus filifolius		0 – 10%	
Marrubium vulgare		0 – 1%	
Mirabilis multiflora		0 – 1%	
Penstemon		0 – 1%	
Thelesperma subnudum		0 – 1%	
Occasional Native Annual Short Forbs		0 – 3%	
Annual Forb	1%	0 – 1%	1%
Amsinckia		0 – 1%	
Astragalus		0 – 1%	
Chenopodium berlandieri		0 – 1%	
Coreopsis		0 - 1%	
Descurainia		0 – 1%	
Erysimum capitatum		0 – 1%	
Eriastrum diffusum		0 – 1%	
Erigenia		0 – 1%	
Eriogonum		0 – 1%	
Euphorbia		0 – 1%	
Gilia		0 – 1%	
Lotus		0 – 1%	
Mentzelia albicaulis		0 – 1%	
Phacelia		0 – 1%	
Plantago ovata		0 – 1%	
Physalis		0 – 1%	
Imlay Key Area # 2 Ecological Condition: Total of Current Score = 28% of the expected potential natural community (Mid-Seral).			

**Current Score = lower of either Column 2 (current composition) or Column 5 (site guide composition).
T = trace (less than 1%)

Table C.16. Imlay Key Area #3 – West (Imlay-Hobble Pasture) Ecological Site Inventory Data – Ecological Condition.

Imlay Key Area # 3 Ecological Site: Shallow Upland 10 – 14" p.z. Warm (R035XC331AZ) Site was previously classified as Shallow Loamy 10 – 14" p.z. in 2005 Land Health Evaluation. Most recent monitoring data collected in 2019.			
Plant Species	**Current Composition**	**Site Guide Composition**	**Current Score****
Shrubs			
Dominant Shrubs		52 – 69%	
Artemisia tridentata ssp. *wyomingensis*	26%	1 – 3%	3%
Atriplex canescens		1 – 3%	
Chrysothamnus viscidiflorus		1 – 2%	
Coleogyne ramosissima	4%	52 – 54%	4%
Ephedra nevadensis		3 – 5%	
Ephedra viridis		3 – 5%	
Fallugia paradoxa		1 – 2%	
Gutierrezia sarothrae	22%	1 – 2%	2%
Purshia mexicana		1 – 3%	
Yucca baccata		3 – 5%	
Succulent Shrubs		1 – 4%	
Echinocactus		0 – 1%	
Echinocereus triglochidiatus		0 – 1%	
Mammillaria		0 – 1%	
Opuntia acanthocarpa		0 – 1%	
Opuntia polyacantha		0 – 1%	
Opuntia polyacantha var. *hystricina*		0 – 1%	
Opuntia		0 – 1%	
Other Shrubs		1 – 3%	
Shrubs	1%	0 – 1%	1%
Berberis fremontii	T	0 – 1%	
Ephedra torreyana		0 – 1%	
Eriogonum fasciculatum var. *polifolium*		0 – 1%	
Grayia spinosa		0 – 1%	
Lycium andersonii		0 – 1%	
Lycium pallidum	5%	0 – 1%	1%
Trees		0 – 1%	

Juniperus osteosperma	14%	0 – 1%	1%
Grass			
Dominant Grasses		19 – 28%	
Bouteloua gracilis			
Hilaria jamesii	1%	5 – 10%	1%
Koeleria macrantha		1 – 3%	
Oryzopsis hymenoides	T	1 – 3%	
Sitanion hystrix	16%	1 – 3%	3%
Sporobolus cryptandrus		1 – 3%	
Stipa speciosa		4 – 6%	
Other Perennial Grasses		1 – 4%	
Perennial Grass	T	0 – 2%	
Aristida		0 – 1%	
Bouteloua curtipendula		0 – 1%	
Bouteloua eriopoda		0 – 1%	
Dasyochloa pulchella		0 – 1%	
Lycurus phleoides		0 – 1%	
Scleropogon brevifolius		0 – 1%	
Stipa arida		0 – 1%	
Stipa comata		0 – 1%	
Tridens muticus		0 – 1%	
Annual Grasses		3 – 5%	
Annual Grass		2 – 4%	
Bromus rubens		0 – 2%	
Bromus tectorum		0 – 2%	
Vulpia octoflora		0 – 2%	
Forb			
Dominant Perennial Forbs		3 – 4%	
Sphaeralcea	1%	3 – 4%	1%
Annual Forbs		0 – 3%	
Annual Forb	10%	0 – 2%	2%
Brassica		0 – 2%	
Perennial Forbs		0 – 3%	
Perennial Forb	T	0 – 1%	
Calochortus flexuosus		0 – 1%	
Dichelostemma capitatum ssp. capitatum		0 – 1%	

Gilia		0 – 1%	
Mirabilis multiflora		0 – 1%	
Phlox	T	0 – 1%	
Imlay Key Area # 3 Ecological Condition: Total of Current Score = 19% of the expected potential natural community (Early Seral)			

Table C.17. Imlay Key Area #4 (Imlay-East Pasture) Ecological Site Inventory Data – Ecological Condition.

Imlay Key Area # 4 Ecological Site: Limestone / Sandstone Upland 10 – 14" p.z. (R035XC319AZ) Most recent monitoring data collected in 2019.			
Plant Species	**Current Composition**	**Site Guide Composition**	**Current Score****
Shrubs			
Occasional Native Short Shrubs		1 – 4%	
Chrysothamnus depressus		0 – 1%	
Eriogonum fasciculatum		0 – 1%	
Gutierrezia sarothrae	7%	0 – 3%	3%
Menodora scabra		0 – 1%	
Penstemon caespitosus var. *desertipicti*		0 – 1%	
Petradoria pumila		0 – 1%	
Psilostrophe cooperi		0 – 1%	
Senecio flaccidus		0 – 1%	
Stanleya pinnata		0 – 1%	
Dominant Native Mid Shrubs		20 - 23%	
Artemisia tridentata ssp. *wyomingensis*		20 - 23%	
Common Native Mid Shrubs		1 – 6%	
Atriplex canescens		1 – 4%	
Ephedra nevadensis		1 – 4%	
Ephedra viridis		1 – 4%	
Common Native Short Shrubs		1 – 4%	
Chrysothamnus viscidiflorus		1 – 3%	
Krascheninnikovia lanata		1 – 3%	

Occasional Native Tall Shrubs		1 – 3%	
Mahonia fremontii		0 – 3%	
Purshia stansburiana		0 – 3%	
Occasional Native Mid Shrubs		0 – 4%	
Artemisia nova		0 – 2%	
Chrysothamnus greenei		0 -2%	
Coleogyne ramosissima		0 – 2%	
Ephedra cutleri		0 – 2%	
Eriogonum corymbosum		0 - 2%	
Ericameria nauseosa		0 – 2%	
Fallugia paradoxa		0 – 2%	
Lycium andersonii		0 – 2%	
Lycium pallidum		0 – 2%	
Quercus turbinella		0 – 2%	
Rhus trilobata		0 – 2%	
Shepherdia rotundifolia		0 – 2%	
Occasional Native Agave-Yucca Like		0 – 2%	
Agave utahensis		0 - 1%	
Yucca baccata		0 – 1%	
Occasional Native Cacti		0 – 2%	
Echinocereus engelmannii		0 – 1%	
Echinocereus triglochidiatus		0 – 1%	
Opuntia engelmannii		0 – 1%	
Opuntia erinacea var. *erinacea*		0 – 1%	
Opuntia polyacantha		0 – 1%	
Opuntia whipplei		0 – 1%	
Tree		1 – 8%	
Juniperus osteosperma		1 – 8%	
Pinus edulis		1 – 8%	
Grasses			
Common Native Summer Perennial Shortgrasses		27 – 35%	
Bouteloua gracilis		14 – 15%	

Hilaria jamesii	16%	1 – 15%	15%
Occasional Native Summer Perennial Mid Grasses		0 – 3%	
Perennial Grass		0 – 3%	
Bouteloua curtipendula		0 – 3%	
Bouteloua eriopoda		0 – 3%	
Muhlenbergia porteri		0 – 1%	
Sporobolus cryptandrus	2%	0 – 3%	2%
Occasional Native Summer Perennial Short Grasses		0 – 1%	
Perennial Grass		0 – 1%	
Muhlenbergia torreyi		0 – 1%	
Scleropogon brevifolius		0 – 1%	
Common Native Spring Perennial Mid Grasses		10 – 14%	
Aristida	3%	3 – 6%	3%
Oryzopsis hymenoides	3%	1 – 6%	3%
Stipa comata	16%	3 – 6%	6%
Stipa neomexicana		3 – 6%	
Common Native Early Spring Perennial Short Grasses		8%	
Sitanion hystrix	4%	8%	4%
Occasional Native Spring Perennial Mid Grasses		0 – 1%	
Perennial Grass		0 – 1%	
Koeleria macrantha		0 – 1%	
Poa fendleriana		0 – 1%	
Stipa speciosa		0 – 1%	
Tridens muticus		0 – 1%	
Occasional Native Annual Grasses		0 – 1%	
Annual Grasses		0 – 1%	
Bouteloua barbata		0 – 1%	
Vulpia octoflora		0 – 1%	
Forbs			

Occasional Native Spring Perennial Short Forbs		1 – 4%	
Perennial Forbs	1%	0 – 1%	1%
Allium		0 – 1%	
Arabis		0 – 1%	
Astragalus humistratus		0 – 1%	
Astragalus subcinereus		0 – 1%	
Calochortus flexuosus	T	0 – 1%	
Calochortus nuttallii		0 – 1%	
Comandra umbellata subsp. *pallida*		0 – 1%	
Cymopterus		0 – 1%	
Delphinium parishii		0 – 1%	
Eriogonum caespitosum		0 – 1%	
Eriogonum inflatum		0 – 1%	
Lepidium		0 – 1%	
Lesquerella		0 – 1%	
Linum lewisii		0 – 1%	
Phlox hoodii		0 – 1%	
Phlox longifolia		0 – 1%	
Sphaeralcea	51%	0 – 1%	1%
Townsendia exscapa		0 – 1%	
Zigadenus paniculatus		0 – 1%	
Occasional Native Summer Perennial Short Forbs		0 – 3%	
Perennial Forb		0 – 1%	
Castilleja		0 – 1%	
Chaetopappa ericoides		0 – 1%	
Erigeron pumilus		0 – 1%	
Hymenopappus filifolius		0 – 10%	
Marrubium vulgare		0 – 1%	
Mirabilis multiflora		0 – 1%	
Penstemon		0 – 1%	
Thelesperma subnudum		0 – 1%	
Occasional Native Annual Short Forbs		0 – 3%	

Annual Forb		0 – 1%	
Amsinckia		0 – 1%	
Astragalus		0 – 1%	
Chenopodium berlandieri		0 – 1%	
Coreopsis		0 - 1%	
Descurainia		0 – 1%	
Erysimum capitatum		0 – 1%	
Eriastrum diffusum		0 – 1%	
Erigenia		0 – 1%	
Eriogonum		0 – 1%	
Euphorbia		0 – 1%	
Gilia		0 – 1%	
Lotus		0 – 1%	
Mentzelia albicaulis		0 – 1%	
Phacelia		0 – 1%	
Plantago ovata		0 – 1%	
Physalis		0 – 1%	
Imlay Key Area # 4 Ecological Condition: Total of Current Score = 38 % of the expected potential natural community (Mid-Seral).			

Table C.18. Imlay Allotment Updated Rangeland Health Data Summary.

Key Area	Ecological Site	Ecological Condition	Overall Trend
Imlay Key Area #1 (Imlay-East Pasture)	Loamy Upland 10 -14" p.z. (R035XC313AZ)	Early Seral	Static
Imlay Key Area #2 – Middle (Imlay-Hobble Pasture)	Limestone / Sandstone Upland 10 – 14" p.z. (R035XC319AZ)	Mid-Seral	Upward
Imlay Key Area #3 - West (Imlay-Hobble Pasture)	Shallow Upland 10 – 14" p.z. Warm (R035XC331AZ)	Early Seral	Upward
Imlay Key Area #4 (Imlay-East Pasture)	Limestone / Sandstone Upland 10 – 14" p.z. (R035XC319AZ)	Mid-Seral	No Trend*

*There has only been one reading so there is no trend for Key Area # 4. Key Area # 4 was established in 2019. Most recent monitoring data collected in 2019.

