

# United States Department of the Interior Bureau of Land Management

---

Environmental Assessment  
DOI-BLM-AZ-A030-2017-0010-EA

---

December 2018

---

## PROPOSED GRAZING PERMIT RENEWAL FOR THE MOSBY-NAY AND MOSBY ALLOTMENTS

***Location:***

Mosby-Nay Allotment

T.35N. R.15W. Section 6.

T.35N. R.16W. Sections 1 - 3, 10 - 12.

T.36N. R.15W. Sections 1 - 4, 7 - 23, 28 - 32.

T.36N. R.16W. Sections 1 - 5, 7 - 30, 32 - 36.

T.37N. R.16W. Sections 28, 29, 32 - 34.

Mosby Allotment

T.36N. R.16W. Sections 4 - 9.

T.37N. R.16W. Sections 32, 33.

Gila and Salt River Base and Meridian

Mohave County, Arizona

***Applicant:***

C & L Farm & Cattle LLC

---

U.S. Department of the Interior  
Bureau of Land Management  
Grand Canyon-Parashant National Monument  
345 E. Riverside Drive  
St. George, Utah 84790  
Phone: (435) 688-3200  
FAX: (435) 688-3388



# Contents

1.0 Introduction.....	7
<b>1.1 Background.....</b>	<b>7</b>
<b>1.2 Purpose and Need.....</b>	<b>7</b>
<b>1.3 Conformance with Land Use Plan.....</b>	<b>6</b>
<b>1.4 Relationships to Statutes, Regulations, or other Plans .....</b>	<b>8</b>
<b>1.5 Identification of Issues .....</b>	<b>11</b>
2.0 Description of the Alternatives .....	11
<b>2.1 Management Common to All Alternatives .....</b>	<b>11</b>
2.1.1 Arizona Standards for Rangeland Health (ASRH) (Appendix 3).....	11
<b>2.2 Management Common to Alternatives A and B .....</b>	<b>12</b>
2.2.1 Utilization .....	12
2.2.2 Monitoring and Adaptive Management .....	12
<b>2.3 Alternative A – Proposed Action - Combine Allotments and Create New Fences and Pastures.....</b>	<b>12</b>
2.3.1 Grazing System.....	16
2.3.2 Range Improvements Background.....	18
2.3.3 Proposed Range Improvements .....	18
<b>2.4 Alternative B – No Action – Continue Current Management .....</b>	<b>21</b>
2.4.1 Grazing System.....	22
2.4.2 Range Improvements .....	22
<b>2.5 Alternative C – No Grazing.....</b>	<b>22</b>
<b>2.6 Alternatives Considered But Eliminated From Further Analysis.....</b>	<b>23</b>
2.6.1 Reduction of Grazing Preference.....	23
3.0 Affected Environment.....	23
<b>3.1 General Setting .....</b>	<b>23</b>
<b>3.2 Resources Brought Forward for Analysis.....</b>	<b>25</b>
3.2.1 Livestock Grazing.....	26
3.2.2 Soils.....	28
3.2.3 Threatened, Endangered, or Candidate Animal Species.....	29
3.2.4 Vegetation and Invasive, Non-native Species .....	31
3.2.5 Wildlife (including Big Game, Migratory Birds, and Sensitive Species).....	41
4.0 Environmental Consequences .....	47

<b>4.1</b>	<b>Livestock Grazing .....</b>	<b>47</b>
4.1.1	Impacts of Alternative A – Proposed Action - Combine Allotment and Create New Pastures.....	47
4.1.2	Impacts of Alternative B – No Action – Continue Current Management .....	48
4.1.3	Impacts of Alternative C – No Grazing .....	48
<b>4.2</b>	<b>Soils.....</b>	<b>49</b>
4.2.1	Impacts of Alternative A – Proposed Action - Combine Allotment and Create New Pastures.....	49
4.2.2	Impacts of Alternative B – No Action – Continue Current Management .....	50
4.2.3	Impacts of Alternative C – No Grazing .....	50
<b>4.3</b>	<b>Threatened, Endangered, or Candidate Animal Species.....</b>	<b>51</b>
4.3.1	Impacts of Alternative A – Proposed Action - Combine Allotment and Create New Pastures.....	51
4.3.2	Impacts of Alternative B – No Action – Continue Current Management .....	52
4.3.3	Impacts of Alternative C – No Grazing .....	52
<b>4.4</b>	<b>Vegetation and Invasive, Non-native Species .....</b>	<b>53</b>
4.4.1	Impacts of Alternative A – Proposed Action - Combine Allotment and Create New Pastures.....	53
4.4.2	Impacts of Alternative B – No Action – Continue Current Management .....	55
4.4.3	Impacts of Alternative C – No Grazing .....	57
<b>4.5</b>	<b>Wildlife (including Big Game, Migratory Birds, and Sensitive Species) .....</b>	<b>57</b>
4.5.1	Impacts of Alternative A – Proposed Action - Combine Allotment and Create New Pastures.....	57
4.5.2	Impacts of Alternative B – No Action – Continue Current Management .....	59
4.5.3	Impacts of Alternative C – No Grazing .....	59
<b>4.6</b>	<b>Cumulative Impacts .....</b>	<b>60</b>
4.6.1	Livestock Grazing.....	60
4.6.2	Soils.....	62
4.6.3	Vegetation and Invasive, Non-native Species .....	62
4.6.4	Wildlife (including Threatened, Endangered, Candidate, Big Game, Migratory Birds, and Sensitive Species).....	63
<b>4.7</b>	<b>Monitoring .....</b>	<b>64</b>
5.0	Consultation and Coordination .....	65
<b>5.1</b>	<b>Summary of Public Participation .....</b>	<b>65</b>
<b>5.2</b>	<b>List of Preparers and Contributors.....</b>	<b>65</b>
<b>5.3</b>	<b>US Fish and Wildlife Service Consultation.....</b>	<b>66</b>

6.0 Literature Cited .....	66
7.0 Appendices.....	72
Appendix 1. Elements/Resources of the Human Environment .....	73
Appendix 2. Figures.....	76
Appendix 3. Arizona Standards for Rangeland Health and Guidelines for Grazing Administration .....	84
Appendix 4. BLM Fence, Gate, Pipeline Specifications for Mosby-Nay Allotment .....	92
Appendix 5. Vegetation Monitoring and Inventory Data .....	101
Appendix 6. Historical Precipitation Reports .....	122
Appendix 7. Soils Tables .....	125
Appendix 8. Public Comment and Response.....	128
Appendix 9. USFWS Biological Opinion.....	135

### **List of Tables**

Table 2.1 Current Grazing Preference and Season of Use for the Mosby-Nay Allotment.....	13
C & L Farm & Cattle LLC Authorization 0202106. ....	13
Table 2.2 Current Grazing Preference and Season of Use for the Mosby Allotment.....	14
C & L Farm & Cattle, LLC Authorization 0200205. ....	14
Table 2.3 Current Acres and AUMs by Ownership of the Separate Allotments* .....	14
Table 2.4 Alternative A: Combined Grazing Preference and Season of Use for the New Mosby-Nay Allotment. ....	16
Table 2.5 Alternative A: Proposed Season of Use by Pasture for the Combined Mosby-Nay Allotment. ....	18
Table 2.6. Proposed New Fence Segments. See Figure A2.3 below for location map.....	19
Table 2.7. Proposed New Cattleguard or Wire Gate Locations. See Figure A2.4 below for location map.....	19
Table 2.8. Alternative B: Current Season of Use by Pasture for the Mosby-Nay Allotment. ....	22
Table 3.1. Summary of precipitation data for the Mosby-Nay and Mosby Allotments. ....	24
Table 3.2. Mosby-Nay Allotment Existing Range Improvements .....	27
Table 3.3. Mosby Allotment Existing Range Improvements .....	27
Table 3.4. Mosby-Nay Allotment Vegetation Types.....	31
Table 3.5. Mosby Allotment Vegetation Types.....	31
Table 3.6. Rangeland Health Data Summary.....	37

Table 3.7. USFWS Birds of Conservation Concern Found in the Mosby and Mosby-Nay Allotments.....	43
Table 3.8. Sensitive Species Associated with the Mosby and Mosby-Nay Allotments .....	44
Table 3.9. Sensitive Species Excluded from Further Analysis .....	45
Table 5.1. List of BLM Preparers/Reviewers .....	65
Table 5.2. List of Persons, Agencies and Organizations Consulted .....	65
Table A1. Elements of the Human Environment and Other Resources/Concerns .....	73
Table A5.1. Trend Data .....	101
Table A5.2. Trend Data .....	102
Table A5.3. Trend Data .....	103
Table A5.4. Trend Data .....	104
Table A5.5. Trend Data .....	105
Table A5.6. Utilization Summary.....	106
Table A5.7. Utilization Summary.....	107
Table A5.8. Utilization Summary.....	107
Table A5.9. Utilization Summary.....	108
Table A5.10. Utilization Summary.....	109
Table A5.11. Mosby-Nay Allotment Ecological Site Inventory Data – Ecological Condition.	109
Table A5.12. Mosby-Nay Allotment Ecological Site Inventory Data – Ecological Condition..	110
Table A5.13. Mosby-Nay Allotment Ecological Site Inventory Data – Ecological Condition.	111
Table A5.14. Mosby-Nay Allotment Ecological Site Inventory Data – Ecological Condition..	112
Table A5.15. Mosby Allotment Ecological Site Inventory Data – Ecological Condition.....	113
Table A5.16. Desired Plant Community Objectives Determination Table .....	114
Table A5.17. Desired Plant Community Objectives Determination Table .....	115
Table A5.18. Desired Plant Community Objectives Determination Table .....	117
Table A5.19. Desired Plant Community Objectives Determination Table .....	118
Table A5.20. Desired Plant Community Objectives Determination Table .....	120
Table A6.1 Cottonwood Wash Exclosure Rain Gauge Historical Precipitation Report.....	122
Table A7.1 – Excerpts from NRCS Web Soil Survey Taxonomic Classification Report (Soil Survey Staff, 2018) .....	125
Table A7.2 – Excerpts from Hydric Soils Report for Mosby-Nay Combined Allotments (Soil Survey Staff, 2018) .....	127
Table A8.1. Public Comment and Response .....	128

## List of Figures

Figure 1.1 General map of the Mosby-Nay Allotment (AZ04836) and Mosby Allotment (AZ04835).....	5
Figure 2.1 Proposed combined Mosby-Nay Allotment with seven pastures.....	15
Figure 2.2. Desert tortoise habitat with proposed combined Mosby-Nay Allotment.....	17
Figure A2.1. Mosby-Nay Allotment (AZ04836) and Mosby Allotment (AZ04835) Fire History. ....	76
Figure A2.2. Proposed Fence Segments & Old Fire Fence Segments to be Removed to create Pasture System. ....	77
Figure A2.3. Proposed Fence Segments to Create Seven Pasture sSystem.....	78
Figure A2.4. Two Proposed Cattleguards or Wire Gates in Fence Segments Two & Five.....	79
Figure A2.5. Proposed Water Pipeline. ....	80
Figure A2.6. Existing Range Improvements on the Mosby-Nay and Mosby Allotments.....	81
Figure A2.7. Major Vegetation Types – Shows Major Vegetation Types Prior to 2005 and 2006 Wildfires. ....	82
Figure A2.8. Current Key Area Monitoring Locations on Mosby-Nay and Mosby Allotments. ....	83

## List of Acronyms

ACEC	Area of Critical Environmental Concern
AGFD	Arizona Game and Fish Department
AMP	Allotment Management Plan
ASLD	Arizona State Land Department
ASRH	Arizona Standards for Rangeland Health and Guidelines for Livestock Grazing Administration
ATV	All-Terrain Vehicle
AUM	Animal Unit Month
BCC	Birds of Conservation Concern
BLM	Bureau of Land Management
CBW	Composition by Weight
CFR	Code of Federal Regulations
DFC	Desired Future Condition
DM	Decision Memo
DPC	Desired Plant Community
DR	Decision Record

DWR	Dry-Weight Rank
EA	Environmental Assessment
EIS	Environmental Impact Statements
ESA	Endangered Species Act
FLPMA	Federal Lands Policy Management Act
FONSI	Finding of No Significant Impacts
GCPNM	Grand Canyon-Parashant National Monument
IAT	Interdisciplinary Assessment Team
NEPA	National Environmental Policy Act
NPS	National Park Service
NRCS	Natural Resource Conservation Service
OHV	Off-Highway Vehicle
PNC	Potential Natural Community
PRIA	Public Rangelands Improvement Act
p.z.	Precipitation Zone
RAS	Rangeland Administration System
RAWS	Remote Automated Weather Stations
RMP	Resource Management Plan
RRT	Rangeland Resources Team
ROW	Right of Way
TGA	Taylor Grazing Act
USFWS	U.S. Fish and Wildlife Service

## **1.0 Introduction**

### **1.1 Background**

The Bureau of Land Management (BLM), Grand Canyon Parashant National Monument (GCPNM) is considering combining the Mosby-Nay and Mosby Allotments into one grazing allotment with multiple pastures as part of the grazing permit renewal process for the Mosby-Nay Allotment. The proximity of the two allotments make the combination potentially feasible. The Mosby Allotment, is surrounded by the Mosby-Nay Allotment except for the western border. Both allotments are currently permitted to the same grazing permittee (See Figure 1.1).

This Environment 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 Mosby-Nay Allotment. This analysis provides information as required by the BLM implementing regulations for the National Environmental Policy Act (NEPA), the Taylor Grazing Act (TGA), and the Federal Land Policy Management Act (FLPMA) and to determine whether to authorize grazing within this allotment, or if 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 Arizona Standards for Rangeland Health and Guidelines for Grazing Administration (ASRH) (Appendix 3). This EA determines if current grazing management practices would maintain desirable conditions and continue to allow improvement of public land resources, or if changes in grazing management for the allotment 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 Grand Canyon-Parashant National Monument RMP (BLM 2008a).

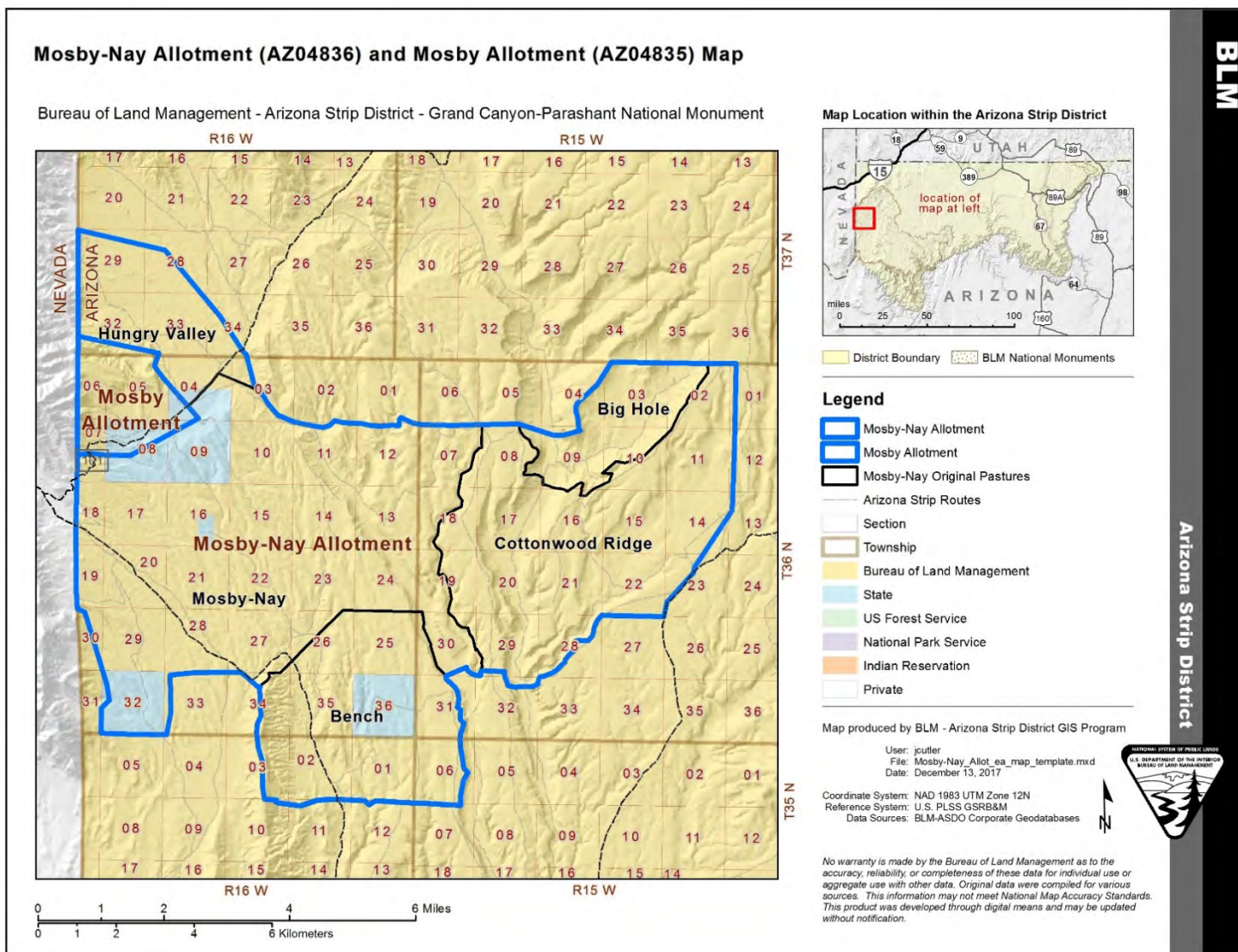
### **1.2 Purpose and Need**

A grazing permit renewal application has been received from C & L Farm & Cattle LLC to renew its 10-year grazing permit on the Mosby-Nay Allotment (AZ04836). The need for the proposed action is for the permittee to be able to continue sustained livestock grazing on the



allotment through utilization of forage at proper use levels while being in compliance with, or making significant progress towards meeting the Arizona Standards for Rangeland Health and

Figure 1.1 General map of the Mosby-Nay Allotment (AZ04836) and Mosby Allotment (AZ04835).



Guidelines for Livestock Grazing Administration (Appendix 3) and the Grand Canyon-Parashant RMP (BLM 2008a).

The purpose of this EA is to fully process the term grazing permit on the Mosby-Nay Allotment in accordance with all applicable laws, regulations, and policies. Because the grazing permit for the Mosby-Nay Allotment expired on 2/28/2017, the BLM renewed the permit for a 10-year period 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 environmental assessment is being prepared to fully process the permit.