Desired Plant Community Objectives

Desired Plant Community Objectives (DPC) were developed during the evaluation process by an interdisciplinary team of specialists (BLM 2005a). These DPCs are to replace the 1990 AMP allotment specific vegetation frequency and cover objectives which focus on livestock forage needs. These objectives focus on the ecological site and its potential, which is a reflection of the biodiversity of the area. DPCs include Species Composition by Weight (CBW) using the Dry Weight Ranking method of data collection and live vegetative ground cover using the point step method of data collection to measure vegetative basal cover (4.4 Monitoring). DPCs will be used, from this point forward, to assess effectiveness of management actions (BLM 2005a). Although canopy cover is included in the objectives it is not part of the data that is collected in the key area trend monitoring.

Imlay Key Area #1 (Imlay-East Pasture)
Ecological Site: Loamy Upland 10 -14" p.z. (R035XC313AZ)

- Increase *Sitanion hystrix* to between the range of 5 to 10% CBW
- Increase *Oryzopsis hymenoides* to between the range of 5 to 10% CBW
- Increase *Hilaria jamesii* to between the range of 10 to 15% CBW
- Increase *Agropyron smithii* to between the range of 1 to 5% CBW
- Maintain *Artemisia tridentata* to between the range of 0 to 10% CBW
- Maintain *Juniperus osteosperma* to between the range of 0-5% CBW
- Maintaining forbs to between the range of 1 to 5% or above CBW
- Maintain ground cover above 50%
- Increase live vegetation cover (basal cover) to between 3 and 8% on perennial vegetation.
- Increase canopy cover to between the range of 10 to 30% on perennial vegetation.

Table C.19. Imlay Key Area #1 (Imlay-East Pasture), Desired Plant Community Objectives Determination Table

Imlay Key Area #1 Ecological Site: Loamy Upland 10 -14" p.z. (R035XC313AZ) Most recent monitoring data collected in 2019.			
Plant Group (or Ground Cover)	**Current Composition**	**Desired Plant Composition**	**Objective Met or Not Met**
Ground Cover (Total Litter, Rock, Live Basal Vege)	37%	>50%	Not Met
Live Basal Vege Cover	11%	3 – 8%	Not Met (Exceeds)
Canopy Cover	Not Measured	10 – 30%	N/A
Shrubs			
Artemisia tridentata	0	0 – 10%	Met
Trees			
Juniperus osteosperma	0	0 – 5%	Met
Grasses			
Agropyron smithii	0	1 – 5%	Not Met

Hilaria jamesii	8%	10 – 15%	Not Met
Oryzopsis hymenoides	0	5 – 10%	Not Met
Sitanion hystrix	0	5 – 10%	Not Met
Forbs		1 – 5%+	
Allium sp.	T		
Aster arenosus	T		
Sphaeralcea sp.	59%		Not Met (Exceeds)

Based on 2019 monitoring DPC objectives are partially met at this key area. Ground cover is not met with 37% which is less than the objective of greater than 50%. Live basal vegetation cover exceeds the objective with 11%. The shrub and tree objectives were both at zero CBW but that fits within the range of 0 – 10% for *Artemisia tridentata,* and 0 – 5% for *Juniperus osteosperma* so those objectives were met. Grasses do not meet the objective with *Hilaria jamesii* at 8 %, which is just below the objective of 10%. The forbs objective is exceeded by a large amount of *Sphaeralcea sp.* (globemallow) an early seral forb.

Imlay Key Area #2 – Middle (Imlay-Hobble Pasture)

Ecological Site: Limestone / Sandstone Upland 10 – 14" p.z. (R035XC319AZ)

- Increase *Sitanion hystrix* to between the range of 5 to 10% CBW
- Increase *Oryzopsis hymenoides* to between the range of 5 to 10% CBW
- Increase *Hilaria jamesii* to between the range of 5 to 15% CBW
- Increase *Agropyron smithii* to between the range of 10 to 20% CBW
- Decrease *Artemisia tridentata* CBW from 63% to between the range of 1 to 15%
- Maintain *Juniperus osteosperma* to between the range of 2 to 5% CBW
- Maintaining the forbs to between the range of 5 to 10% or above CBW
- Maintain ground cover above 65%
- Maintain live vegetation cover (basal cover) to between 5 and 10% on perennial vegetation.
- Maintain canopy cover to between range of 25 to 35% on perennial vegetation.

Table C.20. Imlay Key Area #2 – Middle (Imlay-Hobble Pasture), Desired Plant Community Objectives Determination Table

Imlay Key Area # 2 Limestone / Sandstone Upland 10 – 14" p.z. (R035XC319AZ) Most recent monitoring data collected in 2019.			
Plant Group (or Ground Cover)	**Current Composition**	**Desired Plant Composition**	**Objective Met or Not Met**
Ground Cover (Total Litter, Rock, Live Basal Vege)	76%	>65%	Met
Live Basal Vege Cover	2%	5 – 10%	Not Met
Canopy Cover	Not Measured	25 – 35%	N/A
Shrubs			
Artemisia tridentata	90%	1 – 15%	Not Met (Exceeds)
Trees			
Juniperus osteosperma	1%	2 – 5%	Not Met
Grasses			
Agropyron smithii	0	10 – 20%	Not Met

Hilaria jamesii	0	5 – 15%	Not Met
Oryzopsis hymenoides	0	5 – 10%	Not Met
Sitanion hystrix	2%	5 – 10%	Not Met
Forbs		5 – 10%+	Met
Perennial Forbs	2%		
Sphaeralcea	4%		

The objectives for this key area are partially met. The DPC objective for ground cover is met. Live basal vegetation cover is not met with 2% below the objective of 5 – 10%. The objective for grasses is not met with *Sitanion hystrix* at 2% below the objective of 5%. The DPC objective for *Artemisia tridentata* (sagebrush) was to reduce current composition from 64% (in 2003) down to 1 – 15% (BLM 2005a). The current composition of sagebrush in 2019 is 90% (Table C.21) with few other plant species present. Sagebrush at Key Area #2 has been above the desired 1 – 15% since the monitoring point was established in 1982 and has ranged between 64 – 90%. It is unlikely that a large decrease in sagebrush will occur without some type of vegetation treatment. The objective for forbs is met with a combined 6% of *Sphaeralcea* and perennial forbs.

Table C.21. Percent frequency of *Artemisia tridentata* (sagebrush) at Imlay Key Area # 2 (1982 – 2019).

Species	1982	1984	1985	1989	1992	1997	2003	2009	2014	2019
Artemisia tridentata	75%	71%	87%	80%	73%	78%	64%	68%	72%	90%

Imlay Key Area #3 – West (Imlay-Hobble Pasture)

Ecological Site: Shallow Upland 10 – 14" p.z. Warm (R035XC331AZ)

- Maintain *Sitanion hystrix* to between the range of 5 to 10% CBW
- Maintain *Oryzopsis hymenoides* to between the range of 1 to 5% CBW
- Maintain *Hilaria jamesii* to between the range of 1 to 10% CBW
- Maintaining *Artemisia tridentata* to between the range of 15 to 25% CBW
- Maintaining *Juniperus osteosperma* to between the range of 15 to 20% CBW
- Maintaining the forbs to between the range of 1 to 5% CBW or above
- Maintain ground cover above 55%
- Increase live vegetation cover (basal cover) to between 3 and 8% on perennial vegetation.
- Maintain canopy cover at range of 25 to 35% on perennial vegetation.

Table C.22. Imlay Key Area #3 – West (Imlay-Hobble Pasture), Desired Plant Community Objectives Determination Table

Imlay Key Area # 3 Shallow Upland 10 – 14" p.z. Warm (R035XC331AZ) Most recent monitoring data collected in 2019.			
Plant Group (or Ground Cover)	**Current Composition**	**Desired Plant Composition**	**Objective Met or Not Met**
Ground Cover (Total Litter, Rock, Live Basal Vege)	57%	> 55%	Met
Live Basal Vege Cover	2%	3 – 8%	Not Met
Canopy Cover	Not Measured	25 – 35%	N/A
Shrubs			
Artemisia tridentata	26%	15 – 25%	Not Met (Exceeds)

Trees			
Juniperus osteosperma	14%	15 – 20%	Not Met
Grasses			
Hilaria jamesii	1%	1 – 10%	Met
Oryzopsis hymenoides	T	1 – 5%	Not Met
Sitanion hystrix	16%	5 – 10%	Not Met (Exceeds)
Forbs		1 - >5%	Not Met
Lomatium dissectum	T		
Sphaeralcea	T		
Phlox	T		

Objectives were partially met at Key Area # 3. The objective for ground cover was met with 57%. The objective for shrubs, *Artemisia tridentata,* slightly exceeds the objective by 1% with 26% current composition. The objective for the perennial grasses was met with 1% for *Hilaria jamesii*. The objective for *Sitanion hystrix* was exceeded with 16%. The objective for *Oryzopsis hymenoides* was not met. The objective for perennial forbs was not met. The current composition for trees (*Juniperus osteosperma)* is not met with 14% just 1% below the objective. Live basal vegetation cover did not meet the objective but was 1% below with 2%.

Imlay Key Area #4 (Imlay-East Pasture)

This key area was established in 2019. There have not been Desired Plant Community Objects established. This key area was chained in 1955 and had the Imlay/Sullivan Prescribed Burn #2 in 1998 (Table 3.6). There is no record of wildfire at this key area. The key area is in mid-seral ecological condition a trend has not been established because the key areas has been read once (Table 3.4).

APPENDIX D – Land Health Evaluation Update for the Sullivan Tank Allotment

The Sullivan Tank Allotment land health evaluation was completed in 2005 (BLM 2005a). That evaluation showed that the allotment was making progress towards meeting the applicable standards for rangeland health (Section 3.2.3). This update re-evaluates the allotment based on analysis of additional monitoring data that has been collected since the original evaluation was completed.

Sullivan Tank Updated Monitoring Data

Actual Use

Actual use as reported by the permittee annually. Total active preference for the allotment is 456 AUMs. Average annual AUMs used, during the ten-year period 2010 - 2020, was 301which is 66% of the total available. AUMs used ranged from 32% in 2012 to 81% used in 2018 and 2019.

Table D.1. Sullivan Tank Allotment Actual Use

Grazing Year	AUMs Used	Total Active AUMs Available	Percent Active AUMs Used
2010	223	456	49%
2011	245	456	54%
2012	146	456	32%
2013	293	456	64%
2014	287	456	63%
2015	328	456	72%
2016	336	456	74%
2017	341	456	75%
2018	369	456	81%
2019	370	456	81%
2020	367	456	80%
Average	301		66%

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). The Grazed-Class Method was used to collect the data (Section 4.4 Monitoring). Utilization is read at or around key areas. Average utilization levels of key forage species for this allotment should not exceed 50% (BLM 2008a). Utilization data from 1991 – 2020 has been compiled in the following tables. Tables D.2 - D.5 show percent utilization of key forage species by year read at each of the four 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 at a specific key area. No average utilization readings above 50% were recorded at any of the four key areas in the Sullivan Tank Allotment. Utilization on key species has ranged from 0 – 34%, which allows the species to maintain themselves in drought, even with grazing. In addition, livestock are removed from the allotment by 6/15 each year (Table 2.2), allowing for growing season rest.

Table D.2. Utilization, Sullivan Tank Key Area #1 Little Joe Draw (Little Joe Pasture)

Percent utilization of key species at Key Area #1 by year.												
Species	**1991**	**1992**	**1993**	**1995**	**1996**	**1998**	**1999**	**2004**	**2016**	**2018**	**2019**	**2020**
Grasses												
Hilaria jamesii *	17	15	34	No use	No use	No use	14	4	0	1	0	1
Oryzopsis hymenoides *	13	20	21	No use	No use	No use	8	10	1	3	1	0
Sitanion hystrix *	19	17	21	No use	No use	No use	7	2	1	3	1	4
Stipa occidentalis				No use	No use	No use			1	0	1	1
Sporobolus cryptandrus *	26	18	28	No use	No use	No use	8	5				
Average Percent Utilization by Year	18	18	24	No use	No use	No use	9	4	1	2	1	2

*Key species
Burned July and August 1998**.** No water and no use 1995, 1996 and 1998.

Table D.3. Utilization, Sullivan Tank Key Area #2 Sullivan Draw (Sullivan Tank Pasture)

Percent utilization of key species at Key Area #2 by year.												
Species	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1999**	**2004**	**2016**	**2018**	**2019**	**2020**
Grasses												
Agropyron smithii *	24			No use	No use	No use			6	0	6	10
Agropyron sp. (species) *		27		No use	No use	No use						
Hilaria jamesii *	24	23	27	No use	No use	No sue	13	7	2	0	7	14
Oryzopsis hymenoides *	23	24	24	No use	No use	No use	12	3	11	3	7	10
Sitanion hystrix *	16	20	17	No use	No use	No use	11	0	3	0	7	10
Sporobolus cryptandrus *	22	28	27	No use	No use	No use	15	0				
Average Percent Utilization by Year	22	24	23	No use	No use	No use	13	6	5	1	6	11

*Key species
Sullivan Draw **-** No cattle use 1994, 1995, 1996.

Table D.4. Utilization, Sullivan Tank Key Area #3 Post Office (Sullivan Tank Pasture)

Percent utilization of key species at Key Area #3 by year.												
Species	**1992**	**1993**	**1994**	**1996**	**1997**	**1998**	**1999**	**2004**	**2016**	**2018**	**2019**	**2020**
Shrub												
Cowania mexicana *	7	16	No use	21	17	19	11	13	No use	1	5	
Grasses												
Hilaria jamesii *									No use	1	0	20
Oryzopsis hymenoides *	11	17	No use	32	24	4	3	7	No use	1	0	10
Poa fendleriana *	5	5	No use	14	24	13	5	3	No use	1		30
Sitanion hystrix *	10	14	No use	25	22	7	5	8	No use	1	3	14
Average Percent Utilization by Year	8	13	No use	24	21	10	6	8	No use	1	1	18

*Key species
Post Office – No cattle use in 1994 and 2016.

Table D.5. Utilization, Sullivan Tank Key Area #4 Cox Pond (Sullivan Tank Pasture)

Percent utilization of key species at Key Area #4 by year.											
Species	**1991**	**1992**	**1993**	**1996**	**1997**	**1998**	**2004**	**2016**	**2018**	**2019**	**2020**
Grasses											
Hilaria jamesii *	22	0	12	9	16	6	5	1	No use	1	5
Oryzopsis hymenoides *	19	20	13	14	17	1	5	1	No use	1	7
Sitanion hystrix *	20		18	18	19	2	6	1	No use	1	3
Sporobolus cryptandrus *	31	0	16	15	27	12			No use		
Stipa occidentalis								0	No use	0	7
Average Percent Utilization by Year	21	20	15	14	20	6	5	1	No use	1	5

*Key species

Trend

Trend monitoring was conducted at four key areas in the Sullivan Tank Allotment. There are two pastures in the Sullivan Tank Allotment, the Sullivan Tank and the Little Joe Pasture. Key areas are in the Little Joe Draw, Sullivan Draw, Post Office, and Cox Pond areas within the

allotment. There is one key area in the Little Joe Pasture, the smallest pasture, and the other three key areas are in the Sullivan Tank Pasture (Appendix A, Figure 3).

Data was collected using the Pace-Frequency method (Section 4.4 Monitoring). This method of monitoring measures the percent of bare ground, litter, rock and live vegetation/basal cover. In additional, it measures the occurrence frequency of plant species. Key Areas #1, #2, #3 and #4 were established in 1981.

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 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. Detailed tables for each key area with data by year and species is available below in Tables D.6 - D.13. 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 (Upland Sites) of the Arizona Standards for Rangeland Health (Appendix B, BLM 1997). Overall trend at a key area is the direction of change in frequency observed between the initial reading (base year) and the current reading, as depicted by the arrows, i.e., (↗) up, (↘) down, and (→) no apparent static or static. The threshold for a change in trend is +/- 10 percent.

Table D.6. Trend Data, Sullivan Tank Key Area #1 Little Joe Draw (Little Joe Pasture)

Sullivan Tank Key Area # 1 Percent Frequency									
Species	**1981**	**1985**	**1990**	**1993**	**2000**	**2004**	**2009**	**2014**	**2019**
Woody Species									
Artemisia tridentata	32	62	61	64	19	11	12	15	9
Cowania mexicana *							1	1	
Gutierrezia sarothrae	1	5	7	8	2	2	4	4	
Mammillaria		1							
Opuntia			1	2	1				
Grasses – Perennial									
Agropyron cristatum							1		
Agropyron smithii							1		1
Bouteloua gracilis *		3	5	5	3				
Hilaria jamesii *	56	54	52	56	56	46	39	38	52
Oryzopsis hymenoides *			1	2	2		1		
Poa pratensis							1		
Sitanion hystrix *		11	14	14	16	2	8	10	1
Sporobolus cryptandrus *		8	9	11	9	1	1	1	1
Forbs – Perennial/Biennial									
Perennial forb(s)				3	2				
Sphaeralcea	1	14	15	13	13	21	11	37	28
Annuals									
Annual forb(s)						94	17	1	34
Bromus tectorum								47	98
Festuca octoflora								1	
Salsola kali								29	5
Unclassified									
Aster			1	2					

*Key species

Table D.7. Overall Trend, Sullivan Tank Key Area #1 Little Joe Draw (Little Joe Pasture)

Sullivan Tank Key Area #1				
Year	**Percent Frequency of Key Species**	**Percent Live Basal Vegetation**	**Percent Litter**	**Total**
1981	56	6	36	98
1985	76	9	33	118
1990	81	7	34	122
1993	88	7	29	124
2000	86	4	39	129
2004	49	3	51	103
2009	50	4	36	90
2014	48	3	69	120
2019	54	4	68	126
Overall Trend for Sullivan Tank Key Area #1: (↗) Upward				

Data from 2019 showed a slight (2%) decrease in the frequency of key species. A slight (2%) decrease in live basal vegetation. A 32% increase in litter. The total change increase by 28% which is above the +/- 10% change threshold for an upward trend since 1981.

Table D.8. Trend Data, Sullivan Tank Key Area #2 Sullivan Draw (Sullivan Tank Pasture)

Sullivan Tank Key Area # 2 Percent Frequency										
Species	**1981**	**1984**	**1985**	**1988**	**1993**	**2000**	**2004**	**2009**	**2014**	**2019**
Woody Species										
Artemisia tridentata	67	71	77	43	38	67	59	65	72	68
Ceratoides lanata		1				1				
Gutierrezia sarothrae	1	2		2	4	2				
Grasses - Perennial										
Agropyron *		11		2	3	10				
Agropyron smithii *			3				1	2	9	2
Bouteloua gracilis *		1		3	4	2				
Hilaria jamesii *	44	40	53	40	44	48	44	46	31	38
Oryzopsis hymenoides *		1	4	4	4	2	1	2	4	2
Sitanion hystrix *	6	21	20	7	8	22	9	38	81	77
Sporobolus cryptandrus *	2	8	3	3	3	6			5	6
Forbs – Perennial/Biennial										
Perennial forb(s)					2	2				1
Sphaeralcea		4	1	1	2	5		1	1	1
Annuals										
Annual forb(s)							21			37
Chenopodium album										3
Portulaca oleracea							10			

*Key species

Table D.9. Overall Trend, Sullivan Tank Key Area #2 Sullivan Draw (Sullivan Tank Pasture)

Sullivan Tank Key Area #2				
Year	**Percent Frequency of Key Species**	**Percent Live Basal Vegetation**	**Percent Litter**	**Total**
1981	52	7	30	89
1984	82	9	41	132
1985	83	8	36	127
1988	59	7	42	108
1993	66	5	41	112
2000	90	6	41	137
2004	55	4	43	102
2009	88	4	50	142
2014	130	4	65	199
2019	125	6	58	189
Overall Trend for Sullivan Tank Key Area #2: (↗) Upward				

The trend for Key Area #2 was upward from 1981 to 2019. Data from 2019 showed a large 73% increase in the percent frequency of key species. A slight decrease of 1% in live basal vegetation. A 28% increase in litter. Overall, there was an increase of 100% since 1981 showing an upward overall trend.

Table D.10. Trend Data, Sullivan Tank Key Area #3 Post Office (Sullivan Tank Pasture)

Sullivan Tank Key Area #3 Percent Frequency									
Species	**1981**	**1985**	**1988**	**1993**	**2000**	**2004**	**2009**	**2014**	**2019**
Woody Species									
Amelanchier utahensis							2	1	1
Artemisia tridentata	27	42	30	28	14	10	5		2
Berberis fremontii		4	1	2	2	2		1	
Cowania mexicana *	8	17	9	11	7	4	1		
Ephedra viridis		3	2		2	2			
Eriogonum – shrub #1						2	1		
Eriogonum ovalifolium									1
Fallugia paradoxa						17	24	19	32
Gutierrezia sarothrae	16	33	32	37	9	22	5	8	20
Juniperus osteosperma	9	12	6	5	2	5	3		
Opuntia		2	3	3	2	2			1
Quercus turbinella	4								
shrub/half shrub	7								
Yucca baccata				1	1				
Grasses – Perennial									
Agropyron cristatum							1		
*Agropyron smithii**		1							
Aristida						1		2	8
Bouteloua curtipendula								1	
Bouteloua gracilis *								1	
Hilaria jamesii *			2	4	2	1	2	3	1
Oryzopsis hymenoides *		2	5	6	4	2	8	3	3
Poa fendleriana *	3	5	5	5	6	3	3		1
Sitanion hystrix *	1	20	18	20	23	9	15	6	3
Sporobolus cryptandrus *		3					2	17	26
Forbs – Perennial/Biennial									
Asclepias						1			
Perennial forb(s)					2				

Sphaeralcea		1	2	3	9	5	13	13	1
Verbena								1	
Annuals									
Annual forb(s)						3			1
Bromus tectorum						28		50	92
Eriogonum – annual forb #1						5			
Erodium cicutarium						7	9		
Euphorbia								9	9
Unclassified									
Antennaria				1	1				
Aster		1		1	1	1			
Ephedra				3	2				
Mentzelia						3			
Phlox						1			

*Key species

Table D.11. Overall Trend, Sullivan Tank Key Area #3 Post Office (Sullivan Tank Pasture)

Sullivan Tank Key Area #3				
Year	**Percent Frequency of Key Species**	**Percent Live Basal Vegetation**	**Percent Litter**	**Total**
1981	12	3	27	42
1985	48	3	31	82
1988	39	7	30	76
1993	46	8	36	90
2000	42	8	38	88
2004	19	2	44	65
2009	31	2	38	71
2014	30	2	40	72
2019	34	<1	54	88
Overall Trend for Sullivan Tank Key Area #3: (↗) Upward				

The trend for Key Area #3 was upward from 1981 to 2019. There was a 22% increase in the percent frequency of key species. There was about a 3% decrease in live basal vegetation. There was a 27% increase in litter. Overall, there was an increase of 46% showing an upward trend.