The purpose of this assessment is to analyze site specific environmental impacts of issuing a new livestock grazing permit on resources that may be affected in the Mosby-Nay and Mosby 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; consultation with the United States Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act (ESA); and ensuring that the allotment is achieving or making significant progress toward achievement of ASRH and RMP objectives.

The GCPNM Manager is the authorized officer responsible for the decisions regarding management of public lands within this allotment. Based on the results of the NEPA analysis, the authorized officer may issue a determination of the significance of the environmental effects and whether an environmental impact statement (EIS) would be required. If the authorized officer determines that it is not necessary to prepare an EIS, the EA may be deemed sufficient and 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 would be prescribed for the Mosby-Nay Allotment to ensure management objectives and ASRH are achieved.

### 1.3 Conformance with Land Use Plan

The alternatives described in Chapter 2 are in conformance and consistent with the GCPNM RMP, approved January 29, 2008 (BLM 2008a). The following applicable decisions are from Table 2.12 in the RMP regarding management of livestock grazing. This list is not intended to be all inclusive, but represents the most applicable decisions:

- **DFC-GM-01:** Healthy, sustainable rangeland ecosystems will be maintained or improved to meet Arizona's Standards for Rangeland Health (1997), and Vital Sign Standards on National Park Service (NPS) administered lands, and produce a wide range of public values such as wildlife habitat, livestock forage, recreation opportunities, clean water, and functional watersheds.
- **DFC-GM-02:** Livestock use and associated management practices will be conducted in a manner consistent with other resource needs and objectives to ensure that the health of rangeland resources is preserved or improved so that they are productive for all rangeland

values. Where needed, public rangeland ecosystems will be improved to meet objectives.

- **LA-GM-01:** All allotments will continue to be classified as available for grazing by livestock under the principle of multiple use and sustained yield, except where specifically noted.
- **LA-GM-05:** The portion of the Mosby-Nay Allotment within the former Pakoon ACEC will be unavailable for grazing. The remainder of the allotment will be available for grazing.
- **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 plan (AMP) level and are intended to maintain desirable conditions or improve undesirable rangeland conditions within reasonable time frames.
- **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 DFCs and standards for rangeland health. They will contain the site-specific management objectives, as well as actions, methods, tools, and appropriate monitoring protocols.
- **MA-GM-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 Sign standards on NPS-administered lands. Appropriate and timely actions will be implemented to deal with those areas not meeting the standards.
- **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-11:** Season of use and other management prescriptions consistent with achieving DFC's, will be established on that portion of the Mosby-Nay Allotment outside the former Pakoon ACEC, and available for grazing.
- **MA-TE-11:** Season of use or other modifications to livestock grazing systems can be implemented to protect special status species.
- **MA-TE-15:** Special status species habitat surveys will be required whenever surface disturbances occur within an area of known or suspected occupancy by special status species.

- **MA-TE-28:** Grazing systems will be established for all allotments with desert tortoise habitat with a full range of management options including no grazing (unavailable), inactive season grazing, and rotational grazing prescriptions. Grazing will be authorized based on maintaining or improving vegetation conditions in desert tortoise habitat using ecological site inventory data as the baseline condition. Adaptive management will be used to determine if and when changes in grazing systems, season of use, and other parameters will be implemented to meet DFC's. Exclusion fences or other methods will be used to ensure areas unavailable to grazing will not be grazed.
- **MA-TE-30:** Effects to desert tortoise from authorized projects will be minimized or eliminated. "Project" refer to any surface-disturbing activities proposed that may cause disturbance of desert tortoise habitat and/or death or injury of a desert tortoise, with the exception of grazing by livestock and activities associated with fire suppression. To the extent possible, project activities will be scheduled when tortoises are inactive (October 15 through March 15). The following project activities will only be authorized between October 15 and March 15: organized, non-speed vehicular events; construction and non-emergency maintenance activities in ROW's; and non-emergency maintenance of existing roads. To the extent possible, project features will be located in previously disturbed areas or outside of desert tortoise habitat.
- **MA-TE-41:** Those portions of the Mosby-Nay Allotment within the former Pakoon ACEC will be unavailable for grazing. The remaining portions of the Mosby-Nay Allotment will be available for grazing.

#### 1.4 Relationships to Statutes, Regulations, or other Plans

The statutes that govern public land rangeland management are the Taylor Grazing Act (TGA) of June 28, 1934, as amended (43 U.S.C. 315, 315a–315r); section 102 of the Federal Land Policy and Management Act (FLPMA) of 1976 (43 U.S.C. 1740) as amended by the Public Rangelands Improvement Act (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 Mosby-Nay and Mosby Allotments are within the GCPNM; 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 Bureau of Land Management 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) will 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 Arizona Standards for Rangeland Health and Guidelines for Grazing Administration (Appendix 3), which were developed through a collaborative process involving the Arizona Resource Advisory Council and the BLM State Standards and Guidelines team. The Secretary of the Interior approved the Standards and Guidelines in April 1997. These Standards and Guidelines were incorporated into the GCPNM RMP (BLM 2008a). Standards for Rangelands should be achieving or making significant progress towards achieving the standards and to provide for proper nutrient cycling, hydrologic cycling, and energy flow. Guidelines direct the selection of grazing management practices and, where appropriate, livestock facilities to promote significant progress toward, or the attainment and maintenance of, the standards. The RMP identifies resource management objectives and management actions that establish guidance for managing a broad spectrum of land uses and allocations for public lands in the GCPNM. The RMP identified public lands within the Mosby-Nay Allotment and Mosby Allotment as available for domestic livestock grazing. Where consistent with the goals and objectives of the RMP and ASRH, allocation of forage for livestock use and the issuance of grazing permits to qualified applicants are provided for by the TGA and FLPMA.

On November 6, 2006, the BLM completed an evaluation of rangeland conditions on the Mosby-Nay Allotment (see Figure 1.1 for map). A discussion on rangeland health in this allotment can be found in Chapter 3. The Interdisciplinary Assessment Team (IAT), during the land health evaluation process, determined that the Mosby-Nay Allotment is meeting or making significant progress toward meeting Standard 1 and is meeting Standard 2. Approximately 90% of the allotment is meeting or making significant progress towards meeting Standard 3. The portions of the allotment, about 10%, which are not meeting Standard 3 are due to wildfires in 2005, see Land Health Evaluation for Mosby-Nay (BLM 2006). The BLM is considering the renewal of the existing grazing permit on the Mosby-Nay Allotment.

The Land Health Evaluation for the Mosby Allotment (BLM 2011) was completed on November 17, 2011. It was determined during the land health evaluation process, that the Mosby Allotment was meeting all three standards for rangeland health. The Mosby Allotment Grazing Permit Renewal Environmental Assessment DOI-BLM-AZ-A030-2012-0004-EA was completed and a Decision issued on October 28, 2015. As a result, a new fully processed 10-year permit was issued in 2016.

The Pakoon Springs Allotment previously consisted of four pastures. The 1998 Mojave Amendment to the Resource Management Plan made the Pakoon Desert Wildlife Management Area/Area of Critical Environmental Concern (DWMA/ACEC) unavailable to livestock grazing, which reduced the area available to livestock grazing. On May 27, 1999, the BLM issued a decision to reduce the Animal Unit Month (AUM) preference on the Mosby-Nay Allotment, which was protested and appealed by the grazing permittee. In the early 2000s, the Pakoon

Springs Allotment was relinquished to the BLM. In the mid-2000s, an agreement was reached between the operator of the Mosby-Nay Allotment and the BLM, if the operator dropped the appeal of the May 27, 1999 decision, the BLM would close a portion of the Mosby-Nay Allotment to grazing (as stated in the Decision) and reconfigure the two northern pastures (Bench and Big Hole) of the Pakoon Springs Allotment and add them into the Mosby-Nay Allotment. The other two pastures of the Pakoon Springs Allotment remain unavailable to grazing and have no permitted use. This was the Decision, which was later approved through the 2006 Mosby-Nay permit renewal process (EA-AZ-130-2006-0036). The Bench and Big Hole pastures of the Pakoon Springs Allotment are now incorporated into the Mosby-Nay Allotment (Figure 1.1).

The Land Health Evaluation for the Pakoon Springs Allotment and the Pakoon Allotment (BLM 2012) was completed in 2012. The Pakoon Springs Allotment was making significant progress toward meeting the applicable standards for rangeland health. Recommendations included that portion of the Pakoon Springs Allotment that is available for grazing would become part of the Mosby-Nay Allotment. The Big Hole Pasture on the eastern part of the Mosby-Nay Allotment and the Bench Pasture on the southern part of the allotment (Figure 1.1) were also recommend to be included. The rest of the Pakoon Springs Allotment is unavailable for grazing to benefit desert tortoise habitat. The Desired Plant Community (DPC) objectives developed for the Big Hole and Waynes Well key areas are incorporated into the Mosby-Nay Allotment (Figure A2.8).

The 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 USFWS to provide protection for migratory birds. Implementation of the proposed action is not likely to adversely affect any species of migratory bird known or suspected to occur on the allotment. No take of any such species is anticipated.

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

The proposed action 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.

- Endangered Species Act (ESA) of 1973, as amended
- Arizona Water Quality Standards, Revised Statute Title 49, Chapter II
- Section 106 of the National Historic Preservation Act of 1966, as amended
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001-3013;

104 Stat. 3048-3058)

- National Environmental Policy Act (NEPA) of 1969

## **1.5 Identification of Issues**

Identification of issues for this EA was accomplished by considering the resources that could be affected by implementation of one of the alternatives. These issues were identified by the Rangeland Resources Team (RRT), Interdisciplinary Assessment Team (IAT), and the livestock permittee during the Mosby-Nay Allotment scoping meeting on February 2, 2006, followed by a field visit on February 7, 2006 (see Land Health Evaluation for Mosby-Nay (BLM 2006)). The Mosby Allotment scoping meeting was held on February 26, 2008, followed by a field visit on February 3, 2009 (see Land Health Evaluation for the Mosby Allotment (BLM 2011)). There are no current issues identified for the Mosby Allotment. The Pakoon Springs Allotment and Pakoon Allotment scoping meeting was held on February 26, 2008, followed by a field visit on October 21 and 22, 2008. (see Land Health Evaluation for the Pakoon Springs Allotment and Pakoon Allotment (BLM 2012)). Input from the BLM and the National Park Service (NPS) interdisciplinary team is found in Appendix 1. The current issues identified are:

- Red brome and cheat grass continue to expand due to wildfires.
- Potential conflicts between desert tortoise and livestock.
- Burros on the allotment.

## **2.0 Description of the Alternatives**

This EA focuses on analysis of three alternatives: Alternative A – Proposed Action - Combine Allotments and Create New Fences and Pastures, Alternative B – No Action – Continue Current Management, and Alternative C – No Grazing. The BLM interdisciplinary team explored and evaluated different alternatives to determine whether the underlying need for the proposed action, ensured that the allotment is meeting or making progress toward meeting rangeland health standards.

### **2.1 Management Common to All Alternatives**

#### **2.1.1 Arizona Standards for Rangeland Health (ASRH) (Appendix 3)**

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

- 1) Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform (ecological site).
- 2) Riparian and wetland areas are in properly functioning condition.
- 3) Productive and diverse upland and riparian-wetland plant communities of native species exist and are maintained.



## **2.2 Management Common to Alternatives A and B**

### **2.2.1 Utilization**

Manage the allotment for no more than 45% utilization of current year's growth on key forage species by weight during the grazing season (see Section 3.2.4 Land Health Evaluations for a list of key species for this allotment). According to the GCPNM RMP, "On allotments in desert tortoise habitat or being less intensively managed, utilization is set at 45%." (BLM 2008a).

Approximately 84 percent of the Mosby-Nay Allotment has been designated desert tortoise critical habitat (Figure 2.2). Of that, the Big Hole, Cottonwood Ridge, Bench, Cockscomb, and Mosby-Nay pastures have designated habitat throughout each pasture. The Hungry Valley Pasture has about 11 percent of the pasture with designated desert tortoise critical habitat. The Mosby Pasture has less than 5 percent critical habitat.

The BLM would assess resource conditions through field inspections and determine, in consultation with the permittee, whether management changes (e.g., changes in livestock numbers, adjustment of move date, or other changes or use within the parameters identified under these alternatives) may be implemented prior to reaching maximum utilization. Move dates may be adjusted as needed when monitoring indicates maximum utilization has been reached, or due to unusual climatic conditions, fire, flood, or other acts of nature. If maximum utilization is reached on key species/areas in the allotment before a scheduled move, the use of salt, herding, control of water, or other management options may be used to distribute livestock away from an area where maximum utilization has been reached, or livestock may be removed from the use area or allotment as deemed necessary by the BLM.

### **2.2.2 Monitoring and Adaptive Management**

Alternatives A and B include adaptive management, which provides options for management decisions and actions to meet desired conditions as determined through monitoring. BLM resource specialists would periodically monitor the allotment over the 10-year term of the grazing permit. The University of Arizona reads trend and composition studies at key areas within the allotments at five-year intervals (see Section 4.7 on monitoring for more information on which studies are read). If monitoring indicates that desired conditions are not being achieved and current livestock grazing practices are causing non-attainment of resource objectives, livestock grazing management on the allotment would be modified in cooperation with the permittee. Adaptive management allows the BLM to adjust the timing, intensity, frequency and duration of grazing, the grazing management system and livestock numbers temporarily or on a long-term basis. For summaries of trend and composition data for each key area, see Section 3.2.4 Land Health Evaluation.

## **2.3 Alternative A – Proposed Action - Combine Allotments and Create New Fences and Pastures**

Under Alternative A, a new grazing permit would be issued for the combined Mosby-Nay Allotment (AZ04836) and Mosby Allotment (AZ04835), for a period of 10-years. There would be no proposed changes to kind of livestock and permitted livestock numbers, under the terms and conditions discussed below. The existing Mosby Allotment (AZ04835) would become a pasture within the new Mosby-Nay Allotment. The name of the new allotment would be Mosby-

Nay (AZ04836). The season of use for the new Mosby-Nay Allotment would be year round with a deferred rotation through seven pastures which is discussed in detail in section 2.3.1 Grazing System, Table 2.5.

Other pastures would be available for use without seasonal restrictions but subject to a rotation. The current AUMs from both allotments, see Table 2.1 and Table 2.2, would be combined and the percent public land would be recalculated to reflect the combined allotment, see Table 2.4 below. There would be no increase or decrease in total AUMs. The combined Mosby-Nay Allotment would continue to be categorized as an “I” or improve allotment. Approximately 2.14 miles of new fence would be constructed (see section 2.3.2 and Table 2.6 below), in conjunction with existing fences to allow for better livestock management and pasture rotation (Figure 2.1).

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 Mosby-Nay Allotment.

**Other Terms and Conditions:**

- The permittee will use the advanced billing system.
- Use of nutritional livestock supplements is allowed, including protein, minerals and salt. However, any supplement must be dispersed at a minimum of ¼ mile from any know water sources, riparian areas, populations of special status plant species, winterfat dominated sites, cultural or any sensitive sites.
- Allowable use on key forage species in the Mosby-Nay Allotment is 45%.
- Season of use for the Cockscomb, Mosby-Nay, Bench, Cottonwood Ridge, and Big Hole Pastures would be 10/15 – 3/15.
- Season of use for the Mosby and Hungry Valley Pastures would be 3/1 – 2/28.  
The Mosby and Hungry Valley Pastures would not be used continuously but with rest periods each year. Use would generally be from March 15 – October 15.

**Table 2.1 Current Grazing Preference and Season of Use for the Mosby-Nay Allotment C & L Farm & Cattle LLC Authorization 0202106.**

Allotment Name and Number	Livestock		Grazing Period		% PL (Public Land) <sup>1</sup>	AUMs		
	Number	Kind	Begin	End		Active	Susp.	Total
Mosby-Nay # AZ04836	106	Cattle	3/01	2/28	89%	1132	526	1679
Mosby-Nay # AZ04836	2	Horse	3/01	2/28	89%	21		

<sup>1</sup>Percent public land is based on AUMs (Animal Unit Month).

**Table 2.2 Current Grazing Preference and Season of Use for the Mosby Allotment C & L Farm & Cattle, LLC Authorization 0200205.**

Allotment Name	Livestock		Grazing Period		% PL (Public Land) <sup>1</sup>	AUMs		
	Number	Kind	Begin	End		Active	Susp.	Total
Mosby # AZ04835	26	Cattle	10/1	2/28	63%	82	28	110

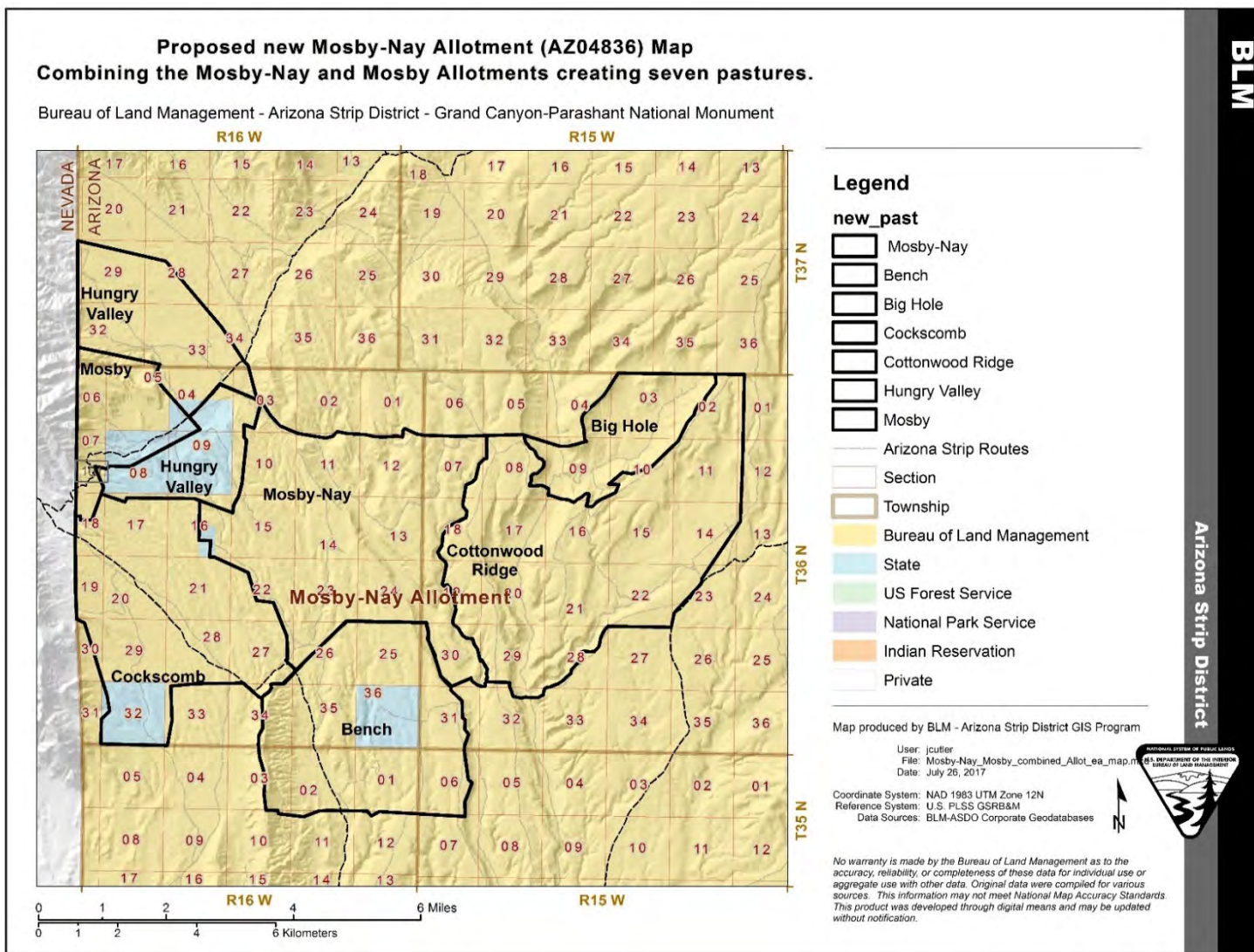
<sup>1</sup>Percent public land is based on AUMs (Animal Unit Month).

**Table 2.3 Current Acres and AUMs by Ownership of the Separate Allotments\***

Mosby-Nay Allotment	Acres**	AUMs
Public Land	30823	1153
State	2503	144
Mosby Allotment		
Public Land	1185	82
State	428	48

\*Information from BLM Rangeland Administration System (RAS). \*\*Allotment acres identified by the RAS database may not match the number of acres identified in BLM Arizona Strip District Geographic Information System (GIS) data used for resource analysis.

Figure 2.1 Proposed combined Mosby-Nay Allotment with seven pastures



**Table 2.4 Alternative A: Combined Grazing Preference and Season of Use for the New Mosby-Nay Allotment.**

New Allotment Name	Livestock		Grazing Period		% PL (Public Land) <sup>1</sup>	AUMs		
	Number	Kind	Begin	End		Active	Susp.	Total
Mosby-Nay (AZ04836)	116	Cattle	3/1	2/28	87%	1211	554	1765
Mosby-Nay (AZ04836)	1	Cattle	10/15	2/13	87%	3	0	3
Mosby-Nay (AZ04836)	2	Horse	3/1	2/28	87%	21	0	21
							<b>Total</b>	<b>1789</b>

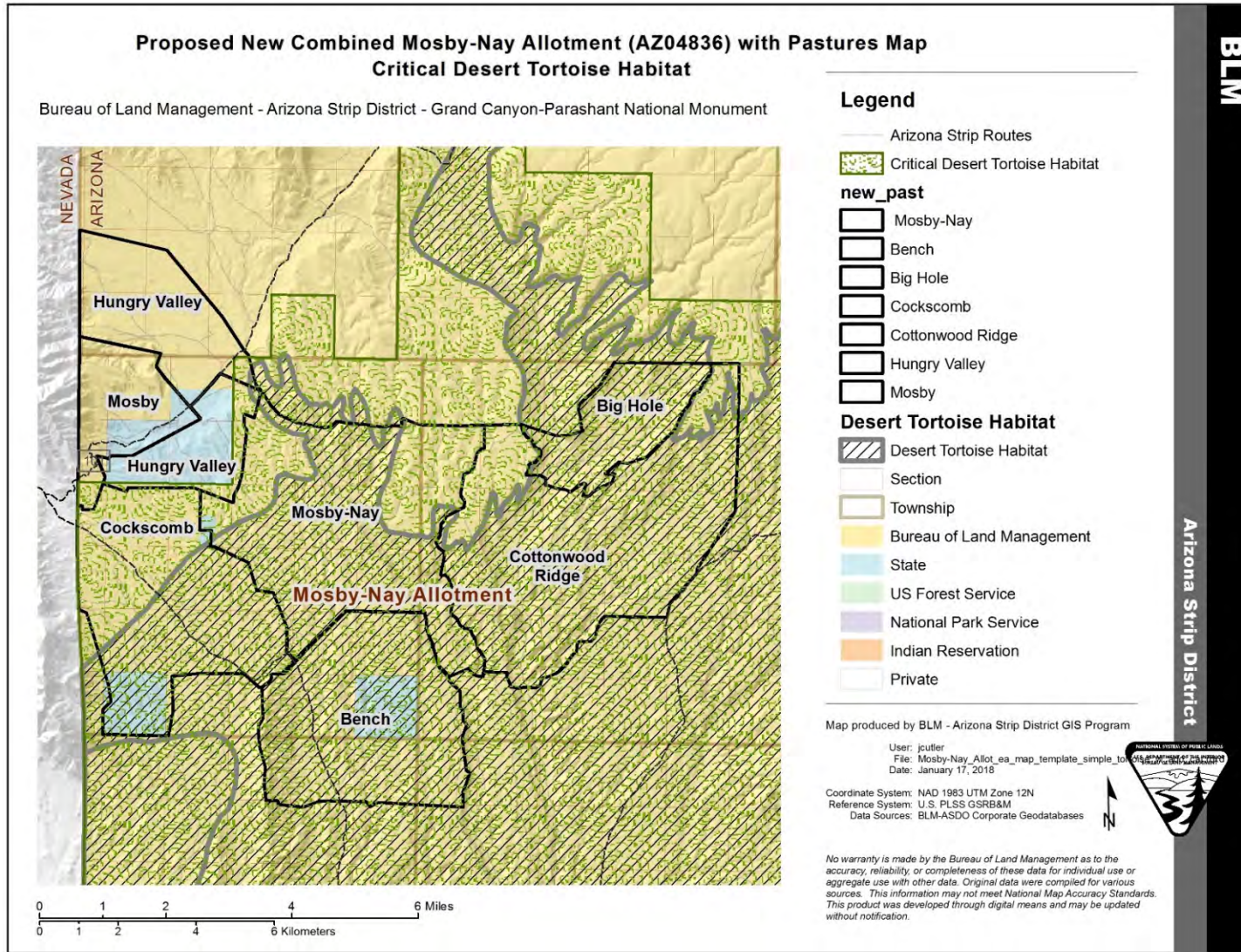
<sup>1</sup>Percent public land is based on AUMs (Animal Unit Month). There would be no increase or decrease in AUMs.

### 2.3.1 Grazing System

The new Mosby-Nay Allotment would use a seven pasture deferred rotation system. Five of the seven pastures (Cockscomb, Mosby-Nay, Bench, Cottonwood Ridge, and Big Hole) contain 100 percent desert tortoise critical habitat (Figure 2.2). The season of use for these five pastures would be 10/15 – 3/15 (Table 2.5). This would allow pastures managed for desert tortoise critical habitat to be rested during the tortoise active season March 16 – October 14. Pastures managed without tortoise timing restrictions are Mosby and Hungry Valley. The Mosby Pasture has less than 5 % and the Hungry Valley Pasture has about 11% desert tortoise critical habitat. These pastures could be used at any time of the year but would generally be used from March 15 – October 15 (Table 2.5). This would be a change in season of use for the Mosby Pasture from the current season of use 10/1 – 2/28 (see Table 2.2). The Mosby and Hungry Valley Pastures would not be used continuously but with rest periods each year, typically during mid-October through early March. The Hungry Valley Pasture would be divided into two sections, which could be used at the same or separate times (Figure 2.1). There is an existing fence and gate between the two sections. The southern portion of the Hungry Valley Pasture is mainly State land. Livestock would be moved from one pasture to another based on reaching the 45% utilization level. None of the pastures would be used continuously year round.



Figure 2.2. Desert tortoise habitat with proposed combined Mosby-Nay Allotment.



**Table 2.5 Alternative A: Proposed Season of Use by Pasture for the Combined Mosby-Nay Allotment.**

Pasture Name	Season of Use
Cockscomb	10/15 – 3/15
Mosby-Nay	
Bench	
Cottonwood Ridge	
Big Hole	
Mosby	3/1 – 2/28
Hungry Valley	The Mosby and Hungry Valley Pastures maybe used at any time of the year. They would not be used continuously but would have rest periods. Use would generally be from 3/15 – 10/15.

### 2.3.2 Range Improvements Background

Due to wildfires that occurred in 2005 and 2006 on the original Mosby-Nay Allotment (Figure A2.1), a number of temporary fire rehabilitation fences were built in 2006 and 2007 (Figure A2.2). Some of the fences protected areas that were seeded in 2006 and 2007. Some were built to promote recovery of vegetation post-fire in areas that were not seeded. Many of the fire fences are in need of repairs. Parts of the fire fences have been washed out, cut, or are beyond repair. The current fire fence configuration does not function as useful pasture fencing (Figure A2.2), large sections of fire fencing would be removed, while retaining some sections to be used as part of the new pasture rotation, see the discussion below for the details.

### 2.3.3 Proposed Range Improvements

#### Fences and Cattleguards

The original Mosby-Nay Allotment has five pastures (Figure 1.1). To create a seven pasture rotation (Figure 2.1), the BLM proposes to remove some of the existing fire fencing (approximately 21 miles), and build approximately 2.14 miles of new fencing (see Figure A2.2 and A2.3). Five new fence segments would be built to connect existing fences and create more functional pastures (see Table 2.6 and Figure A2.3). Under a cooperative agreement, the new fence segments would be built by the grazing permittee and the BLM would supply the fence materials. Construction of the new fences may be done over a two year period with work being done during the tortoise inactive season October 15 through March 15. The removal of the obsolete parts of the fire fences would be done by the grazing permittee, BLM fire crew, or youth crew and may take a period of years. Removal of the fencing would be done during the tortoise inactive season October 15 through March 15. The existing allotment boundary fences

would be kept in their current locations. Some of the existing fire rehabilitation fences would be kept to help form the new pastures (Figure A2.2). Portions of the existing fire fences that would be kept would require repairs, which would be done by the grazing permittee. Some of the pasture boundaries would be made up of natural terrain breaks to restrict livestock movement.

The planning of the new pasture configuration was accomplished through meetings with the grazing permittee on 4/26/2016 and 4/20/2017. New proposed fences would allow access to existing waters on both sides of the pasture fences (Figure A2.3). Segment 1 of the proposed fence would tie in with the existing corral and water facility at Cove Spring Trough 1. Livestock could access water from either side of the fence. Segment 4 of the fence would be built mainly on State land. The removal of the existing fence and construction of the new fence segment would allow access to the LaVon Jones Trough and Jacobs Ranch Spring on the State land in section 16. Without the fence realignment there would only be water on the Mosby-Nay Pasture side. The new fence realignment would tie into the existing corral and water box so that water could be accessed from either the Mosby-Nay or Cockscomb Pastures. Proposed range improvements on or crossing State lands would be subject to approval from the Arizona State Land Department (ASLD). The State of Arizona requires an application from the permittee and would coordinate with the BLM.

The BLM proposes to install two cattleguards or wire gates, depending on funding, on the BLM 1634 road where segments 2 and 5 of the proposed fence would be built (Table 2.7 and Figure A2.4). If cattleguards are installed, the BLM would install and maintain them. If wire gates are installed, they would be constructed and maintained by the permittee and materials would be funded by the BLM through a cooperative agreement.

**Table 2.6. Proposed New Fence Segments. See Figure A2.3 below for location map.**

Fence Segment	Miles of Fence	Location
Segment 1	0.45	T.36N. R.16W. Sec. 3
Segment 2	0.6	T.36N. R.16W. Sec. 15 and 16
Segment 3	0.4	T.36N. R.16W. Sec. 17 and 18
Segment 4	0.44	T.36N. R.16W. Sec.16 (mainly State land)
Segment 5	0.25	T.36N. R.16W. Sec. 26 and 27
Approximate Total Miles	<b>2.14</b>	

**Table 2.7. Proposed New Cattleguard or Wire Gate Locations. See Figure A2.4 below for location map.**

Fence Segment	Location
Segment 2 Cattleguard or Wire Gate	T.36N. R.16W. Sec. 16
Segment 5 Cattleguard or Wire Gate	T.36N. R.16W. Sec. 27

All proposed fences, gates, and pipeline would be built to BLM specifications (see Appendix 4). The proposed pasture fences would be four strand wire fences. The top three strands would be barbed wire and the bottom wire would be smooth to allow for wildlife movement. The fence posts and braces would be steel posts, steel pipe, treated wood, or juniper. The grazing permittee



currently maintains existing range improvements through cooperative agreements. New improvements would also be maintained by the permittee under a cooperative agreement.

Clearing of the site or construction of proposed range improvements would not begin until after the environmental assessment and required surveys, clearances, and consultations are completed. When construction is completed any extra materials and trash would be removed from the allotment and disposed of properly.

The following methods would be allowed for clearing brush and trees from along the fence line during construction and maintenance of the proposed fence.

- No new access roads would be constructed along fence lines or to the jobsite.
- No cross-country travel with motorized vehicles would take place when the ground is muddy and visible ruts can be created four inches deep or greater.
- Hand clearing methods including chainsaws would be allowed. Brush mowers would be allowed as long as no ground disturbance is created.
- The fence line may be cleared of brush, trees, rocks, or debris four feet on each side of the fence centerline. A total maximum clearing width of eight feet.
- No blading, dozing, or scraping of the ground along the fence line on any Bureau of Land Management administered land is permitted.
- When brush or trees are cleared from the fence line they would be moved far enough away from the fence line to prevent it from blowing back onto the fence. Debris would be lopped and scattered and not left in a pile. Juniper trees cut during the clearing of the fence line may be used for fence posts on this project.
- Construction of new fences, cattleguards, and pipelines, and removal of old fences would be done between 10/15 – 3/15 during desert tortoise inactive season.

#### Pipeline Extension

The permittee has proposed a new water pipeline extension that would run from the water facilities at Jacob Ranch to Cove Spring Trough 1. The water source is Middle Spring, which is already piped to the Jacob Ranch on State land. Middle Spring and Cove Spring Trough 1 are both on BLM administered lands (Figure A2.5). The pipeline would be placed underground in the existing road that runs to Cove Spring Trough 1 corral and water facilities, giving it a more reliable source of water. The proposed pipeline would be approximately 1.6 miles of new pipeline but would be placed in or right beside an existing dirt road, BLM 1634, BLM 101, BLM 1633, BLM 1633A, (Figure A2.5). Burying the new pipeline extension in the road or road right of way would result in minimal new disturbance. The pipeline would be 1¼ – 1½ inch poly pipeline that would be buried. The trench would be excavated by a backhoe, ditch witch, or similar equipment. Poly pipe would be placed in the trench and excavated material would be used to backfill. The majority of the proposed pipeline would be on State land. Proposed range improvements on or crossing State lands would be subject to approval from the ASLD. The State of Arizona requires an application from the permittee and would coordinate with the BLM. If approved, the permittee would provide the materials and complete the installation. All work would be done during the tortoise inactive season October 15 through March 15. Maintenance of the pipeline extension would be the responsibility of the permittee by cooperative agreement.

## 2.4 Alternative B – No Action – Continue Current Management

The permittee has submitted an application to renew the grazing permit for the Mosby-Nay Allotment (AZ04836) for a period of 10-years with no changes.

Under Alternative B, a new grazing permit for the Mosby-Nay Allotment would be issued for a period of 10-years with no proposed changes to season-of-use, kind and permitted livestock numbers. There are no proposed changes in number of Active AUMs as identified in Table 2.1, Section 2.3, under the current terms and conditions discussed below. The Mosby-Nay Allotment would continue to be categorized as an “I” or improve allotment. No new range improvements are proposed. Regular maintenance of existing range improvements by the grazing permittee would continue. Livestock would continue to be moved to use areas within the allotment by a combination of herding and water availability. This alternative only applies to the Mosby-Nay Allotment. The Mosby-Nay Allotment and the Mosby Allotment would continue as separate grazing permit authorizations. Currently the grazing preference for both allotments is held by the same permittee. The Mosby Allotment grazing permit was fully processed and a new 10-year permit was issued in 2016.

In addition to the “Mandatory Terms and Conditions” and standard language on the last page of the grazing permit, the following terms and conditions are currently under the “Other Terms and Conditions” section on the current grazing permit for the Mosby-Nay Allotment and would remain unchanged on the new permit.

### Other Terms and Conditions:

- As provided by 43 CFR 4130.3-1(B), this permit shall be subject to cancellation, suspension, or modification for any violation of the regulations of 43 CFR Part 4100 or of any term or condition of this permit.
- The permittee will use the advanced billing system.
- An actual grazing use report (Form 4130-5) must be submitted within 15 days after completing your annual grazing use.
- Range improvements assigned in cooperative agreements and range improvement permits must be maintained in useable condition each year. This also includes wildlife escape ramps for both permanent and temporary water troughs.
- Any hay or other feed used in administering the livestock operation will be certified weed-free and must be approved by the authorized representative prior to use.
- Use of nutritional livestock supplements is allowed, including protein, minerals and salt. However, any supplement used must be dispersed at a minimum of ¼ mile from any known water sources, riparian areas, populations of special status plant species, winterfat dominated sites, cultural or any other sensitive sites.
- A deferred seasonal rotation grazing system between Mosby-Nay and Pakoon Springs pastures will be implemented pending completion of a new Allotment Management Plan (AMP).
- Average utilization levels of key forage species should not exceed the 45% allowable use on desert tortoise habitat, and 50% elsewhere.

### 2.4.1 Grazing System

The Mosby-Nay Allotment is currently permitted for year round use (Table 2.1 and Table 2.8). There are currently five pastures within the Mosby-Nay Allotment, Mosby-Nay, Bench, Cottonwood Ridge, Big Hole, and Hungry Valley (Figure 1.1). Portions of the allotment boundary and pastures fences are delineated with barbed wire fences and portions are topographic breaks made by steep, rocky canyon walls or slope sides on mesas that present a barrier to livestock movement. Livestock are herded through the pastures, pasture movements are based on a utilization level of 45% on key forage species. Livestock use is also controlled through the availability of water at troughs. Water systems are turned on or off to encourage livestock use or movement in those areas. The Hungry Valley Pasture (Figure 1.1) is used from March 15 through October 15 the other pastures are used from October 15 through March 15 (Table 2.8), corresponding with the desert tortoise inactive season. Refer to Figure 2.2 for the designated desert tortoise habitat in the Mosby-Nay Allotment.