Table D.12. Trend Data, Sullivan Tank Key Area #4 Cox Pond (Sullivan Tank Pasture)

Sullivan Tank Key Area #4 Percent Frequency									
Species	**1981**	**1984**	**1987**	**1993**	**2000**	**2004**	**2009**	**2014**	**2019**
Woody Species									
Artemisia tridentata	41	44	59	66	24	4	4	1	3
Ephedra viridis						1		2	1
Eriogonum – shrub #1						1			
Gutierrezia sarothrae	30	34	40	42	7	46	33	7	13
Juniperus osteosperma	4	1		1		1		2	1
Opuntia				1	2				
Grasses - Perennial									
*Agropyron smithii**							4		1
Bouteloua gracilis *	1			1	2				
Hilaria jamesii *	43	42	33	37	33	58	54	57	35
Oryzopsis hymenoides *	1	5	8	11	12	8	10	11	7
Poa fendleriana *	11	16	15	17	16	3		3	6
Sitanion hystrix *	6	34	49	52	49	26	29	24	13
Sporobolus cryptandrus *		2	1	2	2			2	5

Stipa comata				1	1	1	4	9	3
Forbs – Perennial/Biennial									
Linum lewisii								1	
Lotus longebracteatus									9
Mirabilis multiflora									1
Perennial forb #2						1			
Perennial forb(s)		5	13				1		
Phlox austromontana									2
Phlox longifolia								1	
Sphaeralcea		6	9	9	10	11	19	20	50
Townsendia incana									1
Tragopogon									3
Annuals									
Annual forb(s)						7	15	6	37
Bromus tectorum						1		67	78
Erigeron concinnus							4		
Euphorbia						8		2	9
Salsola kali								1	15
Unclassified									
Aster		1	5	4	4				
Astragalus		1	2	3	3			2	
Composite annual forb #1						24			
Mentzelia						10			
Phlox						8			

*Key species

Table D.13. Overall Trend, Sullivan Tank Key Area #4 Cox Pond (Sullivan Tank Pasture)

Sullivan Tank Key Area #4				
Year	**Percent Frequency of Key Species**	**Percent Live Basal Vegetation**	**Percent Litter**	**Total**
1981	62	4	23	89
1984	99	9	33	141
1987	106	7	41	154
1993	120	7	37	164
2000	114	7	42	163
2004	95	7	33	135
2009	97	5	27	129
2014	97	5	56	158
2019	67	4	58	129
Overall Trend for Sullivan Tank Key Area #4: (↗) Upward				

The trend was upward from 1981 to 2019. There was a small increase of 5% in percent frequency of key species. There was no change in live basal vegetation. There was an increase of 35% in litter. Overall, there was an increase of 40% from 1981 to 2019.

Ecological Site Inventory

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 kind and amount 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 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 2005b and BLM 2001). This differs from "historic climax plant community" in that an 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 (Section 3.4.2.3 DPC).

The "Dry Weight Rank" vegetative sampling method is used to determine species composition (4.4 Monitoring). 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 Natural Resources Conservation Service.

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 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.

Table D.14. Sullivan Tank Key Area #1 Little Joe Draw (Little Joe Pasture) Ecological Site Inventory Data – Ecological Condition.

Sullivan Tank Key Area #1 Ecological Site: Loamy Upland 10 – 14" P.Z. (R035XC313AZ) The area is a mixed site with Loamy Upland 10 – 14" P.Z. (R035XC313AZ) in the draw and Limestone/Sandstone Upland 10 -14" (R035XC319AZ) in the surrounding area. Most recent data collected in 2019.			
Plant Species	**Current Composition**	**Site Guide Composition**	**Current Score****
Shrubs and Trees (15 – 20%)			
Dominant Shrubs		10 – 19%	
Artemisia tridentata ssp. *wyomingensis*	12%	10 – 12%	12%
Atriplex canescens		10 – 12%	
Other Shrubs		10 – 14%	
Ephedra		2 – 8%	
Gutierrezia sarothrae		2 - 4%	
Lycium		2 – 4%	
Mahonia trifoliolata		0 – 2%	
Opuntia		2 – 4%	
Yucca		2 – 4%	
Trees		0 – 5%	
Juniperus		0 – 5%	
Pinus edulis		0 – 5%	
Grasses (70 – 80%)			
Dominant Perennial Grasses		53 – 58%	
Agropyron smithii		24 – 29%	
Bouteloua gracilis		24 – 29%	
Hilaria jamesii	51%	12%	12%
Oryzopsis hymenoides		17 – 19%	
Other Grasses		19 – 24%	
Annual Grass		0 – 1%	
Perennial Grass		0 – 3%	
Aristida purpurea var. *fendleriana*		0 – 3%	
Muhlenbergia torreyi		0 – 3%	
Poa fendleriana		8%	
Sitanion hystrix	T	8%	
Sporobolus cryptandrus	T	0 – 3%	
Stipa comata		8%	
Fobs (5 – 10%)			
Annual forbs		0 – 4%	
Perennial forbs		0 – 4%	

Allium			
Aster arenosus			
Eriogonum		0 – 4%	
Lupinus		0 – 4%	
Senecio		0 – 4%	
Sphaeralcea	36%	0 – 4%	4%
Sullivan Tank Key Area # 1 Ecological Condition: Total of Current Score = 28 % of the expected potential natural community (Mid-Seral).			

**Current Score = lower of either Column 2 (current composition) or Column 5 (site guide composition).
T = trace (less than 1%)

Table D.15. Sullivan Tank Key Area #2 Sullivan Draw (Sullivan Tank Pasture) Ecological Site Inventory Data – Ecological Condition

Sullivan Tank Key Area #2 Ecological Site: Loamy Upland 10 -14" P.Z. (R035XC313AZ) Most recent monitoring data collected in 2019.			
Plant Species	**Current Composition**	**Site Guide Composition**	**Current Score****
Shrubs and Trees (15 – 20%)			
Dominant Shrubs		10 – 19%	
Artemisia tridentata ssp. *wyomingensis*	43%	10 – 12%	12%
Atriplex canescens		10 – 12%	
Other Shrubs		10 – 14%	
Ephedra		2 – 8%	
Gutierrezia sarothrae		2 - 4%	
Lycium		2 – 4%	
Mahonia trifoliolata		0 – 2%	
Opuntia		2 – 4%	
Yucca		2 – 4%	
Trees		0 – 5%	
Juniperus		0 – 5%	
Pinus edulis		0 – 5%	
Grasses (70 – 80%)			
Dominant Perennial Grasses		53 – 58%	
Agropyron smithii	2%	24 – 29%	2%
Bouteloua gracilis		24 – 29%	
Hilaria jamesii	15%	12%	12%
Oryzopsis hymenoides	1%	17 – 19%	1%
Other Grasses		19 – 24%	
Annual Grass		0 – 1%	
Perennial Grass		0 – 3%	

Aristida purpurea var. *fendleriana*		0 – 3%	
Muhlenbergia torreyi		0 – 3%	
Poa fendleriana		8%	
Sitanion hystrix	36%	8%	8%
Sporobolus cryptandrus	3%	0 – 3%	3%
Stipa comata		8%	
Fobs (5 – 10%)			
Annual forbs		0 – 4%	
Perennial forbs	1%	0 – 4%	1%
Allium			
Aster arenosus			
Eriogonum		0 – 4%	
Lupinus		0 – 4%	
Senecio		0 – 4%	
Sphaeralcea	T	0 – 4%	
Sullivan Tank Key Area # 2 Ecological Condition: Total of Current Score = 39 % of the expected potential natural community (Mid-Seral).			

**Current Score = lower of either Column 2 (current composition) or Column 5 (site guide composition).
T = trace (less than 1%)

Table D.16. Sullivan Tank Key Area #3 Post Office (Sullivan Tank Pasture) Ecological Site Inventory Data – Ecological Condition

Sullivan Tank Key Area # 3 Ecological Site: Sedimentary Cliffs 10 – 14" (R035XC302AZ) Site was previously classified as Loamy Upland 10 – 14" P.Z. In 2005 Land Health Evaluation. Most recent monitoring data collected in 2019.			
Plant Species	**Current Composition**	**Site Guide Composition**	**Current Score****
Shrubs		14 – 26%	
Amelanchier		0 – 4%	
Arctostaphylos		0 – 1%	
Artemisia filifolia		0 – 2%	
Artemisia tridentata ssp. wyomingensis	2%	4 – 5%	2%
Atriplex canescens		4 – 5%	
Brickellia		0 – 1%	
Chrysothamnus		0 – 4%	
Ephedra		4 – 5%	
Eriogonum wrightii		0 – 2%	
Gutierrezia sarothrae	26%	2 – 4%	4%
Purshia stansburiana		2 – 4%	
Purshia tridentata		0 – 2%	
Quercus turbinella		0 – 4%	

Rhus trilobata		0 – 4%	
Shepherdia rotundifolia		0 – 1%	
Cacti and Succulents		1 – 3%	
Agave		4%	
Echinocereus		4%	
Mammillaria		4%	
Opuntia	1%	4%	1%
Yucca		4%	
Trees		16 – 22%	
Juniperus		16 – 22%	
Pinus edulis		16 – 22%	
Quercus gambelii		0 – 4%	
Grass			
Cool Season Grasses		20 – 27%	
Poa fendleriana	T	5%	
Sitanion hystrix	3%	4 – 5%	3%
Stipa comata		5 – 8%	
Stipa speciosum		5 – 8%	
Warm Season Grasses		26 – 27%	
Aristida	6%	0 – 3%	3%
Bouteloua curtipendula		0 – 3%	
Bouteloua eriopoda		0 – 3%	
Bouteloua gracilis		3 – 6%	
Hilaria jamesii	2%	3%	2%
Muhlenbergia porteri		0 – 3%	
Muhlenbergia pungens		0 – 2%	
Muhlenbergia torreyi		0 – 2%	
Sporobolus contractus		3%	
Sporobolus cryptandrus	24%	3%	3%
Sporobolus flexuosus		3%	
Forbs		8 – 11%	
Annual Forb		3 – 4%	
Perennial Forb		3 – 4%	
Artemisia frigida		3 – 4%	
Eriogonum		3 – 4%	
Sphaeralcea	T	3 – 4%	
Sullivan Tank Key Area # 3 Ecological Condition: Total of Current Score = 18 % of the expected potential natural community (Early Seral).			

**Current Score = lower of either Column 2 (current composition) or Column 5 (site guide composition).

T = trace (less than 1%)

Table D.17. Sullivan Tank Key Area #4 Cox Pond (Sullivan Tank Pasture) Ecological Site Inventory Data – Ecological Condition

Sullivan Tank Key Area # 4 Ecological Site: Limestone / Sandstone Upland 10 – 14" P.Z. (R035XC319AZ) Site was previously classified as Loamy Upland 10 – 14" P.Z. In 2005 Land Health Evaluation. Most recent monitoring data collected in 2019.			
Plant Species	**Current Composition**	**Site Guide Composition**	**Current Score****
Shrubs			
Occasional Native Short Shrubs		1 – 4%	
Chrysothamnus depressus		0 – 1%	
Eriogonum fasciculatum		0 – 1%	
Gutierrezia sarothrae	8%	0 – 3%	3%
Menodora scabra		0 – 1%	
Penstemon caespitosus var. *desertipicti*		0 – 1%	
Petradoria pumila		0 – 1%	
Psilostrophe cooperi		0 – 1%	
Senecio flaccidus		0 – 1%	
Stanleya pinnata		0 – 1%	
Dominant Native Mid Shrubs		20 - 23%	
Artemisia tridentata ssp. *wyomingensis*	4%	20 - 23%	4%
Common Native Mid Shrubs		1 – 6%	
Atriplex canescens		1 – 4%	
Ephedra nevadensis		1 – 4%	
Ephedra viridis		1 – 4%	
Common Native Short Shrubs		1 – 4%	
Chrysothamnus viscidiflorus		1 – 3%	
Krascheninnikovia lanata		1 – 3%	
Occasional Native Tall Shrubs		1 – 3%	
Mahonia fremontii		0 – 3%	
Purshia stansburiana		0 – 3%	

Occasional Native Mid Shrubs		0 – 4%	
Artemisia nova		0 – 2%	
Chrysothamnus greenei		0 -2%	
Coleogyne ramosissima		0 – 2%	
Ephedra cutleri		0 – 2%	
Eriogonum corymbosum		0 - 2%	
Ericameria nauseosa		0 – 2%	
Fallugia paradoxa		0 – 2%	
Lycium andersonii		0 – 2%	
Lycium pallidum		0 – 2%	
Quercus turbinella		0 – 2%	
Rhus trilobata		0 – 2%	
Shepherdia rotundifolia		0 – 2%	
Occasional Native Agave-Yucca Like		0 – 2%	
Agave utahensis		0 - 1%	
Yucca baccata		0 – 1%	
Occasional Native Cacti		0 – 2%	
Echinocereus engelmannii		0 – 1%	
Echinocereus triglochidiatus		0 – 1%	
Opuntia engelmannii		0 – 1%	
Opuntia erinacea var. *erinacea*		0 – 1%	
Opuntia polyacantha		0 – 1%	
Opuntia whipplei		0 – 1%	
Tree		1 – 8%	
Juniperus osteosperma	T	1 – 8%	
Pinus edulis		1 – 8%	
Grasses			
Common Native Summer Perennial Shortgrasses		27 – 35%	
Bouteloua gracilis		14 – 15%	
Hilaria jamesii	29%	1 – 15%	15%
Occasional Native Summer Perennial Mid Grasses		0 – 3%	

Perennial Grass		0 – 3%	
Bouteloua curtipendula		0 – 3%	
Bouteloua eriopoda		0 – 3%	
Muhlenbergia porteri		0 – 1%	
Sporobolus cryptandrus	2%	0 – 3%	2%
Occasional Native Summer Perennial Short Grasses		0 – 1%	
Perennial Grass		0 – 1%	
Muhlenbergia torreyi		0 – 1%	
Scleropogon brevifolius		0 – 1%	
Common Native Spring Perennial Mid Grasses		10 – 14%	
Aristida		3 – 6%	
Oryzopsis hymenoides	7%	1 – 6%	6%
Stipa comata	3%	3 – 6%	3%
Stipa neomexicana		3 – 6%	
Common Native Early Spring Perennial Short Grasses		8%	
Sitanion hystrix	8%	8%	8%
Occasional Native Spring Perennial Mid Grasses		0 – 1%	
Perennial Grass		0 – 1%	
Koeleria macrantha		0 – 1%	
Poa fendleriana	5%	0 – 1%	1%
Stipa speciosa		0 – 1%	
Tridens muticus		0 – 1%	
Occasional Native Annual Grasses		0 – 1%	
Annual Grasses		0 – 1%	
Bouteloua barbata		0 – 1%	
Vulpia octoflora		0 – 1%	
Forbs			
Occasional Native Spring Perennial Short Forbs		1 – 4%	
Perennial Forbs	T	0 – 1%	
Allium		0 – 1%	

Arabis		0 – 1%	
Astragalus humistratus		0 – 1%	
Astragalus subcinereus		0 – 1%	
Calochortus flexuosus		0 – 1%	
Calochortus nuttallii		0 – 1%	
Comandra umbellata subsp. *pallida*		0 – 1%	
Cymopterus		0 – 1%	
Delphinium parishii		0 – 1%	
Eriogonum caespitosum		0 – 1%	
Eriogonum inflatum		0 – 1%	
Lepidium		0 – 1%	
Lesquerella		0 – 1%	
Linum lewisii		0 – 1%	
Phlox hoodii		0 – 1%	
Phlox longifolia		0 – 1%	
Sphaeralcea	32%	0 – 1%	1%
Townsendia exscapa		0 – 1%	
Zigadenus paniculatus		0 – 1%	
Occasional Native Summer Perennial Short Forbs		0 – 3%	
Perennial Forb		0 – 1%	
Castilleja		0 – 1%	
Chaetopappa ericoides		0 – 1%	
Erigeron pumilus		0 – 1%	
Hymenopappus filifolius		0 – 10%	
Marrubium vulgare		0 – 1%	
Mirabilis multiflora		0 – 1%	
Penstemon		0 – 1%	
Thelesperma subnudum		0 – 1%	
Occasional Native Annual Short Forbs		0 – 3%	
Annual Forb		0 – 1%	
Amsinckia		0 – 1%	
Astragalus		0 – 1%	
Chenopodium berlandieri		0 – 1%	

Coreopsis		0 - 1%	
Descurainia		0 – 1%	
Erysimum capitatum		0 – 1%	
Eriastrum diffusum		0 – 1%	
Erigenia		0 – 1%	
Eriogonum		0 – 1%	
Euphorbia		0 – 1%	
Gilia		0 – 1%	
Lotus	2%	0 – 1%	1%
Mentzelia albicaulis		0 – 1%	
Phacelia		0 – 1%	
Plantago ovata		0 – 1%	
Physalis		0 – 1%	
Sullivan Tank Key Area # 4 Ecological Condition: Total of Current Score = 44 % of the expected potential natural community (Mid-Seral).			

**Current Score = lower of either Column 2 (current composition) or Column 5 (site guide composition).
T = trace (less than 1%)

Table D.18. Sullivan Tank Allotment Updated Rangeland Health Data Summary

Key Area	Ecological Site	Ecological Condition	Overall Trend
Sullivan Tank Key Area # 1 Little Joe Draw (Little Joe Pasture)	Loamy Upland 10 – 14" p.z. (R035XC313AZ)	Mid-Seral	Upward
Sullivan Tank Key Area # 2 Sullivan Draw (Sullivan Tank Pasture)	Loamy Upland 10 - 14" P.Z. (R035XC313AZ)	Mid-Seral	Upward
Sullivan Tank Key Area # 3 Post Office (Sullivan Tank Pasture)	Sedimentary Cliffs 10 – 14" p.z. (R035XC302AZ)	Early Seral	Upward
Sullivan Tank Key Area # 4 Cox Pond (Sullivan Tank Pasture)	Limestone / Sandstone Upland 10 – 14" p.z. (R035XC319AZ)	Mid-Seral	Upward

Desired Plant Community Objectives

Desired Plant Community Objectives (DPC) were developed during the evaluation process by an interdisciplinary team of specialists (BLM 2005a). These DPCs are to replace the 1990 AMP allotment specific vegetation frequency and cover objectives which focus on livestock forage needs. These objectives focus on the ecological site and its potential, which is a reflection of the biodiversity of the area. DPCs include Species Composition by Weight (CBW) using the Dry Weight Ranking method of data collection and live vegetative ground cover using the point step method of data collection to measure vegetative basal cover (4.4 Monitoring). DPCs will be used, from this point forward, to assess effectiveness of management actions (BLM 2005a). Although canopy cover is included in the objectives it is not part of the data that is collected in the key area trend monitoring.

Sullivan Tank Key Area #1, Little Joe Draw (Little Joe Pasture)
Ecological Site: Loamy Upland 10 – 14" p.z. (R035XC313AZ)

- Increase *Sitanion hystrix* to between the range of 5 to 10% CBW
- Increase *Oryzopsis hymenoides* to between the range of 5 to 10% CBW
- Maintain *Hilaria jamesii* to between the range of 30 to 50% CBW
- Maintain *Sporobolus cryptandrus* to between the range of 1 to 3% CBW
- Maintain *Artemisia tridentata* to between the range of 0-15% CBW
- Maintaining forbs to between the range of 5 to 10 percent CBW
- Maintain ground cover above 65%
- Maintain basal cover to between 5 to 10% on perennial vegetation
- Increase canopy cover to between the range of 25 to 35% on perennial vegetation

Table D.19. Sullivan Tank Key Area #1, Little Joe Draw (Little Joe Pasture), Desired Plant Community Objectives Determination Table

Sullivan Tank Key Area #1 Ecological Site: Loamy Upland 10 – 14" p.z. (R035XC313AZ) Most recent monitoring data collected in 2019.			
Plant Group (or Ground Cover)	**Current Composition**	**Desired Plant Composition**	**Objective Met or Not Met**
Ground Cover (Total Litter, Rock, Live Basal Vege)	72%	>65%	Met (Exceeds)
Live Basal Vege Cover	4%	5 – 10%	Not Met
Canopy Cover	Not Measured	25 – 35%	
Shrubs			
Artemisia tridentata	12%	0 – 15%	Met
Grass			
Hilaria jamesii	51%	30 – 50%	Not Met (Exceeds)
Oryzopsis hymenoides	0	5 – 10%	Not Met
Sitanion hystrix	T	5 – 10%	Not Met
Sporobolus cryptandrus	T	1 – 3%	Not Met
Forbs		5 – 10%	
Sphaeralcea sp.	36%		Not Met (Exceeds)

T = trace (less than 1%)

DPC objectives are partially met at this key area. Ground cover met and exceeded the objective with 72%. The objective for live basal vegetation cover was not met with 4% which is just below the objective of 5 – 10%. The objective for shrubs, *Artemisia tridentata,* was met with 12%. The objective for perennial grasses was partially met with *Hilaria jamesii* with 51% which exceeds the objective by 1%, but the objective for other grass species was not met. The objective for perennial forbs was exceeded with *Sphaeralcea sp.* at 36%. *Sphaeralcea sp.* is an early seral species.

Sullivan Tank Key Area #2, Sullivan Draw (Sullivan Tank Pasture)
Ecological Site: Loamy Upland 10 - 14" p.z. (R035XC313AZ)

- Increase *Sitanion hystrix* to between the range of 5 to 10% CBW
- Increase *Oryzopsis hymenoides* to between the range of 5 to 10% CBW
- Maintain *Hilaria jamesii* to between the range of 25 to 35% CBW
- Increase *Bouteloua gracilis* to between the range of 1 to 5% CBW
- Reduce *Artemisia tridentata* to between the range of 5 to 10% CBW
- Maintaining forbs to between the range of 5 to 10 percent CBW
- Maintain ground cover above 65%
- Maintain basal cover to between 5 and 10% on perennial vegetation
- Maintain canopy cover to between the range of 25 to 35% on perennial vegetation

Table D.20. Sullivan Tank Key Area #2 Sullivan Draw (Sullivan Tank Pasture) Desired Plant Community Objectives Determination Table

Sullivan Tank Key Area #2 Ecological Site: Loamy Upland 10 - 14" p.z. (R035XC313AZ) Most recent monitoring data collected in 2019.			
Plant Group (or Ground Cover)	**Current Composition**	**Desired Plant Composition**	**Objective Met or Not Met**
Ground Cover (Total Litter, Rock, Live Basal Vege)	64%	>65%	Not Met
Live Basal Vege Cover	6%	5 – 10%	Met
Canopy Cover	Not Measured	25 – 35%	
Shrubs			
Artemisia tridentata	43%	5 – 10%	Not Met (Exceeds)
Grass			
Bouteloua gracilis	0	1 – 5%	Not Met
Hilaria jamesii	15%	25 – 35%	Not Met
Oryzopsis hymenoides	1%	5 – 10%	Not Met
Sitanion hystrix	36%	5 – 10%	Not Met (Exceeds)
Forbs		5 – 10%	Not Met
Perennial Forbs	1%		
Sphaeralcea	T		

T = trace (less than 1%)

DPC objectives are partially met at this key area. The ground cover objective was not met with 64% CBW. It was just below the objective of >65%. The live basal vegetation cover objective was met with 6%. The shrub objective exceeded the objective with 43% *Artemisia tridentata,* well over the objective of 5 – 10%. This key area is dominated by shrubs. The perennial grass objective is partially met with *Sitanion hystrix* at 36% which exceeds its objective of 5 – 10%. The objectives for other perennial grass species were not met. *Hilaria jamesii* had 15% CBW but did not meet the objective of 25 – 35%. *Oryzopsis hymenoides* was present with 1% CBW but did not meet the objective of 5 - 10%. Other species of perennial grasses were present *Agropyron*

smithii with 2% CBW, and *Sporobolus cryptandrus* with 3%. The objective for forbs was not met.