**Table 2.8. Alternative B: Current Season of Use by Pasture for the Mosby-Nay Allotment.**

Pasture Name	Season of Use
Mosby-Nay	10/15 – 3/15
Bench	
Cottonwood Ridge	
Big Hole	
Hungry Valley	3/15 – 10/15

### 2.4.2 Range Improvements

No new range improvements are proposed under Alternative B. Any new range improvements proposed in the future would be considered through a separate NEPA process. Only maintenance of current range improvements fences, pipelines, water facilities, and corrals, would be allowed under this alternative.

## 2.5 Alternative C – No Grazing

In the event of this alternative being chosen, it would necessitate an amendment to the GCPNM RMP before this alternative could be implemented. Both allotments are currently listed in the RMP as available to grazing. Alternative C would make the Mosby-Nay Allotment unavailable to livestock grazing and no new permit would be issued. The current permit for Mosby-Nay would be canceled. The two allotments, Mosby-Nay and Mosby, would remain separate. This alternative would have no effect on the Mosby Allotment, as it would remain available for grazing under its current permit, which expires 2/28/2026. Livestock grazing permit renewal was recently analyzed for the Mosby Allotment under DOI-BLM-AZ-A030-2012-0004-EA where a No Grazing Alternative was analyzed.

## **2.6 Alternatives Considered But Eliminated From Further Analysis**

### **2.6.1 Reduction of Grazing Preference**

Under this alternative, the livestock grazing active preference of the Mosby-Nay Allotment of 1153 active AUMs would be reduced. This alternative would have only affected the Mosby-Nay Allotment. This alternative was not carried forward for analysis based on monitoring data and rangeland health evaluations that indicate that range conditions are within acceptable limits. The Mosby-Nay Allotment was determined to be meeting or making significant progress toward meeting the standards for rangeland health on 90% of the allotment. The rest of the allotment was not meeting standards due to wildfires that occurred in 2005 and 2006. Livestock grazing was not cited as a substantial factor for the burned areas where Standards were not being met on 10% of the allotment.

## **3.0 Affected Environment**

The Affected Environment was considered and analyzed by an interdisciplinary team. Appendix 1 addresses the elements and resources of concern considered in the development of this EA; this table indicates whether the element/resource is not present in the project area, present but not impacted to a degree that requires detailed analysis, or present and potentially impacted. The resources identified below include the relevant physical and biological conditions that may be impacted with implementation of the proposed action or alternatives, and provides the baseline for comparison of impacts described in 4.0 Environmental Consequences.

This chapter provides information to assist the reader in understanding the existing situation and current grazing management on the Mosby-Nay and Mosby Allotments. The affected environment is tiered to the GCPNM Record of Decision and RMP (BLM 2008a). This EA incorporates by reference the Land Health Evaluation for the Mosby-Nay (BLM 2006), Land Health Evaluation for the Mosby Allotment (BLM 2011), and the Land Health Evaluation for the Pakoon Springs Allotment and Pakoon Allotment (BLM 2012). These documents provide a complete discussion, analysis, and summaries of the vegetation resources including DPC objectives to measure success of management actions. Specific resource data has been updated including the tables for pace frequency trend data and trend analysis of the key species, and utilization tables (see Appendix 5) to include additional monitoring information and analysis that has occurred since the allotment evaluations were completed. This assessment describes the resources and issues applicable to these allotments.

## **3.1 General Setting**

The Mosby-Nay and Mosby Allotments are located on the western boundary of the Arizona Strip in northwestern Arizona, approximately 45 air miles southwest of St. George, Utah and 20 air miles southeast of Mesquite, Nevada (Figure 1.1). The Mosby-Nay Allotment surrounds the Mosby Allotment on three sides. The west edge of both allotments is the Nevada State line with Arizona. The topography of the allotments is typified by; sloping, rolling, or flat terrain to steep canyon walls and rock outcrops. The Mosby Allotment sits on the east side of the Virgin Mountains. Both allotments sit in the upper reaches of the Mojave Desert, the northern portion of the Mosby-Nay and all of the Mosby Allotment are in the Mojave-Great Basin Transition Ecological Zone. The southern part of the Mosby-Nay Allotment is in the Mojave Desert

Ecological Zone. Both allotments are within the Pakoon Basin region. In the Mosby-Nay Allotment elevation ranges from 2700 – 4720 feet. The Mosby Allotment elevation ranges from 3780 to 5140 feet. The Mosby Allotment is mostly on a ridge with a large flat to the north, and springs on the north and south sides of the allotment. A large reservoir fed by a pipeline from Middle Spring, in the Mosby Allotment, is located at the old Jacobs Ranch on State land. Middle Spring provides most of the livestock water and is distributed by various pipeline systems to both allotments.

**Climate**

The climate is arid and warm. Temperatures average 50 – 60 degrees in the winter, with summer temperatures ranging from 92 – 102 degrees. Temperatures as low as 27 and as high as 110 degrees have been recorded. The growing season starts in early March and runs through October, with an average frost-free period of 207 days. Precipitation in Arizona typically occurs in a bimodal fashion, with a very dry May and June. Winter moisture is influenced by Pacific oceanic temperatures and airstreams; summer moisture is influenced by the North American monsoon. Summer moisture generally occurs from July through September. It should be recognized that summer rainstorms exhibit considerable variability in their location and intensity (Sprinkle et al. 2007). Adequate amounts of precipitation may come during one season, then be all but absent through the next season. Then, during the following year, precipitation may occur in different seasons. This fluctuation, coupled with low total precipitation and various soil types with different soil chemistry, makes it difficult for plant establishment on certain sites.

There are no rain gauges within either allotment. The Cottonwood Wash Exclosure rain gauge is about 5 miles northeast of the Mosby-Nay Allotment. It is located in T.37N. R.15W. Sec. 17, northeast of Brumley Well, at the exclosure in the middle of the Cottonwood Allotment, at an elevation of about 3250 feet. The Olaf Knolls rain gauge was replaced with a Remote Automated Weather Stations (RAWS) and is about 4 miles east of the Mosby-Nay Allotment. It is located in T.36N. R.14W. Sec. 20, in the Pakoon Allotment, at an elevation of about 2900 feet. Annual precipitation can vary greatly from year to year, with the lowest reading for the Cottonwood Wash Exclosure rain gauge being 3.75 inches in 2002 and the highest reading of 24.25 inches occurring in 2005. In 2017, the annual precipitation at this gauge was 15.75 inches or 134% of normal annual precipitation. The lowest reading for the Olaf Knolls rain gauge being 1.69 inches in 2002 and the highest being 20.89 inches in 2005. Precipitation in the Mosby-Nay and Mosby Allotments generally comes as rain it rarely snows.

**Table 3.1. Summary of precipitation data for the Mosby-Nay and Mosby Allotments.**

Rain Gauge	Fall Average		Winter Average		Spring Average		Summer Average		Annual Average
	Inches	Percent of total	Inches	Percent of total	Inches	Percent of total	Inches	Percent of total	Inches
Cottonwood Wash Exclosure	1.67	14%	4.63	39%	1.98	17%	3.46	29%	11.75
Olaf Knolls RAWS	1.31	15%	3.61	40%	1.80	20%	2.28	25%	8.99

Precipitation at the Cottonwood Wash Exclosure rain gauge over the last 10-years of available data 2008 – 2017 has been at or above normal for seven years. “At or above normal” for this analysis is considered 90% of average annual precipitation or greater. Precipitation was below 90 % of the long-term average for three years. The highest precipitation received in the 10-year period was 126 % of average in 2011 and the lowest was 47 % of average in 2014. Precipitation at the Olaf Knolls rain gauge over the last 10-years of available data 2005 – 2014 has been at or above normal for five years. Precipitation was below 90 % of the long-term average for five years. The highest precipitation received in the 10-year period was 232 % of average in 2005 and the lowest was 51 % of average in 2008. It should be noted that departures from normal are not unusual, in fact, departures from normal are quite typical (Doswell 1997), and precipitation may very often be either well above or well below the seasonal average (National Drought Mitigation Center 2015). See Appendix 6 for the complete historic precipitation report for both rain gauges. The historic report for the Cottonwood Wash Exclosure rain gauge data from 1978 – 2017 and for the Olaf Knolls rain gauge data from 1988 – 2014. This rain gauge was replaced with a RAWS gauge, the data from 2015 through 2017 has been spotty and is not complete so it is not being presented here.

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

### **3.2 Resources Brought Forward for Analysis**

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 alternatives. These elements are identified in Appendix 1, along with the rationale for determination on potential effects. If any element was determined to be potentially impacted, it was carried forward for detailed analysis in this EA; if an element is not present or would not be affected, it was not carried forward for analysis. Appendix 1 also contains other resources/concerns that have been considered in this EA. As with the elements of the human environment, if these resources were determined to be potentially affected, they were carried forward for detailed analysis in this document.



### **3.2.1 Livestock Grazing**

The analysis area for livestock grazing for this grazing permit renewal is the Mosby-Nay and Mosby Allotments.

A grazing permit is issued for livestock forage produced annually on public lands and is allotted on an AUM basis. (An AUM is a unit of measurement indicating how much forage is eaten by a cow/calf pair in one month.) The 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. The BLM retains the right to manage the public lands for multiple uses and to make periodic inspections to ensure that livestock grazing is in compliance with the terms and conditions of the permit.

Land ownership within the Mosby-Nay and Mosby Allotments consists primarily of federal land managed by the BLM with some State land included, see in Section 2.3 Table 2.3. The current permittee holds State grazing leases within both allotments. The State land within the allotment is not fenced separately and is used in conjunction with the federal grazing permit. Both allotments are currently billed in advance of the livestock going on to the allotments.

Active grazing use on the Mosby-Nay Allotment is 1,153 AUMs, with 526 suspended AUMs (Section 2.3 Table 2.1). The Mosby-Nay Allotment is currently permitted for year round use (Table 2.1 and Table 2.8). There are currently five pastures within the Mosby-Nay Allotment, Mosby-Nay, Bench, Cottonwood Ridge, Big Hole, and Hungry Valley (Figure 1.1). Livestock are herded through the pastures. Livestock use is also controlled through the availability of water at troughs. Water systems are turned on or off to encourage livestock use or movement in those areas. The Hungry Valley Pasture which has a few acres of designated desert tortoise habitat (Figure 1.1) is used from March 15 through October 15 the other pastures which do have designated desert tortoise habitat are used from October 15 through March 15 (Table 2.8), corresponding with the desert tortoise inactive season. Refer to Figure 2.2 for the designated desert tortoise habitat in the Mosby-Nay Allotment. For more information on the current grazing system also see Section 2.4.1.

The Mosby Allotment has 82 AUMs of active grazing use, with 28 suspended AUMs (Section 2.3 Table 2.2). The Mosby Allotment is relatively small and has one pasture. There is no formal grazing system for this allotment. The season of use for the Mosby Allotment is 10/1 – 2/28. Currently the Mosby-Nay and Mosby Allotments have the same permittee and are adjacent to each other. The Mosby Allotment does not have designated desert tortoise habitat.

#### **Range Improvements**

The Mosby-Nay and Mosby Allotments contain numerous existing structural range improvements, as listed in Table 3.2 and Table 3.3 and as shown on the Range Improvement Figure A2.6. These range improvements consist of cattleguards, corrals, water pipelines, fences, springs, a water well, reservoirs, livestock troughs, a water tank, a detention dam, and a wildlife drinker. Some of the fences, cattleguards, and water pipelines are shared by both allotments.

**Table 3.2. Mosby-Nay Allotment Existing Range Improvements**

<b>Range Improvement Type</b>	<b>Quantity</b>
Cattleguards	7 (1 of the 7 is shared between Mosby-Nay and Mosby Allotments).
Corrals	7
Water Pipelines	9 pipelines for a total of 13.9 miles
Fences	Approximately 70 miles of allotment boundary, pasture, and fire rehab fences and an additional 15 – 20 miles of natural boundaries (steep rims and ridges) without fences. A little over 4 miles of fence is shared by both allotments. The Allotment boundary fence between Mosby-Nay and Mosby Allotments.
Developed Springs	8
Undeveloped Springs	2
Water Well	1
Fenced Reservoirs	2
Unfenced Reservoirs	2
Livestock Troughs	12
Water Storage Tanks	2

**Table 3.3. Mosby Allotment Existing Range Improvements**

<b>Range Improvement Type</b>	<b>Quantity</b>
Cattleguards	3 (1 of the 3 is shared on the allotment boundary between the Mosby and Mosby-Nay Allotments).
Corral	1
Water Pipelines	2 pipelines for a total of approximately 2 miles.
Fences	Approximately 6.5 miles of allotment boundary fence, of that a little over 4 miles of allotment boundary fence is shared with the Mosby-Nay Allotment.
Developed Springs	2



Undeveloped Springs	1
Fenced Reservoirs	1
Livestock Trough	1
Detention Dam	1
Wildlife Drinker	1

### 3.2.2 Soils

The analysis area for soils for this grazing permit renewal is the Mosby-Nay and Mosby Allotments. Soils within the allotment boundaries are reflective of the diversity of geology, precipitation, slope ranges, vegetation, and landscape stability found within the area of interest. In this case, the footprint for analysis is the combined 47,566 (GIS) acres of the Mosby-Nay/Mosby grazing allotments.

Soils data shown in tables (Table A7.1 and Table A7.2 in Appendix 7) within this EA was garnered from the NRCS Web Soil Survey (Soil Survey Staff, accessed April, 2018). Soil map units for the project are predominantly from two soil taxonomic orders: Aridisols and Entisols. Soil orders are the broadest level of soil taxonomic classification and for the purpose of this analysis will be the main differentiation between soil types. The two main soil orders represented reflect the low-precipitation and low vegetative cover of the Mosby-Nay and Mosby Allotments. These soils are low in organic matter due to a lack of biomass inputs (root and leaf decay) and soil moisture. Conversely, these soil types are high in sodium, calcium, and/or sulfur salts (carbonates and sulfates) as desert conditions do not promote the leaching of these minerals down through the soil profile. Soil pH is accordingly high while fertility (nutrient levels) are low when compared to other soil orders.

Aridisols have an aridic soil moisture regime in which there is insufficient precipitation to leach soluble minerals from the soil profile (Soil Survey Staff, 2014). For this reason, salts and carbonate minerals accumulate in the soil profile and the desert vegetation adapted to grow on this soil type/precipitation regime are tolerant of these otherwise harsh conditions.

Aridisols account for nearly 66% of the mapped soils for the spatial bounds of the combined allotments. Aridisols are found on alluvial fans, fan remnants, mesas, mesa remnants, mountain slopes, plateaus, alluvial terraces, and sand sheets. Geologic parent materials include sedimentary rocks including limestone and sandstone, igneous rocks such as basalt, and metamorphic rocks such as quartzite. Most of the documented Aridisols that should occur in the project area have thin topsoils, typically 1 to 3 inches thick over carbonate-rich subsoils that often result in a root-restricting, cemented horizon called “caliche”.

The other main soil order represented in the project area are Entisols; these weakly developed soils lack distinguishing characteristics and are considered “young” soils still in the early stages of soil formation. Biotic (organisms) and abiotic (climate, time) factors of soil formation do not have a strong influence on soil properties of Entisols compared to soils forming in wetter, more

densely vegetated settings. For these and other reasons, Entisols have a closer resemblance to the geologic parent material they formed from compared to other soil orders. Entisols account for over one quarter (26%) of the project area and occur in the form of sand-deposits from wind and sandstone, fine-textured “badlands” from gypsum-rich mudstones, and water-deposited alluvium in dry channels. Entisols occur on the same landforms as described for Aridisols, but are found in recent depositional environments such as stream channels, washes, sand sheets, and sand dunes.

Large areas of hydric (wetland) soils are not identified in the soil survey for the project area although isolated riparian/wetland are found near developed springs (See Table A7.2 in Appendix 7).

### **3.2.3 Threatened, Endangered, or Candidate Animal Species**

The ESA, as amended, provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The law requires federal agencies, in consultation with the U.S. Fish and Wildlife Service (USFWS) and/or the U.S. National Oceanic and Atmospheric Administration Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species.

The purpose of the ESA is to provide a means for conserving the ecosystems upon which threatened and endangered species depend, and to provide a program for protecting these species. The Act defines an endangered species as a species that is in danger of extinction throughout all or a major portion of its range. A threatened species is defined as any species that is likely to become an endangered species within the foreseeable future throughout all or a major portion of its range. Critical habitat is a specific area or type of area that is considered to be essential for the survival of a species, as designated by the USFWS under the Act.

#### **Desert Tortoise**

The desert tortoise was listed as endangered under emergency rule in 1989 (USFWS 1989) and reclassified to threatened in 1990 (USFWS 1990). Critical habitat was designated on February 8, 1994 (USFWS 1994b). The recovery plan was developed in 1994 (USFWS 1994a) and was revised in May 2011.

Under the revised recovery plan, the focal areas for recovery of the species are “tortoise conservation areas.” These tortoise conservation areas include desert tortoise habitat within critical habitat units, Areas of Critical Environmental Concerns (ACEC), Desert Wildlife Management Areas, national monuments, national wildlife refuges, National Park Service lands, the Red Cliffs Desert Reserve, and other areas managed for desert tortoises. Tortoise conservation areas capture the diversity of the Mojave population of the desert tortoise within each recovery unit and are considered the minimum baseline within which to focus recovery efforts (USFWS 2011). The project area is within the Northeastern Mojave Recovery Unit and the Gold Butte-Pakoon critical habitat unit. The primary constituent elements of desert tortoise critical habitat are as follows:

- Sufficient space to support viable populations within each of the six recovery units and provide for movements, dispersal, and gene flow;

- Sufficient quantity and quality of forage species and the proper soil conditions to provide for the growth of such species;
- Suitable substrates for burrowing, nesting, and overwintering;
- Burrows, caliche caves, and other shelter sites;
- Sufficient vegetation for shelter from temperature extremes and predators; and
- Habitat protected from disturbance and human-caused mortality.

Desert tortoises are most active during the spring and early summer when annual plants are most common. Additional activity occurs during warmer fall months and occasionally after summer rain storms. In Arizona, tortoises are generally considered to be active from approximately March 15 through October 15, although activity has been observed as early as February and as late as November (depending on climatic conditions). Desert tortoises spend the remainder of the year in burrows, escaping the extreme conditions of the desert.