Sullivan Tank Key Area #3, Post Office (Sullivan Tank Pasture)
Ecological Site: Sedimentary Cliffs 10 – 14" p.z. (R035XC302AZ)

- Increase *Sitanion hystrix* to between the range of 5 to 10% CBW
- Increase *Oryzopsis hymenoides* to between the range of 5 to 10% CBW
- Increase *Poa fendleriana* to between the range of 3 to 7% CBW
- Increase *Hilaria jamesii* to between the range of 3 to 7% CBW
- Maintain *Artemisia tridentata* to between the range of 5 to 15% CBW
- Maintain *Cowania mexicana* to between the range of 5 to 10% CBW
- Maintaining forbs to between the range of 5 to 10 percent CBW
- Maintain ground cover above 80%
- Maintain basal cover to between 5 and 10% on perennial vegetation
- Maintain canopy cover to between the range of 25 to 35% on perennial vegetation

Table D.21. Sullivan Tank Key Area #3, Post Office (Sullivan Tank Pasture) Desired Plant Community Objectives Determination Table

Sullivan Tank Key Area #3 Ecological Site: Sedimentary Cliffs 10 – 14" p.z. (R035XC302AZ) Most recent monitoring data collected in 2019.			
Plant Group (or Ground Cover)	**Current Composition**	**Desired Plant Composition**	**Objective Met or Not Met**
Ground Cover (Total Litter, Rock, Live Basal Vege)	77%	>80%	Not Met
Live Basal Vege Cover	T	5 – 10%	Not Met
Canopy Cover	Not Measured	25 – 35%	
Shrubs			
Artemisia tridentata	2%	5 – 15%	Not Met
Cowania mexicana	0	5 – 10%	Not Met
Grass			
Hilaria jamesii	2%	3 – 7%	Not Met
Poa fendleriana	T	3 – 7%	Not Met
Oryzopsis hymenoides	5%	5 – 10%	Met
Sitanion hystrix	3%	5 – 10%	Not Met
Forbs		5 – 10%	
Sphaeralcea	T		Not Met

T = trace (less than 1%)

DPC objectives are partially met at this key area. The objective for ground cover was not met. The current ground cover is 77% which is 3% below the objective of >80%. Live basal vegetation cover objective was not met. The shrub objective was not met at 2% CBW of

Artemisia tridentata. There was no *Cowania mexicana* recorded on the transect. Other shrubs like *Fallugia paradoxa* at 30% CBW and *Gutierrezia sarothrae* with 26% CBW were recorded. *Fallugia paradoxa* responds to fire by resprouting and can be a pioneer species. The objective for perennial grasses was partially met with *Oryzopsis hymenoides* which meets the objective with 5% but the objective for other grass species was not met. *Hilaria jamesii* was at 2% just below the objective of 3 – 7%. *Sitanion hystrix* was at 3% CBW which is below the objective of 5 – 10% CBW. Other species of early seral perennial grasses were present *Aristida sp*. 6% CBW, and *Sporobolus cryptandrus* with 24% CBW. The objective for forbs was not met. This is likely due to the repeated fires that have occurred in this area. The attempt to seed failed due to drought and additional fires.

Sullivan Tank Key Area #4, Cox Pond (Sullivan Tank Pasture)
Ecological Site: Limestone / Sandstone Upland 10 – 14" p.z. (R035XC319AZ)

- Maintain *Sitanion hystrix* to between the range of 5 to 10% CBW
- Increase *Oryzopsis hymenoides* to between the range of 5 to 10% CBW
- Increase *Poa fendleriana* to between the range of 1 to 5% CBW
- Maintain *Hilaria jamesii* to between the range of 40 to 50% CBW
- Maintain *Artemisia tridentata* to between the range of 1-15% CBW
- Maintain *Juniperus osteosperma* to between the range of 1-3% CBW
- Maintaining forbs to between the range of 5 to 10 percent CBW
- Maintain ground cover above 65%
- Maintain basal cover to between 5 and 10% on perennial vegetation
- Maintain canopy cover to between the range of 35 to 45% on perennial vegetation

Table D.22. Sullivan Tank Key Area #4, Cox Pond (Sullivan Tank Pasture) Desired Plant Community Objectives Determination Table

Sullivan Tank Key Area #4 Ecological Site: Limestone / Sandstone Upland 10 – 14" p.z. (R035XC319AZ) Most recent monitoring data collected in 2019.			
Plant Group (or Ground Cover)	**Current Composition**	**Desired Plant Composition**	**Objective Met or Not Met**
Ground Cover (Total Litter, Rock, Live Basal Vege)	72%	>65%	Met
Live Basal Vege Cover	4%	5 – 10%	Not Met
Canopy Cover	Not Measured	35 – 45%	
Shrubs			
Artemisia tridentata	4%	1 – 15%	Met
Trees			
Juniperus osteosperma	T	1 – 3%	Not Met
Grass			
Hilaria jamesii	29%	40 – 50%	Not Met

Oryzopsis hymenoides	7%	5 – 10%	Met
Poa fendleriana	5%	1 – 5%	Met
Sitanion hystrix	8%	5 – 10%	Met
Forbs		5 – 10%	
Lotus longebracteatus	2%		Not Met
Phlox austromontana	T		Not Met
Sphaeralcea sp.	32%		Not Met (Exceeds)

T = trace (less than 1%)

DPC objectives are partially met at this key area. The ground cover objective was met with 72% but the objective for live basal vegetation cover was not met with 4%, just below the objective of 5 – 10% CBW. The shrub objective was met with *Artemisia tridentata* with 4%. The objective for trees was not met. The objective for perennial grasses was partially met. *Oryzopsis hymenoides, Poa fendleriana,* and *Sitanion hystrix* met the objectives for each species. The objective for *Hilaria jamesii* was not met. Other species of perennial grasses were present *Sporobolus cryptandrus* with 2% and *Stipa comata* with 3%. The objective for forbs was not met by *Lotus longebracteatus* at 2% but was exceeded by *Sphaeralcea sp.* with 32%. *Sphaeralcea sp*. is an early seral species that frequently comes in after disturbances like fire.

APPENDIX E- Historic Precipitation Reports

Table E.1 Mud Mountain Historical Precipitation Report (All precipitation readings are in inches.)

Historical Precipitation Report **Rain Gauge Name: Mud Mountain Rain Gauge Number: 07** **Annual long-term average is 13.83 inches through 2020.**						
YEAR	**FALL**	**WINTER**	**SPRING**	**SUMMER**	**ANNUAL TOTAL**	**ANNUAL PERCENTAGE**
1978	1.83	14.52	4.30	1.32	21.97	157%
1979	4.57	5.50	4.54	2.52	17.13	122%
1980	0.61	10.32	1.74	3.32	15.99	114%
1981	1.60	2.50	4.48	2.93	11.51	82%
1982	1.26	3.12	3.33	4.23	11.94	85%
1983	4.35	6.40	4.04	5.42	20.21	144%
1984	2.28	1.56	0.70	5.36	9.90	71%
1985	2.21	6.70	0.98	2.19	12.08	86%
1986	3.44	1.98	3.55	4.56	13.53	97%
1987	2.20	4.75	2.60	5.13	14.68	105%
1988	4.50	2.89	3.18	5.16	15.73	112%
1989	0.67	5.24	0.84	3.57	10.32	74%
1990	0.67	3.39	2.18	4.97	11.21	80%
1991	1.06	4.08	1.85	4.20	11.19	80%
1992	1.06	5.55	5.30	1.76	13.67	98%
1993	2.00	15.25	2.50	1.25	21.00	150%
1994	3.13	3.59	2.03	11.75	20.50	146%
1995	3.93	9.83	3.75	2.25	19.76	141%
1996	0.62	4.63	0.25	3.37	8.87	63%
1997	2.75	6.00	0.25	4.50	13.50	96%
1998	1.88	7.62	3.23	6.27	19.00	136%
1999	3.21	1.66	3.38	2.50	10.75	77%
2000	0.00	4.75	0.63	3.21	8.59	61%
2001	3.50	8.61	0.00	3.00	15.11	108%
2002	0.25	1.50	0.25	1.50	3.50	25%
2003	1.00	3.00	2.88	2.38	9.25	66%
2004	0.70	4.30	1.12	0.88	7.00	50%
2005	6.00	13.50	3.25	4.25	27.00	193%
2006	1.25	1.00	4.00	5.13	11.38	81%
2007	0.75	1.30	0.95	3.00	6.00	43%
2008	0.00	7.50	0.50	2.78	10.78	77%
2009	1.60	4.85	0.50	1.90	8.85	63%
2010	0.38	8.87	2.63	0.87	12.75	91%
2011	3.25	12.50	2.38	2.63	20.75	148%
2012	3.00	3.50	2.00	9.50	18.00	128%
2013	1.75	3.63	0.68	7.75	13.80	98%
2015	0.50	4.38	2.63	5.75	13.25	95%
2016	2.00	3.50	3.50	5.00	14.00	100%
2017	0.88	10.13	2.50	6.75	20.25	145%
2018	0.00	2.88	2.63	6.00	11.50	82%
2019	3.00	7.50	6.50	0.50	17.50	125%
2020	5.00	3.50	3.75	0.50	12.75	92%

All precipitation readings are in inches. The most complete data through 2020. For a summary of the report see Section 3.2.2 Climate. Long term average 13.83 inches.

Table E.2 Sullivan Tank Historical Precipitation Report (All precipitation readings are in inches.)

Historical Precipitation Report **Rain Gauge Name: Sullivan Tank Rain Gauge Number: 24** **Annual long-term average is 12.27 inches.**						
YEAR	**FALL**	**WINTER**	**SPRING**	**SUMMER**	**ANNUAL TOTAL**	**ANNUAL PERCENTAGE**
1978	1.35	10.00	3.78	1.88	17.01	137%
1979	1.56	9.64	2.01	4.54	17.75	143%
1980	1.41	10.00	1.64	4.63	17.68	142%
1981	1.13	2.28	3.74	4.39	11.54	93%
1982	0.86	4.83	3.08	6.37	15.14	122%
1983	2.20	4.00	3.36	5.65	15.21	123%
1984	2.33	1.69	0.70	7.08	11.80	95%
1985	1.53	6.49	1.88	3.06	12.96	104%
1986	2.67	1.51	3.06	3.33	10.57	85%
1987	1.94	4.71	3.82	3.33	13.80	111%
1988	3.45	1.93	3.59	3.19	12.16	98%
1989	0.89	4.37	1.22	2.91	9.39	76%
1990	0.56	2.07	1.50	6.35	10.48	84%
1991	0.88	4.57	1.24	2.82	9.51	77%
1992	2.00	4.10	4.38	3.86	14.34	116%
1993	2.30	11.39	2.63	1.43	17.75	143%
1994	2.25	3.52	1.98	1.25	9.00	73%
1995	1.55	9.20	1.86	4.14	16.75	135%
1996	2.38	4.66	1.84	1.37	10.25	83%
1997	2.75	3.75	1.75	6.50	14.75	119%
1998	1.38	6.05	1.82	9.00	18.25	147%
1999	2.56	1.44	2.50	3.50	10.00	81%
2000	0.00	3.62	0.26	2.72	6.60	53%
2001	1.88	4.62	2.88	0.75	10.13	82%
2002	1.25	2.00	0.12	0.78	4.15	33%
2003	2.00	4.50	2.50	4.50	13.50	109%
2004	0.50	3.65	1.37	6.00	11.52	93%
2005	5.00	5.50	3.00	2.25	15.75	127%
2006	1.50	0.63	3.12	2.75	8.00	64%
2007	1.75	2.00	0.75	2.50	7.00	56%
2008	0.00	7.38	0.75	1.12	9.25	75%
2009	2.00	4.00	0.63	0.87	7.50	60%
2010	0.38	6.83	2.54	2.45	12.20	98%
2011	3.25	5.43	1.70	1.75	12.13	98%
2012	2.50	2.50	3.00	6.50	14.50	117%
2013	0.25	2.81	1.13	11.06	15.25	123%
2015	0.50	4.63	1.13	6.93	13.18	106%
2016	2.95	2.81	2.56	3.75	12.08	97%
2017	1.19	6.06	1.00	5.38	13.63	110%
2018	0.25	2.81	2.81	4.13	10.00	81%
2019	2.13	8.63	3.00	0.50	14.25	115%
2020	No data	7.00	3.75	0.00	No Data	Insufficient Data

The most complete data is through 2019. Long term average 12.27 inches. Due to missed readings in 2020 there is no annual percentage of normal calculated for 2020. For a summary of the report see Section 3.2.2 Climate.