The desert tortoise is found in creosote-bursage habitats below about 4,500 feet in elevation. Desert tortoise home range sizes vary with respect to location and year. Over its lifetime, each desert tortoise may require more than 1.5 square miles of habitat and make forays of more than seven miles at a time. Tortoises use multiple burrows within their home ranges to aid in escaping temperature extremes while out foraging. During droughts, tortoises forage over larger areas, increasing the likelihood of injury or mortality through encounters with humans and predators.

There are 22,970 acres of desert tortoise habitat in the project area based on elevation and other habitat parameters (Figure 2.2). All of the tortoise habitat is located in the Mosby-Nay Allotment. Approximately 11,680 acres of desert tortoise habitat burned in 2005 and 2006 (Figure A2.1). Tortoise habitat was severely damaged by the fires and efforts were made to restore the habitat with seeding. However, these projects were mostly ineffective due to dry conditions that followed the fires. The habitat still has not recovered and areas that were once dominated by blackbrush are now largely invasive annual grasses.

The project area has 29,434 acres which have been designated as critical habitat for the desert tortoise. The critical habitat acreage is greater because section lines were used in the designation process resulting in some acres of critical habitat that do not contain the elements of desert tortoise habitat. Some of the project area contains primary constituent elements of desert tortoise critical habitat. The project area provides sufficient space to support viable populations. Sufficient quantity and quality of forage species and the proper soil conditions to provide for the growth of such species is present. Suitable substrates for burrowing, nesting, and overwintering are present in the project area. The project area provides sufficient vegetation for shelter from temperature extremes and predators.

According to the 2017 range wide monitoring data, the population density for the Gold Butte-Pakoon is estimated to be 1.9 tortoises per square kilometer (USFWS 2018). This monitoring found one live tortoise in the southwest corner of the project area and one live tortoise within a mile of the northwest corner of the project area. Also, three dead tortoises were found within two miles of the project area. There were a total of nine transects in or touching the project area as part of the 2017 monitoring. There are 11 records of desert tortoise occurrences in the Arizona

Game and Fish Department’s (AGFD) Heritage Data Management System in or near the project area. These records are all from the 1980’s.

### 3.2.4 Vegetation and Invasive, Non-native Species

The analysis area for vegetation and invasive, non-native species for this grazing permit renewal is the Mosby-Nay and Mosby Allotments.

#### Vegetation

Both the Mosby-Nay and Mosby Allotments sit in the upper reaches of the Mojave Desert, the northern portion of the Mosby-Nay and all of the Mosby Allotment are in the Mojave-Great Basin Transition Ecological Zone. The southern part of the Mosby-Nay Allotment is in the Mojave Desert Ecological Zone. The vegetation on the Mosby-Nay Allotment consists of scattered pinyon-juniper woodlands and chaparral in the higher elevations, blackbrush (*Coleogyne ramosissima*), Joshua tree (*Yucca brevifolia*), and desert shrub in the unburned areas. Past wildfires in the lower elevations of the Mosby-Nay Allotment have led to large areas of invasive annual grasses and forbs, including red brome (*Bromus rubens*), cheatgrass (*Bromus tectorum*), and common Mediterranean grass (*Schismus barbatus*). Much of the area that burned was blackbrush, there has been slow recovery in portions of the allotment that have burned. Vegetation on the Mosby Allotment is dominated by blackbrush with scattered Joshua tree, desert shrub, and pinyon-juniper woodlands. The Mosby Allotment has not burned recently. See Figure A2.7 Major Vegetation Types below. The data presented in the figure and Table 3.4 and Table 3.5 reflects the plant communities prior to the 2005 and 2006 wildfires.

**Table 3.4. Mosby-Nay Allotment Vegetation Types**

Major Vegetation Type	GIS Acres
Chaparral	868
Creosote/ Bursage	13446
Great Basin Blackbrush	219
Mojave Blackbrush	17632
Mojave Mixed Shrub	1156

**Table 3.5. Mosby Allotment Vegetation Types**

Major Vegetation Type	GIS Acres
Chaparral	90
Creosote/ Bursage	460
Great Basin Blackbrush	1072
Mojave Blackbrush	2.4

This does not reflect the actual acreages of some vegetation types that is currently on the allotment see Figure A2.7 Appendix 2 and Fire History in Chapter 2 Section 2.3.2.

#### Invasive, Non-native Species

Malta starthistle (*Centaurea melitensis*) was found and treated in 2003 at Middle Spring in the Mosby Allotment. This area has been, and would continue to be, monitored; and retreated as necessary. Malta starthistle has also been documented at the BLM Pakoon Fire Station parking

area, which is within the Cottonwood Ridge Pasture on the eastern edge of the Mosby-Nay Allotment. Weed treatments are expected to be monitored and treated as they are detected.

Red brome (*Bromus rubens*), cheatgrass (*Bromus tectorum*), and common Mediterranean grass (*Schismus barbatus*) are present in some areas across both the Mosby-Nay and Mosby Allotments. They are invasive annual grasses native to the Mediterranean region. They are commonly found through the western United States. These species expand their distribution after wildfires. In 1989 annual brome grasses were documented in trend monitoring on the Mosby-Nay Allotment, it may have been present prior to that time, but not documented. Red brome has been documented in trend monitoring in the Mosby Allotment since 1991. Common Mediterranean grass was documented in 2007 on the Mosby-Nay Allotment and 2013 on the Mosby Allotment. Invasive annual grasses compete with more desirable perennial grasses for moisture and after maturity quickly dry out becoming a fire hazard (Whitson et al. 2001). In years with sufficient moisture the increase in fine fuel load increases the intensity and rapid spread of fire. These invasive annual grasses contribute to the conversion of desert shrubland into annual grassland by carrying fire across open areas, where they ignite and kill native shrubs. Large areas of red brome can alter fire patterns in many plant communities and has been especially harmful to desert plants that are not fire adapted such as blackbrush (*Coleogyne ramosissima*) (Forest Service 2014). Based on several studies, natural reestablishment of late-successional species such as blackbrush or creosote bush (*Larrea tridentate*) will require long time periods, often longer than 30 years and possibly longer than 100 years (Callison et al. 1985; Lei 1999; Lovich and Bainbridge 1999) (BLM 2012). Therefore, even if there are no future fires, it will still be decades before desirable species of brush and grass return to these burns. Drought events might prolong the recovery period and perhaps prohibit the return of some species altogether. It also decreases the fire return interval making reestablishment of native shrubs more difficult, particularly in the Mojave Desert environment. Cheatgrass, red brome, and common Mediterranean grass are not on the Arizona Noxious Weed list.

Disturbance, fire, and livestock grazing can provide opportunities for the establishment and spread of invasive annual grasses. Research by Douglas et al. (1990) and Hunter (1991) shows that cheatgrass can readily invade areas that have not been disturbed and do not have livestock influence. Invasive annual grasses have shallow short lived root systems and provide poor erosion control especially during long periods of drought. Annual grasses and forbs can provide livestock and wildlife forage value during the short period of time they are green usually during the spring or after summer monsoon rains. Their production varies from year to year based on precipitation.

Redstem filaree (*Erodium cicutarium*) is an invasive winter annual or biennial forb that is native to Eurasia and is now common worldwide. It is found on both the Mosby-Nay and Mosby Allotments. It grows actively for about 4 to 6 weeks and then dries out becoming a potentially hazardous fine fuel. Depending on the year and the amount of precipitation received, it can provide some value as livestock or wildlife forage but may crowd out other native species (Whitson et al. 2001). Redstem filaree is not on the Arizona Noxious Weed list.

## **Wildfire History**

The Mosby-Nay Allotment is about 33,327 GIS acres of that about 19,825 GIS acres have burned since 1986 (See Figure A2.1 in Appendix 2 and Fire History in Section 2.3.2). Some of those acres have been burned twice during the period of 1980 – 2017 of our current fire history data. Of the acres that have burned about 21 % have burned twice during the record period. See the list (below) of documented wildfires that occurred within the Mosby-Nay Allotment. The busiest years for wildfires were 1993 – 1994 and 2005 – 2006. A period of above average precipitation in 1992 (Cottonwood Wash 113 % and Olaf 118 %), and 1993 (Cottonwood Wash 158% and Olaf 162%), coincides with the wildfires in 1993 – 1994 (See Appendix 6 Historical Precipitation Reports). A drought period occurred from 2002 – 2004 with precipitation in the 32 – 68% of average was followed by a very wet year in 2005 where the Cottonwood Wash rain gauge received 206 % and the Olaf rain gauge received 234 % of average precipitation. The drought likely stressed or killed many plants. That was followed in 2005 by the highest recorded precipitation since records have been kept at these locations. Producing large quantities of fuel including native and invasive non-native annual grasses. Then a four-year period of drier than average conditions started in 2006 which had 72 % of average precipitation at the Cottonwood Wash rain gauge followed by 47% in 2007 and 73 % in 2008, and 55 % in 2009. This four-year period of reduced precipitation after the 2005 and 2006 wildfires likely reduced the establishment of seeded or re-sprouting species.

### List of documented wildfires that have occurred on the Mosby-Nay Allotment.

- Muddiest 1986
- Cottonwood 1993
- Cedar Wash 1993
- Cottonwood 1994
- Wayne 1994
- Airstrip 1995
- Cockscomb 2005
- Cow 2005
- Jacob 2005
- Jacob 2006
- Pocket Complex 2006

During 2005 and 2006 wildfires burned about 15,482 GIS acres within the Mosby-Nay Allotment (Figure A2.1 in Appendix 2 and Fire History in Section 2.3.2). The Jacob 05 Fire occurred in August 2005 and burned about 2,680 GIS acres with the allotment. In November 2006, 1,043 GIS acres of burned desert tortoise critical habitat within the Jacob 05 Fire were aerially seeded by helicopter with nine perennial and two annual Mojave Desert species. Seeding was done to stabilize the soil, minimize erosion, and reestablish ground cover and native plant species. Seeded areas were grazed prior to the completion of protective fencing in March 2007. Fire rehabilitation fences were built to rest areas both seeded and unseeded from grazing and to help with recovery for a minimum of two years. During the first growing season seeded burned areas and unseeded burned control areas responded similarly mainly due to the lack of precipitation for germination and establishment. Monitoring was conducted for the first two years and was discontinued after that due to lack of funding. The drought period lasted from 2006 through 2009. The seedings were not successful over the long term. Red brome and other



invasive annual grasses and forbs were present before the fires and have returned to large areas post burn. Note that many of these wildfires were not confined to the Mosby-Nay Allotment many of them were large and covered numerous allotments. (Jacob 05 Fire monitoring reports FY 2006, 2007, 2008 on file at GCPNM Office).

Wildfires have had a great influence on the Mosby-Nay Allotment, all four of the key areas where trend and utilization monitoring data is collected were burned in 2005. See Table 3.6 Rangeland Health Data Summary in Section 3.2.4 Land Health Evaluations. Three of the four key areas are currently in early seral ecological condition the other key area is in mid seral condition. The overall trend for two of the key areas that are in early seral condition is downward as compared the baseline data that was collected in 1982. Wildfire is likely a reason for the current poor condition. Not all of the allotment has burned in recent years and those unburned areas appear to be in mid to late seral condition. There are not any long term monitoring key areas in the unburned parts of the allotment. Desert shrublands are slow to recover from wildfire especially areas that have burned more than once.

Of the acres that have burned on the Mosby-Nay Allotment, 10,612 GIS acres or about 68% was previously mapped as Mojave Blackbrush Major Vegetation Type. 4,848 GIS acres or 31% was mapped as Creosote/Bursage Major Vegetation Type. Less than 1% of Great Basin Blackbrush and Mojave Mixed Shrub types were also burned. Blackbrush communities do not respond well to burning. Even blackbrush communities without invasive annual grasses are considered very flammable. Blackbrush communities may require centuries to recover from wildfire, this native shrub may not be able to re-establish in areas after the ecosystem has been greatly altered by the combination of wildfire, and invasive non-native species (Forest Service 2014). The areas that were mapped as blackbrush are no longer dominated by blackbrush.

### **Land Health Evaluations**

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 the Public Rangelands Improvement Act (PRIA). These Acts mandate that Federal agencies develop and maintain inventories of range conditions and trends on public rangelands and update inventories on a regular basis.

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

Ecological sites have developed a characteristic composition and cover of vegetation. The natural plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in annual production (BLM 2001). While the natural plant community of a particular ecological site is

recognized by characteristic patterns of species associations and community structure, the specific species present from one location to another may exhibit natural variability - the natural plant community is not a precise assemblage of species for which the proportions are the same from place to place, or even in the same place from year to year. Variability is the rule rather than the exception. The distinctive plant communities associated with each ecological site (including the variability which frequently occurs) can be identified and described, and are called ecological site descriptions.

The BLM measures range condition, or ecological condition, by the degree to which the existing vegetation of a site is different from the Potential Natural Community (PNC) for the respective ecological site, as identified in the ecological site description. PNC is “the biotic community that would become established if all successful sequences were completed without interferences by humans under the present environmental conditions. It may include naturalized non-native species” (BLM 2005 and BLM 2001). This differs from “historic climax plant community” in that a historic climax plant community is “the plant community that existed before European immigration and settlement” (BLM 2001). The BLM uses “potential natural community” terminology rather than “historic climax plant community” because PNC recognizes past influences by man. Knowing the PNC of the area, and using the ecological site descriptions as a guide, DPC objectives can be developed. The DPC then becomes the objectives by which management actions would be measured (see Appendix 5 Tables A5.16 – A5.20 of this EA for the DPC objectives for these allotments).

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.
- **PNC:** 76-100% of the expected potential natural community exists.

Land health evaluations were conducted and allotment evaluation reports were completed in 2006 for the Mosby-Nay Allotment (BLM 2006), 2011 for the Mosby Allotment (BLM 2011), and in 2012 for the Pakoon Springs Allotment (BLM 2012). These allotment evaluations were made in accordance with the ASRH (Appendix 3) using standard BLM methods for estimating ecological conditions and current trend. 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 (see Figure A2.8). Existing trend studies, ecological condition data, and utilization studies for the allotments were analyzed. The trend identified in the rangeland health evaluation survey assessed erosion status, vegetative cover, vigor, species diversity, location of the most palatable plants in relation to access to a grazing animal, and general age classes. The land health evaluations identified trend over a wider



area within each ecological site or sites surveyed than the 3-foot x 3-foot and 5-foot x 5-foot areas the monitoring studies represent.

The rangeland health evaluation conducted on the Mosby-Nay Allotment (Key Areas # 1 and # 3, the two key areas still available for grazing) concluded that the allotment is meeting Standard 1 (Upland Sites) at Key Area # 1 and making significant progress towards meeting Standard 1 at Key Area # 3. The allotment is meeting Standard 2 (Riparian-Wetlands Sites). Approximately, 90 % of the allotment is meeting or making significant progress toward meeting Standard 3 (Desired Resource Conditions), 10 % of the allotment is not meeting Standard 3 due to wildfires in 2005 on the Mosby-Nay Grazing Allotment. After reviewing that latest monitoring data, it appears that these key areas are still recovering from wildfires in 2005 and drought.

Mosby-Nay Key Area Big Hole #1 and Waynes Well # 2 were assessed as part of the Pakoon and Pakoon Springs Allotment evaluation. These key areas are now part of the Mosby-Nay Allotment and are available for grazing. These key areas are making significant progress toward meeting the applicable standards for rangeland health. The causal factor is wildfire. There are no riparian-wetland sites within the portion of the evaluation area that is available for grazing. The most recent monitoring data shows that reestablishment of desired vegetation is slowly occurring. This portion of the allotment is still recovering from wildfire and drought.

The rangeland health evaluation conducted on the Mosby Allotment concluded that the allotment is meeting all three standards for rangeland health. This allotment has not burned in recent times.

### **Trend**

See Appendix 5, Tables A5.1 – A5.5 for updated data and trend determination by key area. 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 collected using the Pace-Frequency method, which measures the occurrence frequency of forage and non-forage vegetative species. Cover data, which determines the percent of bare ground, litter, rock, cryptogam, and live basal vegetation, is also collected. Ground cover is determined by dividing the total number of hits for all categories except bare ground by the total number of hits (including bare ground) – see page 73 of BLM Technical Reference 1734-4 (BLM 1999b). Change in ground cover is an important aspect of trend. It is also used to determine if favorable or unfavorable conditions exist for germination and establishment of new plants, and to estimate nutrient cycling. In addition, the occurrence frequency of all plant species is collected. The first readings established a baseline for comparison to all future readings. Trend is considered up when the species increases by 10+ points from the first reading to the last shown reading. The trend of a species is static or not apparent if it shows a change of 0 to 10 or 0 to -10 from the first to the last reading. Down trend is a reading of more than -10 from the first reading.

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, comparing the most recent data to the base year. A summary of this data is in Table 3.6 Rangeland Health Data Summary below. Detailed tables with

data by year and species are available in Appendix 5. 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 of ASRH (Appendix 3).

**Table 3.6. Rangeland Health Data Summary**

Allotment	Key Area	Ecological Site	Ecological Condition	Overall Trend
Mosby-Nay	# 1	Limy Upland 9-12" precipitation zone	Early Seral	Static
Mosby-Nay	# 3	Limy Upland 6-9" p.z.	Mid Seral	Up
Mosby-Nay (Big Hole)	# 1	Limy Upland (Deep), 6-9" p.z.	Early Seral	Down
Mosby-Nay (Waynes Well)	# 2	Limy Upland (Deep), 6-9" p.z.	Early Seral	Down
Mosby	# 5	Shallow Upland 10-12" p.z.	Late Seral	Up

For more details concerning the ecological condition, refer to Appendix 5, Table A5.11 – A5.15. For the complete trend data for each key area, refer to Appendix 5, Table A5.1 – A5.5. These tables reflect the most recent monitoring data.