APPENDIX F – Existing Range Improvements

Table F.1. Imlay Allotment Existing Range Improvements

Range Improvement Type	Description/Quantity
Corral	• George's Corral (1) • Sullivan Corral (1) Shared with Sullivan Tank Allotment
Cattleguards	• Cattleguards (6)
Fenced Reservoirs	• Black Knoll Tank (1) • Imlay Resort Reservoirs (2)
Unfenced Reservoirs	• Un-named Reservoir (1)
Livestock Troughs	• Imlay Catchment Pipeline Trough (1) • Sullivan Draw Pipeline Extension Trough (1)
Precipitation Gauge	• Sullivan Tank precipitation gauge is on the allotment boundary fence between Imlay Allotment and Sullivan Tank Allotment. It is on the Imlay side of the fence.
Wildlife Catchments (Water for Wildlife)	• Imlay Wildlife Catchment and exclosure fence • Hobble Wildlife Catchment

No developed springs

Table F.2. Imlay Allotment Existing Fences

Range Improvement Type	Name	Miles
Fence	Anderson-Layton Division Fence	1.8
Fence	Hobble Canyon Division Fence	3.9
Fence	Sullivan Tank Division Fence 1 *	0.9
Fence	Sullivan Tank Division Fence 1 *	1.9
Fence	Sullivan Tank Division Fence 1 *	2.4
Fence	Imlay Division Fence	2.3
Fence	Whiterock Imlay Division Fence	5.7
Fence	FENCE-A BRINK EST	4.0
Fence	Sullivan Tank Division Fence 1 *	1.9
Fence	DIV F #2-SULL TANK	0.9
Fence	Atkin-Blake-Brinkerhoff Division Fence	7.5
Fence	Imlay Wildlife Catchment Exclosure	0.3
Fence	Imlay West Boundary Fence	3.1
Fence	Anderson-Layton Division Fence	0.9
Fence	Whiterock Imlay Division Fence	0.9
Total		38.4

*Fence shared between Imlay and Sullivan Tank Allotments.

Table F.3. Imlay Allotment Existing Pipelines

Range Improvement Type	Name	Miles
Pipeline	PIPELINE-LAYTON	1.1
Pipeline	Imlay Catchment Pipeline	0.9
Pipeline	Sullivan Draw Pipeline Extension	0.4
Total		2.4

Some of the fences are shared boundary fences like Sullivan Tank Division Fence 1 segments run between the Imlay and Sullivan Tank Allotments.

Table F.4. Sullivan Tank Allotment Existing Range Improvements

Range Improvement Type	Description/Quantity
Corral	• Sullivan Corral (1) Shared with Imlay Allotment • Post Office Corral and Chute (1)
Cattleguard	• Cattleguards (2)
Fenced Reservoirs	• Cox Pond (1) • Hobble Pond (1) • Sullivan Reservoirs (2)
Unfenced Reservoirs	• Post Office Tank (1) • Sullivan Reservoir (1)
Livestock Troughs	• Post Office Water Trough (1) • Sullivan Draw Pipeline Extension Trough (1)

No developed springs.

Table F.5. Sullivan Tank Allotment Existing Fences

Range Improvement Type	Name	Miles
Fence	Sullivan Tank Division Fence 1 *	0.9
Fence	Jump Sullivan Division Fence	3.6
Fence	Sullivan Tank-Jump Fence	5.7
Fence	Sullivan Tank Division Fence 1 *	1.9
Fence	Sullivan Tank Division Fence 1 *	2.4
Fence	Sullivan Draw Fence	8.1
Fence	Sullivan Tank Division Fence 1 *	1.9
Fence	Division Fence 2-Sullivan Tank	0.9
Fence	South Sullivan Pasture Fence	2.1
Total		27.5

*Fence shared between Imlay and Sullivan Tank Allotments.

Table F.6. Sullivan Tank Allotment Existing Pipelines

Range Improvement Type	Name	Miles
Pipeline	Sullivan Draw Pipeline Extension	7.9
Total		7.9

APPENDIX G. Public Comment and Response

A 30-day public comment period for this environmental assessment was available from March 24, 2021 to April 23, 2021. Comments from the public comment period are in the table below. Comments that were not considered substantive (e.g., opinions or preferences) did not receive a formal response but were considered in the BLM decision-making process.

Table G.1. Public Comment and Response

Commenter	Comment Number	Comment	Comment Response
R. Spotts	1	*I reviewed this EA. I am concerned that the key rangeland health evaluations were done in 2003 and 2004. This was before the serious wildfires in 2005.*	Section 3.2.3 of the EA addresses rangeland health evaluations. It is accurate that BLM conducted field evaluations of rangeland health conditions on the Imlay Allotment in 2003 and Sullivan Tank Allotment in 2004. A Rangeland Health Assessment for the Imlay and Sullivan Tank Allotments was completed and signed in 2005 (BLM 2005a). Both allotments were making significant progress toward meeting the applicable standards for rangeland health. Further in Section 3.2.3, in 2019, an interdisciplinary team re-evaluated both allotments utilizing Interpreting Indicators of Rangeland Health, Version 4 (BLM 2005b) and made field visits in 2019. The re-evaluation built upon the original evaluation that was completed in 2005 and in addition reviewed monitoring data including utilization, and trend that was collected since the 2005 evaluation (See Appendix C and D). The team determined that the allotments continue to make progress toward meeting the Arizona BLM Standards for Rangeland Health (Standards for Rangeland Health) (Appendix B). See Wildfire History Section 3.4.2.2 in EA. The wildfire history of the allotments was considered in the permit renewal process. Wildfires that have occurred on both of the allotments from 1980 -2020. Tables 3.8 and 3.9 show the fire year and approximate acres burned and any key areas that were burned. Imlay Key Area #3 (burned in 2021) and Sullivan Tank Key Area # 3 was burned during wildfires in 1999, 2005, and 2012. Appendix C and D shows the monitoring that has been done including Imlay Key Area #3 and Sullivan Tank Key Area #3 that were burned. Section 3.4.1 Livestock Grazing Table 3.4 and 3.5 Updated Rangeland Health Data Summary for each allotment shows that both key areas # 3 are currently in early seral condition with an upward trend. In the process of recovering from the wildfires.

			Utilization data from the 1990's through 2020. Imlay Allotment Tables C.2 – C.5. Sullivan Tank Allotment Tables D.2 – D.5. Trend data from the 1980's through 2019. Imlay Allotment Tables C.6 – C.13. Sullivan Tank Allotment Tables D.6 – D.13. Also see EA Section 3.4.1 Tables 3.4 Imlay Allotment Updated Rangeland Health Data Summary and Table 3.5 Sullivan Tank Allotment Updated Rangeland Health Data Summary. This data provides recent factual data used for re-valuation of both allotments during this EA. The team determined that the allotments continue to make progress toward meeting the Arizona BLM Standards for Rangeland Health (Standards for Rangeland Health) (Appendix B).
R. Spotts	2	*I am also concerned that these allotments are managed under a 1990 Allotment Management Plan.*	There is an Allotment Management Plan (AMP) for the Imlay and Sullivan Tank Allotments signed 1990. There is no expiration date for an AMP, but they may be revised as per 43 CFR 4120.2. During the current Imlay and Sullivan Tank Allotment Grazing Permit Renewal EA grazing practices were evaluated and if changes were required to improve allotment management those changes would be identified and changes would be made to the grazing permit through the site specific NEPA process. In the 2019 update of the allotment evaluations the team determined that the allotments continued to make progress toward meeting the Arizona BLM Standards for Rangeland Health. This permit renewal EA serves as an update to the existing AMP for management of the Imlay and Sullivan Tank Allotments. Section 2.2 the proposed action proposes to combine the Imlay and Sullivan Tank Allotments into one allotment with a four-pasture rotation. The season of use would be 10/1 – 6/15. It would completely rest the allotment from 6/16 – 9/30 each year. Allowable use on key forage species is 50% on allotments with rotational grazing systems. When 50% forage utilization is reached, livestock will be moved to another pasture or off the allotment completely. Allowing up to eight horses to be grazed instead of eight cattle. Keeping the total number of active and suspended AUMs the same as the current permit authorization Table 2.1 and Table 2.2. This in combination with the 2019 updated land health evaluation, which built upon the 2005 evaluation, and review of long and short-term monitoring data.

R. Spotts	3	*Unfortunately, the EA analysis of this Alternative C is biased and inadequate because it does not acknowledge the many positive benefits from giving these vegetative communities a decade's worth of rest. Among other things, this rest from livestock grazing would increase of the rate of post-fire healing, reduce stress on native wildlife species, and sequester a greater amount of carbon in vegetation.*	See response to comment # 1 above concerning the allotments evaluation (2005) and recent re-evaluation (2019) of both allotments and the ongoing collection and review of monitoring data for both allotments see EA Appendix C and D. These provide recent factual data used for re-valuation of both allotments. Refer to Chapter 4 Sections 4.2.2.3, 4.2.3.2, 4.3.2, 4.3.3 for impact analysis vegetation and wildlife.
R. Spotts	4	*The EA analysis also gives short shrift to the fact that these allotments are in a national monument, where protection of the specific objects identified in the monument proclamation is the "dominant reservation" and supersedes normal multiple use management where conflicts may occur. BLM has clear discretion to reduce, delay, or stop livestock grazing when necessary.*	See EA at Section 1.3: Grand Canyon-Parashant National Monument Proclamation: Proposed actions within the GCPNM are designed to also ensure the long-term protection of a wide variety of biological objects and a long rich human history, as guided by Presidential Proclamation 7265. This presidential proclamation explains that GCPNM was created because of its "outstanding objects of scientific and historic interest." The proclamation also states, "shall continue to issue and administer grazing leases". The analysis of impacts to affected resources constitutes the analysis of impacts to Monument objects in this EA. See EA at Section 1.5: Designation of the Monument did not, in and of itself, require modification of the current grazing practices. The presidential proclamation states that "Laws, regulations, and policies followed by the BLM in issuing and administering grazing leases on all lands under its jurisdiction shall continue to apply…" (BLM 2008a) Under the Antiquities Act, the BLM must protect objects identified in the presidential proclamation that established the National Monument. Therefore, if the BLM determines that any Monument objects are harmed by current management then management (including permit terms and conditions) would be modified accordingly. The analysis of impacts to specific resources constitutes the analysis of impacts to Monument objects in this EA.
WWP	5	*After a careful review of the EA for this project it is clear that the "trend" BLM claims for vegetation communities is not reflected in the data provided.*	This comment does not specifically address how the trend data is in error. Appendix C and D address the trend monitoring data for the allotments.