Monitoring data has been collected at all five key areas in the Mosby-Nay and Mosby Allotments (see Figure A2.8) with established trend plots from 1982 to the present for the Mosby-Nay Allotment and 1984 to the present for the Mosby Allotment. These plots are usually read on a five year interval, there has been some variance due to wildfires or other factors. The most recent reading for these key areas are for Mosby-Nay Key Area # 1 and #2 was 2016. For Mosby-Nay (Big Hole Key Area # 1 and Waynes Well Key Area # 2) and Mosby Key Area # 5 was 2018. All four of the Mosby-Nay key areas were burned by wildfires during the summer of 2005. These key areas are in different stages of recovery from the 2005 fires. The Mosby-Nay Key Area # 1 was Mojave Blackbrush vegetation type before the burn, it is now in early seral condition and the trend is static. Mosby-Nay Key Area # 3 was also Mojave Blackbrush vegetation type before the burn and now it is in mid seral condition with an upward trend. Mosby-Nay (Big Hole) Key Area # 1 and Mosby-Nay (Waynes Well) Key Area #2 (both key areas are in the northeastern part of the allotment) were Creosote Bush/ Bursage vegetation type before the wildfire, they are both in early seral condition with a downward trend. The threshold for a change in trend is +/- 10 percent as compared to the baseline reading. In 2018 both key areas had an overall trend of a 14 % decrease as compared to the baseline in 1982. A 14 % change is classified as a downward trend but is only a small change from the baseline. Recovery from wildfire is coming along slowly to the Big Hole and Waynes Well part of the allotment. The Mosby Key Area # 5 has not burned it is in late seral condition with an upward trend. This site is Great Basin Blackbrush. It should be noted that the vegetative composition listed in the site guide is an average across the entire ecological site; variations in an ecological site (due to inclusions or transition zones) may result in an actual plant composition that is different from that listed in the site guide.

## Utilization

Utilization data has been collected periodically within the Mosby-Nay and Mosby Allotments, there has been some variance of the schedule due to wildfires or other factors. In the future a more regular schedule of reading utilization on all of the key areas would be followed.

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). Utilization is read using the grazed class method to collect data. Utilization is read at or around the designated key area for each pasture. Under current management average utilization levels of key forage species for these allotments should not exceed the 45% allowable use on desert tortoise habitat, and 50% elsewhere (see MA-GM-08 from the RMP in Section 1.3 above).

See Appendix 5, Utilization Tables A5.6 – A5.10 for complete utilization data. Management of the allotment is based on a selection of key species. These species are selected for their similarity to other grasses and browse species that occur in the allotment. The definition of key species is: (1) forage species of sufficient abundance and palatability to justify its use as an indicator to the *degree of use* of associated species; and (2) those species which must, because of their importance, be considered in the management program.

Utilization of shrubs since the wildfires of 2005 has typically been below 45% utilization of the current year's growth by weight.

Key forage species for Mosby-Nay Key Area # 1 and # 3. The key species for these key areas were identified in the Mosby-Nay Allotment Evaluation (BLM 2006).

<u>Scientific Name</u>	<u>Common Name</u>
<u>Shrubs</u>	
<i>Ambrosia dumosa</i>	Burrobush
<i>Ephedra nevadensis</i>	Mormon tea
<i>Krameria erecta (Krameria parvifolia)</i>	Range ratany
<i>Krameria grayi</i>	Gray ratany
<i>Krascheninnikovia lanata (Ceretoides lanata)</i>	Winterfat
<u>Grasses</u>	
<i>Achnatherum hymenoides (Oryzopsis hymenoides)</i>	Indian ricegrass
<i>Muhlenbergia porter</i>	Bush muhly
<i>Pleuraphis rigida (Hilaria rigida)</i>	Big galleta
<i>Sporobolus spp.</i>	Sand dropseed

Mosby-Nay Key Area # 1 utilization study was established in 1984.

Mormon tea is the most utilized and most frequently present key species in the plot. Average utilization over the last 32 years is 30%. This is the only species to be present every time utilization was read. Since 2005 when the key area was burned by wildfire, there was one reading of 48% utilization of Mormon tea in 2010. Perennial grasses and forbs documented utilization from 1986 -2000. Other shrubs, perennial grasses and forbs were utilized sporadically but did not show up regularly in the utilization key area.

Mosby-Nay Key Area # 3 utilization study was established in 1986.

Mormon tea is the only key species to show up in every utilization reading. Average utilization on that species over 30 years is 34%. Since 2005 when the key area was burned by wildfire there was one reading of 50% utilization on Mormon tea in 2008. Range ratany showed up in the utilization starting in 2007 through 2016 average use was light at 8%.

For Mosby-Nay (Big Hole) Key Area # 1 and (Waynes Well) Key Area # 2 there has only been one reading since the wildfires in 2005 and 2006 and that was in 2016, utilization was well below the 45% use level.

Key forage species for Mosby-Nay Big Hole Key Area # 1 and Waynes Well Key Area # 2. The key species for these key areas were identified in the Pakoon and Pakoon Springs Allotments Evaluation (BLM 2012).

<u>Scientific Name</u>	<u>Common Name</u>
<u>Shrubs</u>	
<i>Ambrosia dumosa</i>	Burrobush
<i>Ephedra nevadensis</i>	Mormon tea
<i>Krameria erecta (Krameria parvifolia)</i>	Range ratany
<i>Krameria grayi</i>	Gray ratany
<i>Krascheninnikovia lanata (Ceretoides lanata)</i>	Winterfat
<u>Grasses</u>	
<i>Achnatherum hymenoides (Oryzopsis hymenoides)</i>	Indian ricegrass
<i>Aristida spp.</i>	Threeawn
<i>Dasyochloa pulchella (Tridens pulchellus)</i>	Low woollygrass
<i>Muhlenbergia porter</i>	Bush muhly
<i>Pleuraphis rigida (Hilaria rigida)</i>	Big galleta
<i>Sporobolus spp.</i>	Sand dropseed

Mosby-Nay (Big Hole) Key Area # 1 utilization study was established in 1982.

Mormon tea a shrub, and Big galleta and Sand dropseed both native perennial grasses were present most years utilization was read until 1993. The last time utilization was read was 2016 there was no utilization by livestock. This key area was burned by a wildfire in 2005.

Mosby-Nay (Waynes Well) Key Area # 2 utilization study was established in 1982.

Big galleta was present in all years the study was read the average utilization over 34 years was 43 %. There was utilization documented on shrubs after the 2005 wildfire. The average utilization on shrubs and grasses was between 35 – 47%.

Key species for Mosby Key Area # 5. The key species for these key areas were identified in the Mosby Allotment Evaluation (BLM 2011).

<u>Scientific Name</u>	<u>Common Name</u>
<u>Shrubs</u>	
<i>Coleogyne ramosissima</i>	Blackbrush

*Ephedra nevadensis*  
*Purshia stansburiana*

Mormon tea  
Stansbury cliffrose

Mosby Key Area # 5 utilization study was established in 1983. Average utilization at this key area has been ranging between 7 – 11% for shrubs and grasses. This key area has not burned and is dominated by blackbrush. The average utilization for blackbrush was 7%. The average utilization for Mormon tea was 11%. The Mosby Key Area # 5 the utilization has been well below the 45% utilization level.

### **Desired Plant Community Objectives**

Desired Plant Community (DPC) objectives were developed to 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. In addition, ecological site descriptions from the Natural Resources Conservation Service (NRCS) were used to determine the soil and vegetation attributes that are within the site potential for the key area. The DCP objectives for each key area are found in the allotment evaluations and in Appendix 5 Tables A5.16 – A5.20. 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, wildfire, and wet periods. The ranges for vegetation attributes are achievable given the current state of the plant community and the ecological site potentials. It was determined that the DPC objectives for each key area would result in healthy and diverse plant communities, which in turn would provide for the habitat needs (both forage and cover) of wildlife, protection for soils and hydrologic functions, and forage for livestock. 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.

See Appendix 5 Tables A5.16 – A5.20 for the DPC Objectives Determination Table for each key area in both the Mosby-Nay and Mosby Allotments. Below is a summary with the DPC Objectives for each key area and whether the objects are met or not met based on the most recent monitoring data.

Mosby-Nay Key Area #1 in the Mosby-Nay Allotment did not meet all of the objectives (See Table A3.16). Live basal vegetation cover was met and exceeded the objective with 7%. The shrub objective was met and exceeded with 75% composition at this site. The native perennial grass objective was not met as there were no grasses recorded on the last reading in 2016. The objective for perennial forbs was not met with a 1% composition. The updated review of the ecological site inventory data table see Table A3.11, the current ecological condition score for this key area is Early Seral. The overall trend is static. This key area is slowly recovering from the wildfire in 2005.

Mosby-Nay Key Area # 3 in the Mosby-Nay Allotment did not meet all of the objectives (See Table A3.17). Live basal vegetation cover did not meet with a 2% composition. Shrub composition was 31% which does not meet the objective. The objective was met and exceeded

for native perennial grass with 42% composition. Forbs exceeded the objective with 23% composition. This key area burned in 2005 which removed the shrub component. While the vegetation in this area has not recovered from the wildfire it is making progress toward recovery with grass and forb recovery. Native species are present on the site but have not increased to desired levels post fire. The updated review of the ecological site inventory data table see Table A3.12, the current ecological condition score for this key area is Mid Seral. The overall trend is upward.

Big Hole Key Area # 1 in the Mosby-Nay Allotment did not meet all of the objectives (See Table A3.18). The ground cover objective was exceeded with 64% composition. The total shrubs and trees objective was not met with 0% composition. Native perennial grasses exceeded the objective with 69% composition. The objective for forbs was not met with 4% this was just below the 5 – 10% minimum. Shrubs and trees are slow to recover from wildfire in the desert environment. For the updated review of the ecological site inventory data table see Table A3.13, the current ecological condition score for this key area is Early Seral. The overall trend is downward.

Waynes Well Key Area # 2 in the Mosby-Nay Allotment did not meet all of the objectives (See Table A3.19). Ground cover did not meet the objective with 23% composition which is just below the desired 25 – 40% composition. Total shrubs and trees did not meet the objective with 22% composition. Native perennial grasses exceeded the objective with 33%. Forbs met the objective with 10%. This area burned around 1980 and 2005. Wildfires are the likely reason for not meeting the shrub and tree objective. The updated review of the ecological site inventory data table see Table A3.14 the current ecological condition score for this key area is Early Seral. The overall trend is downward.

Mosby Key Area # 5 in the Mosby Allotment did not meet all of the objectives (See Table A3.20). Ground cover exceeded the objective with 43 % composition. Browse shrub species met the objective with 69% composition. Other shrubs and trees exceeded the objective with 32%. There were no native perennial grasses recorded during the last reading in 2018. The objective for perennial forbs was met with 1%. This area has not burned and is currently dominated by blackbrush. For the updated review of the ecological site inventory data table see Table A3.15 the current ecological condition score for this key area is Late Seral. The overall trend is upward.

### **3.2.5 Wildlife (including Big Game, Migratory Birds, and Sensitive Species)**

#### **Big Game Species**

The Mosby and Mosby-Nay Allotments are located in Arizona Game and Fish Department (AGFD) Game Management Unit (GMU) 13B. Mule deer can be found throughout these allotments. Eight percent of the allotments are considered desert bighorn sheep habitat.

#### **Mule deer (*Odocoileus hemionus*)**

Unit 13B 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.

The 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. Mosby and Mosby-Nay Allotments are categorized by AGFD as 51% yearlong habitat and 49% limited habitat for mule deer.

### **Desert bighorn sheep (*Ovis canadensis nelsoni*)**

Desert bighorn sheep habitat has been identified from habitat analysis that evaluates a combination of slope, topography, aspect, vegetation, proximity to escape cover, and water availability (Bighorn Sheep Core Team 2011). To escape predators, bighorn sheep prefer rough, rocky terrain with slopes greater than 20%.

Desert bighorn sheep likely obtain some of the moisture they need from succulent vegetation. During the hot summer months, the sheep stay in shaded areas near water as much as possible and are seldom found more than three miles from dependable water sources. When rain or snowfall occurs, bighorn sheep expand their use of suitable habitat and range out from permanent waters. They also commonly drink from ephemeral pools of water found in rock pockets (Bighorn Sheep Core Team 2011).

Desert bighorn sheep are present in the Mosby-Nay Allotment on the western edge and in most of the Mosby Allotment. Sixty-two desert bighorn were released into the Virgin and Beaver Dam Mountains from 1979 to 1982 in three locations. Key habitat use areas for bighorn sheep include concentration areas along the Virgin River and at reliable waters in the Virgin and Beaver Dam Mountains. In 2016, the area supported an estimated population of 120 desert bighorn.

### **Migratory Birds**

The Migratory Bird Treaty Act of 1918 protects against the take of migratory birds, their nests, and eggs, except as permitted. A Memorandum of Understanding 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 Mosby and Mosby-Nay Allotments are summarized in Table 3.7.

**Table 3.7. USFWS Birds of Conservation Concern Found in the Mosby and Mosby-Nay Allotments.**

Species	Habitat Type in the Project Area
Ferruginous Hawk	Open grassland or shrubland with isolated trees (typically juniper) for nesting. ( <i>BLM Sensitive, see section 3.2.5</i> )
Golden Eagle	Habitat generalist, but usually forages in open country for small mammals and carrion. Large cliff faces are used for nesting. ( <i>BLM Sensitive, see section 3.2.5</i> )
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. ( <i>BLM Sensitive, see section 3.2.5</i> )
Prairie Falcon	Typically occupy drier and more open country than peregrine falcons, but there is some overlap in habitat. Cliff faces are used for nesting. Found year-round on the Arizona Strip in low numbers.
Gray Vireo	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. ( <i>BLM Sensitive, see section 3.2.5</i> )
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.

### 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 Mosby and Mosby-Nay Allotments and that may be affected by actions proposed in one of the alternatives presented in Chapter 2 are displayed in Table 3.8.

**Table 3.8. Sensitive Species Associated with the Mosby and Mosby-Nay Allotments**

Species	Potential for Occurrence
Peregrine falcon ( <i>Falco peregrinus</i> )	potential
Ferruginous hawk ( <i>Buteo regalis</i> )	potential
Golden eagle ( <i>Aquila chrysaetos</i> )	potential
Pinyon jay ( <i>Gymnorhinus cyanocephalus</i> )	potential

Five additional sensitive species may also occur within the allotments. However, it has been determined by the BLM wildlife biologists that these species would not be affected by actions proposed in this EA. These species are therefore not addressed further in this document. Table 3.9 lists the sensitive species that will not be discussed in further detail, along with the rationale for their exclusion from further analysis.

**Table 3.9. Sensitive Species Excluded from Further Analysis**

<b>Species</b>	<b>Rationale for Excluding from Further Analysis</b>
Allen’s big-eared bat <i>Idionycteris phyllotis</i>	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 <i>Corynorhinus townsendii</i>	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 <i>Macrotus californicus</i>	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 <i>Eumops perotis californicus</i>	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 <i>Euderma maculatum</i>	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.
Arizona toad <i>Anaxyrus microscaphus</i>	Livestock grazing is excluded from riparian areas. No measurable impacts (changes from the existing condition) would be expected.
Relic leopard frog <i>Lithobates onca</i>	Livestock grazing is excluded from riparian areas. 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 adjoining the west side of the allotments along the Virgin Mountains. Peregrine falcons may also 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 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 Virgin Mountains west of the allotments. Eagles likely utilize the entirety of 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 (Gabaldon 1979, Latta et al. 1999). One nesting colony of pinyon jays typically requires an area of about 230 acres for nesting and about 5,120 acres for total home range (Balda & Bateman 1971).

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

## **4.0 Environmental Consequences**

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 a particular element of the human environment is not discussed, it is because BLM resource specialists have considered effects to the component and found the proposed action would have minimal or no effects (see Appendix 1). The intent of this analysis is to provide the scientific and analytical basis for the environmental consequences. General effects from projects similar to the proposed action and alternatives are also described in the document to which this EA is tiered, the 2008 GCPNM RMP (BLM 2008a).

### **4.1 Livestock Grazing**

The analysis area for livestock grazing for this grazing permit renewal is the Mosby-Nay and Mosby Allotments.

#### **4.1.1 Impacts of Alternative A – Proposed Action - Combine Allotment and Create New Pastures**

The proposed action would affect the livestock grazing permittee by combining the Mosby-Nay and Mosby Allotments and canceling the current grazing permits and issuing one new 10-year grazing permit with new terms and conditions (see Section 2.3). The permittee would have only one bill for use on the combined allotment

Grazing on the combined allotment season of use (3/1 – 2/28) but with a new seven pasture rotation. The proposed action would maintain the current level of livestock use, there would be no change to the kind of livestock, permitted number of livestock or the total number of AUMs. The current AUMs from both allotments would be combined to see the percent public land recalculated see Table 2.4. The seven pasture rotation would allow for more flexibility in pasture rotation which would benefit both the grazing permittee and the allotment (forage/vegetation) by



allowing for rest during the growing season and tortoise active season March 15 – Oct 15 for five of the seven pastures. The other two pastures may be used or rested any time of the year; benefiting the permittee by allowing some pastures to be grazed during the tortoise active season. This would be a change in season of use for the Mosby Pasture who's current season of use is 10/1 – 2/28. None of the pastures would be used continuously year round. Livestock movements from one pasture to another would be based on reaching the 45% utilization level. Resting each pasture for a portion of each year would likely benefit the continued recovery from wildfires and continue making progress toward meeting the ASRH.

Removing the old fire fences and building the new fence segments would create functional pastures and remove miles of un-needed and unmaintained fences making herding livestock between pastures more efficient. The permittee would benefit from the new pipeline extension allowing for a more reliable supply of water for livestock using the Cove Spring Corral and Trough in the Mosby-Nay and Hungry Valley Pastures. This would allow for better livestock distribution. All together this would result in a continued viable ranching operation for the livestock operator, and provide some degree of stability for the permittees' livestock operation. The permittee was consulted during the development of this alternative and supports the combination of the two allotments, new pasture system, and pipeline extension. The proposed action would fit into the permittee's larger seasonal operation in Utah and Arizona.

#### **4.1.2 Impacts of Alternative B – No Action – Continue Current Management**

Alternative B, would affect the livestock grazing permittee on the Mosby-Nay Allotment by canceling the current permit and issuing a new 10-year grazing permit with the same terms and conditions as the previous permit (see Section 2.4). This alternative would only affect the Mosby-Nay Allotment, it would have no effect on the Mosby Allotment. The two allotments, would remain separate. The Mosby Allotment would remain available for grazing under its current permit with no changes. The current season of use for the Mosby-Nay Allotment would remain 3/1 – 2/28.

This alternative would maintain the current level of livestock use, there would be no change to the kind of livestock, permitted number of livestock or the total number of AUMs. No new range improvements, fences, water pipelines or cattleguards would be built on either allotment under this alternative. Management of the Mosby-Nay Allotment would continue with the original five pastures that are currently not working well. Grazing under alternative B would continue to provide some degree of stability for the permittee's livestock operation.