WWP	6	*In light of the drought, climate change, poor range condition, and actual utilization far below the authorized AUMs, the BLM should reduce or eliminate livestock grazing on these allotments, not increase the number of AUMs by combining the 2 allotments.*	Alternative A Proposed Action proposes to combine the Imlay Allotment and the Sullivan Tank Allotment into one allotment with four pastures. The BLM is not proposing to increase the total number of AUMs. See Section 2.2 Proposed Action Table 2.1 and Section 2.3 Alternative B No Changes Table 2.2. The total number of AUMs is the same under either alternative. Alternative A Proposed Action would authorize 1190 Active AUMs and 1164 Suspended AUMs. Alternative B No Changes which would renew the current authorized grazing permit with no changes would authorize 1190 Active AUMs and 1164 Suspended AUMs. There are no proposed changes to AUMs for Alternative A or B. Consequently, grazing on the Monument, as noted in Comment Response 5, is a valid use and has been found to be in compliance with rangeland health.
WWP	7	*The plan to allow utilization of up to 50% also flies in the face of good land management for livestock grazing on arid lands.*	See EA Section 1.4 Conformance with BLM Land Use Plan(s) From Table 2.12 GCPNM RMP (BLM 2008a) **MA-GM-08:** 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, utilization is set at 45%. This is the level of use analyzed in the GCPNM RMP 2008 for grazing allotments with a rotational grazing system. The Imlay and Sullivan Tank Allotments are not in desert tortoise habitat. The combined allotment would have four pastures and has a rotational grazing system. Section 2.2.1 When 50 percent forage utilization is reached, livestock would be moved to another pasture or off the allotment completely. The combined allotment would be completely rested from grazing from 6/16 – 9/30 during the growing season.
WWP	8	*The cumulative effects analysis fails to adequately consider the recent Shivwits vegetation management project.*	The project area for this EA is the Imlay and Sullivan Tank Allotments which are not within the Shivwits Plateau Landscape Restoration Project area.
WWP	9	*In addition, and as the BLM is aware, the entire GCPNM has 24 livestock grazing allotments. The permits for just 7 of those allotments have had land health evaluations (LHEs),or have been "fully processed" in recent years (since approximately 2011) while 17 grazing permits have been reauthorized at least once via the "grazing rider" or 402(c)(2) provision of the Federal Land Policy Management Act, which*	This comment is outside the scope of this EA. The project area for this EA is the Imlay and Sullivan Tank Allotment boundary, and neither allotment is discussed in this comment. To clarify, there are 23 active grazing allotments and 27 authorizations managed by the GCPNM. Of these, 17 authorizations (15 allotments) have received full NEPA analysis through an EA. There are also two Forage Reserves managed by GCPNM. Forage Reserves have no long-term permittee or authorization. As a permit renewal EA is conducted by authorization, the Forage Reserves are not

		requires no assessment or analysis of the impacts of livestock grazing on those allotments. Of those 24 allotments, 9 are located within the project area and 7 of those 9 allotments have been approved via the rider, one has been "fully processed," and one is a forage reserve: *Hidden Hills – 402(c)(2) on 03.01.21* *Hidden Spring – 402(c)(2) on 09.05.14* *Last Chance – 402(c)(2) on 04.01.15* *Link Spring – 402(c)(2) on 03.01.18* *Mule Canyon – 402(c)(2) on 03.01.2019* *Parashant – forage reserve, no information in RAS* *Penn's Well – 402(c)(2) on 05.13.16* *Red Pond – 402(c)(2) on 03.01.2021* *This means that for the vast majority of the project area the impacts of livestock grazing has not even been considered, much less analyzed, since at least 2011. The BLM and NPS has therefore authorized 13,509 AUMs to graze on National Monument lands each year but has only considered the impacts of 4,979 of those AUMs.*	included in the fully processed category. The prepared EA is being used to fully process the subject grazing permit for the Imlay and Sullivan Tank Allotments. A previously fully processed permit was completed in 2007. In 2017, prior to the expiration of the 2007-fully processed permit the BLM renewed the permit under the authority of the 2015 amended Federal Land Policy Management Act (FLPMA-402 (c)(2) to allow for time to prepare the current EA. Due to the change in allotment boundaries, the proposal to allow horse use, and changes to the season of use, it was determined that an EA was needed to disclose and analyze impacts.
WWP	10	*BLM claims that there exists a lot of research that indicates landscape restoration or positive ecological benefits do not result from rest from livestock grazing. BLM cites to Davis 2014 for this assertion, but this is not accurate and there does exist a plethora of information on the deleterious impacts of livestock grazing.*	In Section 4.2.2.3 Direct and Indirect Impacts of Alternative C – No Grazing of the EA it states: "Numerous studies have found positive effects, negative effects, and no effects when managed grazing was removed. Positive outcomes appear to be based on current vegetative community characteristics, history of the area, and the presence and density of invasive non-native plant species (Davies 2014)." Further, "It was noted in the 2005 Land Health Evaluation that some areas would likely require treatment to meet DPCs and increase the amount of grass and grass-like species within the area. Removal of grazing would not substitute for treatment. It may have no effect or even a slight negative effect (Davies 2014)." The statement in section 4.2.2.3 relates to the potential outcomes of removing grazing from the allotments without further actions to ensure a positive

			ecological benefit. It does not contradict the scientific literature about potential deleterious effects of grazing.
WWP	11	*Livestock grazing promotes the spread and colonization of non-native, invasive plants, which can increase fire frequencies. Billings 1990, Billings 1994, Rosentreter 1994, Belsky and Gelbard 2000, Kimball and Schiffman 1993. Disturbance is a reliable indicator of non-native dominance in vegetation composition, and livestock grazing is a significant disturbance. Brooks and Berry 2006. Further, weed invasions are strongly associated with livestock watering sites. Brooks et al. 2006.*	Livestock grazing, depending on management strategies can be a disturbance, but these impacts are mitigated by invasive plant treatments as discussed in Section 4.2.2.2, 4.2.2.3 of the EA.
WWP	12	*Bock and Bock (1993) found that canopy cover of upland perennial grasses was 20 percent higher where livestock were excluded compared to grazed areas. Bock et al. (2007a) found that protection from livestock grazing reduced the rate of exotic invasions into native grasslands and that exotic species of plants are better adapted than most native grasses to livestock grazing as an exogenous disturbance. See also Bock et al. 2007b. The long-term response to relief from livestock grazing pressures includes increases in types of grasses and significant increases in canopy cover for midgrass, shortgrass, shrub, and forb plant groups.*	The Bock and Bock (1993) study was conducted in a grassland with localized oak and mesquite trees. The other two Bock studies were also conducted in grasslands. The allotments in the EA are not characterized as grassland and, according to the ESDs, do not typically develop into grasslands. Direct inferences on changes in vegetation due to removal of livestock grazing cannot be made due to the different underlying ecosystems and variable climatic conditions between the sites. In terms of invasive plant concerns, please see response to comment number 11.
WWP	13	*How livestock grazing impacts invasive species of plants is critical in understanding the relationship between livestock grazing and fire in the project area. The BLM and NPS must therefore analyze the cause and effect relationship of livestock grazing with the woody vegetation. See, e.g. Bahre and Shelton 1993. Fire in the absence of livestock results in the natural postfire recovery of native flora and fauna. Reis et al 2019; Wroblesky*	While livestock grazing is a vector for NNIPs, other vectors on the Monument include visitors, wildlife, and abiotic factors (wind, rain). Under the scenario described, all these other vectors would need to be removed to prevent NNIPs. Primary invasion by NNIPs on the Monument appears to be via roads based on roadside surveys. Alternative C would have a negligible impact on invasive species. As was noted in Section 4.2.2.2, invasive plant management is ongoing and would not be curtailed by this alternative. Removal of grazing would not change in any

		and Kauffman 2003. If the goals for this project are containment and prevention of the spread of non-native invasive species of plants (NNIPs), containment can be efficiently and economically accomplished through a prohibition on livestock grazing in any and all areas where NNIPs are known to be located. Prevention can also be accomplished by eliminating livestock grazing in the Monument because prohibiting livestock from consuming NNIP and trampling areas where NNIPs are located and then moving to non-infested areas would prevent the livestock from defecating NNIP seeds and parts and would also keep seeds and plant parts stuck to hooves and fur from being transported to new locations. *To quote from Reisner et al. (2013):"If the goal is to conserve and restore resistance of these systems, managers should consider maintaining or restoring: (i) high bunchgrass cover and structure characterized by spatially dispersed bunchgrasses and small gaps between them; (ii) a diverse assemblage of bunchgrass species to maximize competitive interactions with B. tectorum (cheatgrass) in time and space; and (iii) biological soil crusts to limit B. tectorum establishment. Passive restoration by reducing cumulative cattle grazing may be* ***one of the most effective means of achieving these three goals.****" (Emphasis added.)*	substantial way the occurrence or distribution of invasive non-native plants in the allotments. Bahre and Shelton is specific to Southeaster Arizona, where mesquite increases in density and it is concluded that the increase is likely due to fire exclusion and heavy grazing over the last 120 years with an enhancement due to winter precipitation. This study does not tie directly to invasive plants. The analysis would be on the historic effects of grazing on woody species in the allotments which adequately explain grazing impacts related to invasive species.
WWP	14	*Cheatgrass is identified as a concern on these allotments. Cheatgrass is most valuable as a spring forage (meaning the time when livestock are also most likely to eat it), which coincides with the time of year perennial cool-season grasses are most susceptible to damage by*	BLM is not managing for use of cheatgrass as forage. The alternatives analyzed in this EA are not proposing livestock grazing as a way of controlling cheatgrass. Livestock typically use cheatgrass during short periods of time when it is green and palatable. Section 2.2.1 Grazing System and Other Terms and Conditions

		grazing. Id. Hoof action that accompanies livestock grazing enhances cheatgrass seed germination and emergence and the seeds are incompletely digested and thus spread by livestock droppings. Id. Grazing at a level that will control cheatgrass is also likely to significantly increase soil erosion and is harder on perennials than it is on NNIP. Id.	Allowable use on key forage species is 50% on allotments with rotational grazing systems. When 50% forage utilization is reached, livestock will be moved to another pasture or off the allotment completely. Following the 50 % utilization limit to trigger livestock pasture movements or removal of livestock from the allotment would protect perennial cool-season grasses and other vegetation. Under Alternative A and B both allotments would have growing season rest from livestock grazing. Section 2.2.1 Alternative A would rest both allotments from 6/16 – 9/30 every year.
WWP	15	***Federal Land Policy Management Act (FLPMA)*** *As the BLM and the NPS are aware, FLPMA does not mandate that every use be accommodated on every piece of land. Rather, delicate balancing is required. See Norton v. S. Utah Wilderness Alliance, 542 U.S. 55, 58, 124 S. Ct. 2373, 159 L. Ed. 2d 137 (2004). "'Multiple use' requires management of the public lands and their numerous natural resources so that they can be used for economic, recreational, and scientific purposes without the infliction of permanent damage." Pub. Lands Council v. Babbitt, 167 F.3d 1287, 1290 (10th Cir. 1999) (citing 43 U.S.C. § 1702(c)); see also Norton v. S. Utah Wilderness Alliance, 542 U.S. 55, 58 (U.S. 2004). The principle of multiple use does not require the agencies to prioritize development over other uses. "If all the competing demands reflected in FLPMA were focused on one particular piece of public land, in many instances only one set of demands could be satisfied. A parcel of land cannot both be preserved in its natural character and mined.'" Rocky Mtn. Oil & Gas Ass'n v. Watt, 696 F.2d 734, 738 n.4 (10th Cir. 1982) (quoting Utah v. Andrus, 486 F. Supp. 995, 1003 (D. Utah 1979)); see also 43 U.S.C. § 1701(a)(8) (stating,*	See Section 1.4 Conformance with BLM Land Use Plan(s). From Table 2.12 GCPNM RMP (BLM 2008a) **LA-GM-01:** On BLM-administered lands, all allotments will continue to be classified as available for grazing by livestock under the principal of multiple use and sustained yield, except where specifically noted. See Section 1.5: The RMP identified public lands within the Imlay Allotment and Sullivan Tank Allotment as available for domestic livestock grazing (BLM 2008a). Where consistent with the goals and objectives of the RMP and Standards for Rangeland Health, allocation of forage for livestock use and the issuance of grazing permits to qualified applicants are provided for by the TGA and FLPMA. See Sections 1.3, 1.5 of the EA, and comment response # 5 above, which address how this project relates to applicable law, regulations, and statutes.

		as a goal of FLPMA, the necessity to "preserve and protect certain public lands in their natural condition"); Public Lands Council v. Babbitt, 167 F.3d 1287, 1299 (10th Cir. Wyo. 1999) (citing § 1701(a)(8)). The Supreme Court has explained that "multiple use" management is an "enormously complicated task" and that "[o]f course not all uses are compatible." Norton v. S. Utah Wilderness Alliance, 542 U.S. 55, 58 (2004). BLM has "a great deal of discretion" in deciding how to balance those competing uses. Id. at 66. However, once an agency makes its choice — i.e., establishes its "priorities"— in a land use plan that reflects Monument designations, agencies are then bound to ensure future management actions are "in accordance with" those choices. W. Watersheds Project v. Salazar, 843 F. Supp. 2d 1105, 1131 (D. Idaho 2012); 43 U.S.C. § 1732(a).	