#### **4.1.3 Impacts of Alternative C – No Grazing**

Alternative C, would negatively affect the livestock grazing permittee on the Mosby-Nay Allotment by making the allotment unavailable for livestock grazing and canceling the current permit. This alternative would necessitate an amendment to the GCPNM RMP before the alternative could be implemented. Both the Mosby-Nay and Mosby Allotments are currently listed in the RMP as available for grazing. No new permit would be issued. 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. The permittee would need to seek alternate arrangements for his herd during the time he had formerly grazed on this allotment, such as leasing private pasture or obtaining a substitute federal grazing permit on a different allotment. This would likely be a large economic impact to

the permittee. This alternative would not meet the purpose and need for action identified in Chapter 1 of this EA.

The existing rangeland improvements would remain on the landscape and likely fall into disrepair. Range improvements such as allotment boundaries would continue to be maintained for neighboring active allotments. Water developments are typically maintained by the livestock grazing permittee. This would be discontinued under this alternative. Unless other organizations continued this maintenance, these facilities would deteriorate and no longer be available for wildlife use within the allotment.

## **4.2 Soils**

The analysis area for soils for this grazing permit renewal is the Mosby-Nay and Mosby Allotments.

### **4.2.1 Impacts of Alternative A – Proposed Action - Combine Allotment and Create New Pastures**

Impacts to soils from livestock grazing could occur from trampling and vegetation removal, resulting in compaction and erosion. Livestock grazing increases soil compaction in trailing, watering, and mineral supplement areas. During the rangeland health evaluation, a Standard #1 documentation worksheet was completed at the key areas in both allotments. The worksheet evaluated seven indicators (surface litter, bare ground, rock, flow patterns, gullies, rills, and plant pedestalling) that determine the functional condition of upland sites as it relates to infiltration, permeability, and erosion rates. Field visits were also conducted to locate possible problems areas on the allotments, soils and watershed function were found to be at acceptable levels. The Mosby-Nay Allotment is meeting or making progress toward meeting the standards for rangeland health. Those areas not meeting were because of wildfires in 2005 and 2006, not because of livestock grazing. According to the Mosby-Nay Allotment evaluation watershed units are in satisfactory erosion condition and the soils are not especially susceptible to wind and water erosion. The soils are resistant to compaction and have not been negatively altered by grazing (BLM 2006). The Mosby Allotment is meeting all standards for rangeland health (BLM 2011). The land health evaluations conducted on both of these allotments did not indicate excessive erosion patterns or that the ecosystem is not properly functioning due to livestock grazing. The combined Mosby-Nay and Mosby Allotment would continue to make progress toward meeting the standards for rangeland health.

Under this alternative, construction of new range improvements would follow best management practices as described in Appendix 4. BLM Fence, Gate, and Pipeline Specifications for the Mosby-Nay Allotment. There would be short term impacts associated with the trenching and installation of a water pipeline but, the proposal is to put the pipeline in or right beside existing dirt roads resulting in minimal new disturbance. There would be minimal ground disturbance from construction of new fence segments and removal of excess fire fences. The new cattleguards would be placed into existing roads. In the specifications for construction of the new fences, pipeline, and cattleguard it says there would be no new access roads created along fence lines or to the job site. No cross-country travel would occur with motorized vehicles when the ground is muddy and visible ruts can be created four inches or deeper. There would be no blading, dozing, or scraping of the ground along the fence line on any BLM administered lands.

The permittee would be given a copy of the specifications and maps and made aware of best management practices to reduce soil impacts before approved to start work. The permittee would contact the BLM Archaeologist before trenching the new pipeline begins to confirm the exact route is cleared for pipeline installation. Following the best management practices for new range improvements outlined in Appendix 4 would reduce impacts to soils.

#### **4.2.2 Impacts of Alternative B – No Action – Continue Current Management**

Livestock grazing can increase soil compaction in trailing, watering, and mineral supplement areas. The Mosby-Nay Allotment is meeting or making progress toward meeting the standards for rangeland health (BLM 2006). Those areas not meeting were because of the wildfires in 2005 and 2006, not because of livestock grazing. Soil condition evaluations were accomplished by field inspections during the rangeland health evaluations. According to the Mosby-Nay Allotment evaluation watershed units are in satisfactory erosion condition and the soils are not especially susceptible to wind and water erosion. The soils are resistant to compaction and have not been negatively altered by grazing (BLM 2006). The land health evaluation conducted on this allotment did not indicate excessive erosion patterns or that the ecosystem is not properly functioning due to livestock grazing. Continuation of current grazing practices would therefore not be expected to adversely impact soil resources within the allotment. The current level of impacts to soils in these areas would be maintained and no changes in soil conditions are anticipated. The Mosby-Nay Allotment would continue to make progress toward meeting the standards for rangeland health.

Slight improvements to soil conditions would be expected over time under Alternative A as compared to Alternative B. The creation of additional pastures and an improved deferred rotation system would improve livestock distribution making the impacts to soils from Alternative B slightly greater, although on a small scale.

#### **4.2.3 Impacts of Alternative C – No Grazing**

Under this alternative, the Mosby-Nay Allotment would become unavailable to livestock grazing and no new permit would be issued. This would not affect the Mosby Allotment it would remain separate and grazing would continue under its current permit. With no permitted grazing on the Mosby-Nay Allotment there would be reduced surface disturbance and a potential for an upward trend in ground cover. Vegetation, which provides a protective canopy for soils, would have the most rest and recovery as compared to the other alternatives. Removing all livestock from the allotment may result in surface compaction being reduced over time, which would increase infiltration rates, root space, available water holding capacity, and aeration. The physical condition of the surface layers of the soil would slowly improve. A gradual decrease in water runoff in areas near stock waters would be realized based on a lack of livestock use, resulting in greater soil infiltration. The Mosby-Nay Allotment would continue to meet or make progress toward meeting the standards for rangeland health and the slow recovery from wildfires would continue.

### 4.3 Threatened, Endangered, or Candidate Animal Species

#### 4.3.1 Impacts of Alternative A – Proposed Action - Combine Allotment and Create New Pastures

Livestock grazing may result in injury or death of individuals due to trampling. Grazing may also result in competition for forage and degradation and localized loss of habitat due to changes in plant community composition and dynamics and erosion. Range improvements proposed under Alternative A would result in effects to tortoises and tortoise habitat that would not occur in the other alternatives.

##### *Direct Effects*

Cattle have been known to trample desert tortoises and their burrows, but the frequency of trampling, or how this affects tortoise populations is unclear. Direct mortality or injury may occur if cattle step on tortoises, their eggs, tortoise burrows, or shelter sites (Burge 1977; Berry 1989; Avery and Neibergs 1993; USFWS 1994). These direct effects can occur when grazing is authorized during the desert tortoise inactive period. Several cases of trampling have been reported on the Arizona Strip; however, the frequency with which trampling occurs is unknown. Trampling has been documented twice on the Beaver Dam Slope, in 1988 (Coffeen 1990) and in 1991 (BLM 1991). However, livestock are not likely to trample desert tortoise eggs under Alternative A since eggs are laid from mid-May through July and most or all would hatch before cattle would be turned out onto those pastures in October (Ernst *et al.* 1994).

Grazing operations may also result in direct fatality or injury of desert tortoises that are struck by vehicles associated with grazing activities, and possibly during range improvement project construction and maintenance. New range improvement projects (fence removal, new fences, and pipeline extension) could result in direct effects to desert tortoises and habitat. Tortoise burrows and vegetation could be damaged by vehicles and workers during range improvement projects. Vegetation would be removed or crushed to gain access to fences and pipelines during construction and maintenance. Vegetation damage would likely recover to some extent between projects. During range improvement construction, maintenance, and inspection, some desert tortoises may be killed or injured as a result of collisions with vehicles or other equipment or the collapsing of burrows. Access to new or existing range developments could lead to desert tortoise fatality through illegal collection, vandalism, crushing by vehicles, and shooting.

##### *Indirect Effects*

Non-native annual plants can increase because of livestock grazing, while native perennial bunchgrasses, which are highly palatable desert tortoise forage species, can become less abundant resulting in habitat degradation (Berry and Nicholson 1984, McClaran and Anable 1992).

Both cattle and desert tortoises consume annual forbs and grasses in the spring if winter precipitation has been sufficient for annual production (Burkhardt and Chamberlain 1982, Burge and Bradley 1976, Coombs 1979, Minden 1980, Esque 1994). During dry winters and other seasons, cattle consume primarily perennial shrub and grass species, such as white bursage, range ratany, and big galleta grass. Outside of the spring months or in dry years when winter annual plants are not available, desert tortoise diets comprise a greater percentage of shrubs,

perennial grasses, and dried annuals (Henen 1992; Turner *et al.* 1984; Nagy and Medica 1986; Hohman and Ohmart 1980).

Pastures in the Mosby-Nay Allotment with desert tortoise habitat would be available for grazing from October 15 through March 15. This seasonal restriction would reduce some forage competition for winter annual plants, which exhibit most growth in April and May (Beatley 1974). Livestock would be feeding upon what early winter annual growth may be available, plus perennial shrubs and grasses, at this time. If perennial plants are overgrazed and reduced in availability, desert tortoise would have less perennial forage in the summer when it is needed most (Jarchow and May 1989, Nagy and Medica 1986). If winter precipitation does not produce winter annual growth, desert tortoise exiting hibernation must feed upon perennial shrubs and grasses and what dried annual vegetation is still available after livestock have been grazing in the area. Ensuring that cattle do not exceed the established forage use threshold of 45% current annual growth would help reduce direct competition for forage between cattle and desert tortoises and simultaneously reduce the chances of desert tortoise habitat degradation. The new pasture system proposed under Alternative A would give the permittee better control over utilization and result in more even use.

#### **4.3.2 Impacts of Alternative B – No Action – Continue Current Management**

Livestock grazing may result in injury or death of individual desert tortoises due to trampling. Grazing may also result in competition for forage and degradation and localized loss of habitat due to changes in plant community composition and dynamics and erosion. Alternative B would not have effects from the new range improvements proposed under Alternative A.

The No Action Alternative (Alternative B), only applies to the Mosby-Nay Allotment. The Mosby-Nay and Mosby Allotments would not be combined. This alternative would continue the current management described in Section 2.4. The allotment would continue to be managed for allowable use of 45% on pastures with desert tortoise habitat and 50% utilization on the other pasture. Pastures that have desert tortoise habitat are to be grazed from October 15 through March 15 during the tortoise inactive season. The Hungry Valley Pasture that is without desert tortoise habitat is grazed from March 15 through October 15 (Figure 1.1). There are currently five pastures in the Mosby-Nay Allotment. Livestock are herded through the pastures. Water systems are turned on or off to encourage livestock use or movement. The current pasture rotation allows rest for four of the five pastures during the growing season and tortoise active season.

Direct and indirect effects would be similar under Alternative B as they are described under Alternative A (section 4.3.1). No new range improvement projects (fence removal, new fences, and pipeline extension) are proposed under Alternative B, therefore impacts to tortoises and tortoise habitat from construction would not occur. Alternative B would continue to use the existing pasture system and would likely result in less even use of forage.

#### **4.3.3 Impacts of Alternative C – No Grazing**

This alternative would only effect the Mosby-Nay Allotment. Under this alternative, no livestock grazing would occur so trampling of desert tortoises by livestock would not occur. There would be more forage available to desert tortoises and no habitat degradation from livestock grazing. No new range improvement projects would occur and, therefore, no tortoises

would be harmed or habitat damaged from construction. However, some impacts could occur if existing range improvements, mainly fences, were removed as a result of discontinued grazing.

#### **4.4 Vegetation and Invasive, Non-native Species**

The analysis area for vegetation and invasive, non-native species for this grazing permit renewal is the Mosby-Nay and Mosby Allotments. Under all of the alternatives weed treatments are expected to continue through chemical and mechanical methods as they are detected. Known weed sites would continue to be monitored.

##### **4.4.1 Impacts of Alternative A – Proposed Action - Combine Allotment and Create New Pastures**

Plants live in ecosystems full of herbivores that range from small insects to large grazing animals. Losing leaves or stems to herbivores is a common event in the life of a rangeland plant. For rangeland plants to remain healthy and productive, enough vegetation must remain after grazing so that plants can photosynthesize and manufacture energy to produce more leaves, stems, and seeds. Perennial plants also need to produce and store energy (such as starches and sugars) in roots and crowns to initiate the next season of new growth. Only when too much of the plant is removed does the plant suffer in a way that yields lasting detrimental effects. Substantial damage to rangeland plants generally occurs under repeated and heavy grazing (University of Idaho 2011).

The impact of grazing on plant growth depends greatly on when grazing occurs during the growing season and at what stage of the plant's life cycle. Plants are generally less damaged by grazing early in the growing season when time, soil moisture, and nutrients needed for regrowth are abundant. Plants are most sensitive to grazing when they are flowering and forming seeds. At this time, the plant has high energy demands to produce seeds, complete growth for the season, and store energy to get through the dormant season. Plus, this generally occurs at the peak of summer when the environment is hot and dry and not favorable for regrowth. Once the plant produces seeds and turns brown (i.e., begins to senesce and becomes dormant), it is no longer sensitive to grazing. At this time, the leaves are not photosynthesizing and are no longer being used by the plant (University of Idaho 2011).

Livestock grazing can directly affect vegetation by reducing plant vigor, decreasing or eliminating desirable forage species, increasing soil instability and erosion, reducing water quantity and quality, and causing loss of, or injury to, individual plants from trampling, particularly near water developments. Long-term changes in vegetation may result if livestock use consistently exceeds established allocations. When combined with the presence of invasive non-native species, drought, wildfire or other environmental factors may reduce range carrying capacity. Improper grazing practices (such as excessive utilization which removes vegetative cover) may lead to soil compaction, reduced infiltration rates, increased runoff and erosion, and declines in watershed condition. Grazing impacts on vegetation are mitigated by timing of use, adjustment of stocking rates, limiting utilization rates, and conformance with ASRH (Appendix 3).

The proposed action's (Alternative A) grazing system (i.e. season-of-use, kind and permitted numbers, pasture rotation and rest) on these allotments has been developed to minimize adverse



effects to vegetation that could occur with repeated grazing during cool and warm growing seasons without some form of rotation or deferment.

The proposed action would combine the Mosby-Nay and Mosby Allotments and create a seven pasture rotation where all pastures receive some rest each year. The new seven pasture rotation would allow for more flexibility in pasture movement which would benefit the vegetation by allowing for rest for five of the pastures during the growing season and tortoise active season March 15 – October 15. The other two pastures may be used or rested at different times of the year but would generally be used during the growing season March 15 – October 15. This would be a change in season of use for the Mosby Pasture. Its current season of use under its own authorization is 10/1 – 2/28. The Hungry Valley Pasture is already grazed during the growing season as part of the current rotation on the Mosby-Nay Allotment. None of the pastures would be used continuously year round. Livestock movements would be based on the allowable utilization level of 45% in combination with five of the seven pastures only grazed from October 15 – March 15. The other two pastures would also have an allowable utilization of 45%. The seven pasture deferred rotation system combined with the 45% allowable utilization level would allow grazing use to be spread more evenly through the allotment, while removing livestock from desert tortoise critical habitat during the tortoise active season. If all pastures have reached their utilization limit and no other pastures are available due to timing restriction then livestock would be removed from the allotment. These actions would ensure that rangeland resources (including habitat for special status species and other wildlife, native vegetation, watershed function, and soil productivity) are maintained or improved over time. Proper grazing use, which maintains stable plant communities, can help reduce invasive non-native and noxious weed establishment.

Extension of the pipeline would improve livestock distribution. The location of the new fence segments, creating new pastures was designed to insure that there would be water available on both sides of the new pasture fences. Construction of new fences and removal of old fire fences would make pasture rotation more effective.

Invasive annual grasses were present before the wildfires in 2005 and 2006. The current condition of the Mosby-Nay Allotment is a result of recent wildfires and the increased spread of invasive non-native annual grasses such as red brome, cheatgrass, and common Mediterranean grass. Native shrub communities have been slow to recover. Seeding of large areas in the Mojave Desert has had a historic low likelihood of success especially in areas that have a large composition of invasive annual grasses. Resting each pasture for a portion of each year would likely continue the recovery from wildfire and continue progress toward meeting ASRH. Current livestock grazing is not identified as the causal factor in any increase in red brome or cheatgrass, since they have existed or become naturalized throughout the region since at least 1911 (Reid et. al. 2008) (BLM 2012). Proper grazing use, which maintains stable plant communities, can help reduce invasive and noxious weed establishment. The combination of proper grazing management to reduce invasive and noxious weed establishment coupled with the ongoing treatment efforts, should minimize the spread of invasive non-native species in this allotment.

As discussed in Chapter 3, allotment monitoring data indicates that the Mosby-Nay Allotment is making progress toward meeting all applicable standards for rangeland health and the Mosby Allotment is meeting all applicable standards for rangeland health (Section 3.2.4 Land Health Evaluations). One factor in making this determination was the assessment that DPC objectives for vegetation components at the key area are partially met on the Mosby-Nay Allotment (see Desired Plant Community Objectives Determination Tables A5.16 – A5.20 in Appendix 5). The current condition of the Mosby-Nay Allotment has been influenced by wildfires in 2005 and 2006, the perennial vegetation particularly the shrub component is slowly recovering. Four years of drought following the 2005 wildfires has contributed to the slow recovery. All four key areas were burned, the fire intensity must not have been the same at all key areas because there are varying degrees of recovery. Livestock grazing is not thought to be the causal factor in not fully meeting standards on the Mosby-Nay Allotment. The Mosby Allotment has not burned in recent years but it is only partially meeting DPC objectives, even though it is in Late Seral ecological condition and has an overall upward trend. It does not meet the objective for native perennial grasses. This is likely because the allotment is dominated by blackbrush, which can form large closed communities. The DPC objectives are used as an indicator of ecosystem function and rangeland health. Thus, managing these allotments to achieve DPC objectives would assure that rangeland health, soil conditions, and ecosystem function are met. This proposed action, along with implementation of the established utilization levels and new pasture rotation, would allow the Mosby-Nay Allotment to continue to improve ecological condition over time, resulting in no adverse impacts on vegetation.

The many fires in the past 30 years have initiated a “grass-fire cycle,” in which fire promotes resurgence of exotic grasses that fuel the fire to create a frequent-fire regime in areas where fire was historically infrequent. Some areas on the Mosby-Nay Allotment have burned more than once in recent years. Based on several studies, natural reestablishment of late-successional species such as blackbrush or creosote bush will require long time periods, often longer than 30 years and possibly longer than 100 years (Callison et al. 1985; Lei 1999; Lovich and Bainbridge 1999). Therefore, even if there are no future fires, it will still be decades before desirable species of brush and grass return to these burns. Drought events might prolong the recovery period and perhaps prohibit the return of some species altogether. (BLM 2012)

#### **4.4.2 Impacts of Alternative B – No Action – Continue Current Management**

Livestock grazing can directly affect vegetation by reducing plant vigor, decreasing or eliminating desirable forage species, increasing soil instability and erosion, reducing water quantity and quality, and causing loss of, or injury to, individual plants from trampling, particularly near water developments. Long-term changes in vegetation may result if livestock use consistently exceeds established allocations, or drought or other environmental factors reduce range carrying capacity. Grazing impacts on vegetation are mitigated by timing of use, adjustment of stocking rates, and conformance with ASRH.

The No Action Alternative (Alternative B), only applies to the Mosby-Nay Allotment. The Mosby-Nay and Mosby Allotments would not be combined. This alternative would continue the current management described in Section 2.4. The allotment would continue to be managed for allowable use of 45% on pastures with desert tortoise habitat and 50% utilization on the other pasture. Pastures that have desert tortoise habitat would be grazed from 10/15 – 3/15 during the tortoise inactive season. The Hungry Valley Pasture that is without desert tortoise habitat would

be grazed from 3/15 – 10/15 (Figure 1.1). There are currently five pastures in the Mosby-Nay Allotment. Livestock are herded through the pastures. Water systems are turned on or off to encourage livestock use or movement. The current pasture rotation allows rest for four of the five pastures during the growing season and tortoise active season. Plants can withstand removal of a part of their current year's growth and still achieve normal growth the following year. The Mosby-Nay Allotment is making progress towards meeting the standards for rangeland health. The causal factor for not meeting all applicable standards is the wildfires that occurred in 2005 and 2006. Under the current management the allotment would likely continue to make progress toward meeting all applicable standards for rangeland health.

Invasive annual grasses were present before the wildfires in 2005 and 2006. The current condition of the Mosby-Nay Allotment is a result of recent wildfires and the increased spread of invasive non-native annual grasses such as red brome, cheatgrass, and common Mediterranean grass. Native shrub communities have been slow to recover. Seeding of large areas in the Mojave Desert has had a historic low likelihood of success especially in areas that have a large composition of invasive annual grasses. Resting each pasture for a portion of each year would likely continue the recovery from wildfire and continue progress toward meeting ASRH. Current livestock grazing is not identified as the causal factor in any increase in red brome or cheatgrass, since they have existed or become naturalized throughout the region since at least 1911 (Reid et. al. 2008) (BLM 2012). Proper grazing use, which maintains stable plant communities, can help reduce invasive and noxious weed establishment. The combination of proper grazing management to reduce invasive and noxious weed establishment coupled with the ongoing treatment efforts, should minimize the spread of invasive non-native species in this allotment.

As discussed in Chapter 3, allotment monitoring data indicates that the Mosby-Nay Allotment is making progress toward meeting all applicable standards for rangeland health (Section 3.2.4 Land Health Evaluations). One factor in making this determination was the assessment that DPC objectives for vegetation components at the key area are partially met on the Mosby-Nay Allotment (see Desired Plant Community Objectives Determination Tables A5.16 – A5.20 in Appendix 5). The current condition of the Mosby-Nay Allotment has been influenced by wildfires in 2005 and 2006, the perennial vegetation particularly the shrub component is slowly recovering. Four years of drought following the 2005 wildfires has contributed to the slow recovery. All four key areas were burned, the fire intensity must not have been the same at all key areas because there are varying degrees of recovery. Livestock grazing is not thought to be the causal factor in not fully meeting standards on the Mosby-Nay Allotment. Thus, managing this allotment to achieve DPC objectives would assure that rangeland health, soil conditions, and ecosystem function are met. Continuing the current management would likely allow the Mosby-Nay Allotment to continue to improve ecological condition over time, resulting in no adverse impacts on vegetation.

The many fires in the past 30 years have initiated a “grass-fire cycle,” in which fire promotes resurgence of exotic grasses that fuel the fire to create a frequent-fire regime in areas where fire was historically infrequent. Some areas on the Mosby-Nay Allotment have burned more than once in recent years. Based on several studies, natural reestablishment of late-successional species such as blackbrush or creosote bush will require long time periods, often longer than 30

years and possibly longer than 100 years (Callison et al. 1985; Lei 1999; Lovich and Bainbridge 1999). Therefore, even if there are no future fires, it will still be decades before desirable species of brush and grass return to these burn sites. Drought events might prolong the recovery period and perhaps prohibit the return of some species altogether. (BLM 2012)

#### **4.4.3 Impacts of Alternative C – No Grazing**

This alternative would only effect the Mosby-Nay Allotment. 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. The Mosby-Nay Allotment is currently making progress toward meeting rangeland health. The causal factor is thought to be wildfire. Plant communities recovering from wildfire as well as those that are unburned would certainly benefit from rest from livestock grazing. Wildlife and the occasional wild burro would still graze and browse the allotment area. This alternative would therefore result in the least grazing on vegetation, meaning the plants would have the maximum amount of energy compounds in their stems for survival and reproduction. Depending on the precipitation levels from year to year there could be increased amounts of invasive annual grasses. Which could increase fire intensity resulting from increased fine fuel loads when grazing is removed (Davies et al. 2010). Livestock and wildlife do graze invasive non-native and annual grasses and forbs during the short period when they are green. Removal of grazing would not result in a decline in invasive non-native annual grasses on the allotment. These grasses have been established on this and surrounding allotments for many years. For more information about length of time for recovery of burned native desert vegetation see Section 3.2.4 Invasive, Non-native Species.

#### **4.5 Wildlife (including Big Game, Migratory Birds, and Sensitive Species)**

Herbaceous vegetation provides forage and concealment cover for wildlife species, particularly during the spring breeding period when calving, fawning, nesting, and rearing of young occurs. Livestock grazing reduces the height and amount of herbaceous vegetation. The presence of livestock and the movement of livestock between areas of use could result in the direct disturbance or displacement of some wildlife from preferred habitats, nesting/birthing sites, or water sources. Both the disturbance and displacement of wildlife and the reduction of herbaceous forage and cover could limit the productivity and reproductive success of some species. However, the livestock grazing proposed in Alternatives A and B would limit utilization to 45% in most of the project area, which would help maintain vegetative condition, and therefore wildlife habitat components.

##### **4.5.1 Impacts of Alternative A – Proposed Action - Combine Allotment and Create New Pastures**

###### **Big Game Species**

###### **Mule Deer**

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. Livestock use on the Mosby Allotment would change from October through February to mid-March through mid-October. This change should lessen the amount of overlap in use between livestock and mule deer since deer use is mostly in the winter. 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 45% 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. Construction of range improvement could result in temporary disturbance to mule deer due to human activity and noise.

### **Desert Bighorn Sheep**

The rugged and steep nature of bighorn habitat limits contact between sheep and livestock to a few areas of the western portion of the allotments. The majority of habitat used by desert bighorn sheep in the allotments is essentially ungrazed due to its steep nature and resulting inaccessibility to livestock. Bighorn sheep may experience some benefit from water developments associated with livestock operations.

### **Migratory Birds**

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. Construction of range improvement 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**

Nesting sites for peregrine falcons or golden eagles would not be impacted by livestock within the allotment because these sites are located on ledges in cliff faces that are inaccessible to livestock. 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. 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 peregrine falcon. Managing the allotment to achieve DPC objectives and implementation of the proposed utilization level would result in maintaining or improving the ecological condition of the allotments. Disturbance to nest sites from livestock management operations is unlikely given the remote and inaccessible locations these species choose for nesting. Implementation of the proposed action is not likely to impact peregrine falcon or golden eagle habitat or nesting success.

#### **Ferruginous Hawk**

Nesting sites and habitat for ferruginous hawk prey species have the potential to be impacted by livestock grazing within the allotment. 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 allotment is sufficient to provide food and shelter requirements for populations of prey species for the



ferruginous hawk. Managing the allotment 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 this allotment so impacts to nesting are unlikely and would not lead to a trend toward listing.

### **Pinyon Jay**

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.

#### **4.5.2 Impacts of Alternative B – No Action – Continue Current Management**

The No Action Alternative (Alternative B), only applies to the Mosby-Nay Allotment. The Mosby-Nay and Mosby Allotments would not be combined. This alternative would continue the current management described in Section 2.4. The allotment would continue to be managed for allowable use of 45% within desert tortoise habitat and 50% utilization elsewhere. Pastures that have desert tortoise habitat are to be grazed from October 15 through March 15 during the tortoise inactive season. The Hungry Valley Pasture that is without desert tortoise habitat is grazed from March 15 through October 15 (Figure 1.1). There are currently five pastures in the Mosby-Nay Allotment. Livestock are herded through the pastures. Water systems are turned on or off to encourage livestock use or movement. The current pasture rotation allows rest for four of the five pastures during the growing season and tortoise active season.

Direct and indirect effects would be similar under Alternative B as they are described under Alternative A (section 4.5.1). No range improvement projects are proposed under Alternative B, therefore, no disturbance to big game, migratory birds, or sensitive species from construction would occur. Alternative B would continue to use the existing pasture system and would likely result in less even use of forage.

#### **4.5.3 Impacts of Alternative C – No Grazing**

This alternative would only effect the Mosby-Nay Allotment. 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 allotment and no disturbance from livestock operations. In addition, nesting sites for birds would not be impacted by livestock within the allotment.

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 the removal of range improvement that 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.

## 4.6 Cumulative Impacts

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

There are a wide variety of uses and activities occurring on the lands within and adjacent to the Mosby-Nay and Mosby Allotments, including livestock grazing, hiking, camping, hunting, etc. Specific actions that are occurring, or are likely to occur in the reasonably foreseeable future are:

- *Livestock grazing* – The Mosby-Nay and Mosby Allotments and the adjacent BLM-administered land are active grazing allotments. Livestock grazing has occurred in the area for 150+ years.
- *Recreation* – Recreation activities occurring throughout the area involve a broad spectrum of pursuits ranging from dispersed and casual recreation to organized, BLM-permitted group uses. Typical recreation in the area consists primarily of motorized vehicle exploring and touring (ATV and 4-wheel-drive), wildlife viewing, camping, and hunting. The Arizona Strip and the GCPNM are known for their large-scale undeveloped areas and remoteness, which provides an array of recreational opportunities for users who wish to experience primitive and undeveloped recreation, as well as those seeking more organized or packaged recreation experiences.
- *Wildland fire* – There are no records of wildland fire occurring within the Mosby Allotment. The Mosby-Nay Allotment has had periodic wildfires (see the list in section 3.2.4 under Wildfire History). The most recent wildfires occurred in 2005 and 2006.

### 4.6.1 Livestock Grazing

#### Past and Present Actions

The cumulative impact analysis area for livestock grazing is the Mosby-Nay and Mosby Allotments. Actions that contribute cumulatively to the condition of grazing allotments are livestock grazing practices in the past and present, as well as recreational activities, condition of vegetation, the presence and spread of invasive, non- native species, and wildfire.

Livestock grazing in the region has evolved and changed considerably since the 1860s, and is one factor that has created the current environment. At the turn of the 20<sup>th</sup> 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. Protective vegetative cover was reduced, and more runoff brought erosion, rills, and gullies in some areas.

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 experience with livestock impacts on public land resources, as well as the cumulative impacts that could occur on the larger ecosystem from grazing on various public and private lands in the region, management of livestock grazing is an important factor in ensuring the protection of public land resources. Past, present, and reasonably foreseeable actions within the analysis area would continue to influence range resources, watershed conditions and trends. The impact of vegetation treatments, voluntary livestock reductions during dry periods, and implementation of a grazing system have improved range conditions. The net result has been greater species diversity, improved plant vigor, and increased ground cover from grasses and forbs.

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

The effects of livestock grazing on resources in the allotments identified in this EA have been analyzed under Chapter 4.0. 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.

### **Reasonably Foreseeable Actions**

The Grand Canyon-Parashant National Monument proclamation signed on January 11, 2000, states that livestock grazing would continue on the lands administered by the monument. Livestock grazing on the GCPNM is anticipated to continue into the foreseeable future. Specifically, grazing allotments to the north and to the east of the Mosby-Nay Allotment are currently available and permitted for grazing and would likely continue to be. Grazing allotments to the south of the Mosby-Nay Allotment and the southwestern part of the Mosby-Nay Allotment are currently unavailable for grazing because of the 1998 Mojave Desert Amendment to the Arizona Strip Resource Management Plan. The amendment made those allotments unavailable to grazing in order to implement the Desert Tortoise Recovery Plan (1994) (BLM 2006). Implementation of the recovery plan is expected to continue.

Aggressive wildland fire suppression on federal lands within the allotments is anticipated to continue into the foreseeable future, especially in desert tortoise habitat.

There are no planned vegetation treatments within the Mosby-Nay or Moby Allotments. After the 2005 wildfires, there were attempts at reseeded portions of the Mosby-Nay and surrounding allotments. The results were not successful. One factor for slow reestablishment of seeded and resprouting species was four years of drought following the wildfire, see Chapter 3 Section 3.2.4 Vegetation and Invasive, Non-Native Species. 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.

#### **4.6.2 Soils**

The cumulative impact analysis area for soils is the Mosby-Nay and Mosby Allotments. Actions that contribute cumulatively to the overall condition of soils are livestock grazing, recreational activities, and wildfire.

Soils in the area formed under conditions that had no vehicles or large numbers of grazing animals to impact them. Population growth, grazing, and developments over the past 150 years have resulted in soil disturbance on hundreds of thousands of acres at and near homesteads, communities, roads, and waters across the Arizona Strip. Continued population growth and the resulting growth in vehicle and Off Highway Vehicle (OHV) use and visitation in the region would continue to add to the acreage of soil disturbance. Continued implementation of the land health evaluation process would continue to examine livestock grazing areas for impacts and would apply remedies to decrease compaction and erosion. Droughts would reduce overall vegetative cover making soils more susceptible to erosion, especially where there is surface disturbance. Wildfire would continue to make soils more susceptible to erosion. Portions of the Mosby-Nay Allotment are still recovering from wildfires that occurred in 2005 and 2006. Recovery is occurring slowly.

The effects of livestock grazing on soils in the Mosby-Nay and Mosby Allotments have been analyzed under the “Direct and Indirect Effects” section of this chapter. In addition to livestock grazing, there are a wide variety of uses and activities occurring on the lands within and adjacent to the Mosby-Nay and Mosby Allotments, as described above. However, continuing to monitor soils and to implement the ASRH should help ensure that soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and ecological site. The Mosby-Nay Allotment is meeting or making progress toward meeting the standards for rangeland health. Those areas not meeting were because of wildfires in 2005 and 2006, not because of livestock grazing. No soils issues were identified during the Mosby-Nay Allotment Evaluation (BLM 2006). The Mosby Allotment is meeting all standards for rangeland health and has not burned. No soils issues were identified on the Mosby Allotment during the evaluation (BLM 2011). The rangeland health evaluations take into account all uses of public rangelands, not just livestock grazing. Selection and implementation of any of the alternatives is not anticipated to result in cumulative impacts to soils on these allotments or to the surrounding Pakoos Basin when added to other past, present, and reasonably foreseeable actions in the area.

#### **4.6.3 Vegetation and Invasive, Non-native Species**

The cumulative impact analysis area for vegetation and invasive, non-native species is the Mosby-Nay and Mosby Allotments. Actions that contribute cumulatively to the overall condition of vegetation and the presence and spread of invasive, non-native species are livestock grazing, recreational activities, and wildfire.

Vegetation on the Arizona Strip has gone through substantial changes since the 1860s due to historic land use practices and the introduction of non-native species. Livestock grazing would continue across the area on BLM-administered lands. The ASRH analysis and permit renewal process would help ensure grazing practices are conducted in a manner to maintain or improve the ecological health of the area. Rangeland management practices would act to prevent and control the spread of invasive plant species, maintain diverse and natural plant communities,

improve wildlife habitat, reduce erosion, and improve water quality. The objectives developed to manage for healthy rangelands have a goal of keeping the entire ecosystem healthy and productive in order to ensure that it yields both usable products and intrinsic values.

### **Reasonably Foreseeable Actions**

The effects of livestock grazing on vegetation in the Mosby-Nay and Mosby Allotments have been analyzed in 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 Mosby-Nay and Mosby Allotments, as described above. Since livestock grazing occurs throughout the area, 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. These systems and the health of the region as a whole are important for the survival of many native species, including the desert tortoise. The Mosby-Nay Allotment is making progress toward meeting and the Mosby Allotment is meeting all applicable standards for rangeland health. Since none of the alternatives propose to increase the level of grazing in the Mosby-Nay and Mosby Allotments, it is anticipated that none of the alternatives would result in cumulative impacts to vegetation resources when added to other past, present, and reasonably foreseeable activities in the area. Continuing to monitor plant communities and to implement the ASRH should help ensure the long-term health of rangeland resources, including vegetation.

### **Invasive, Non-native Species**

Weed treatments are expected to continue through chemical and mechanical methods as they are detected.

#### **4.6.4 Wildlife (including Threatened, Endangered, Candidate, Big Game, Migratory Birds, and Sensitive Species)**

The cumulative impact analysis area for wildlife species is the Mosby-Nay and Mosby Allotments and adjacent lands within three miles. 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 off-highway vehicle (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 in the Mojave Desert are extremely 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.

#### **4.7 Monitoring**

**Long Term:** Long term monitoring studies are scheduled to be read by the University of Arizona at all key areas every 5 years (see Figure A2.8 for the location of key areas). 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 DCP 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.

## 5.0 Consultation and Coordination

### 5.1 Summary of Public Participation

Public involvement for the Mosby-Nay Allotment’s rangeland health evaluation consisted of a scoping meeting on February 2, 2006, followed by a field visit on February 7, 2006. The Mosby Allotment’s rangeland health evaluation began on February 26, 2008 with an initial scoping meeting, followed with a field visit to the allotment on February 3, 2009. The Pakoon Springs Allotment and Pakoon Allotment scoping meeting was held on February 26, 2008, followed by a field visit on October 21 and 22, 2008. The evaluations were conducted by an Interdisciplinary Assessment Team of BLM resource specialists, assisted by the Rangeland Resources Team appointed by the Arizona Resource Advisory Council. Comments from interested publics and stakeholders concerning the rangeland health evaluation were incorporated into this EA, see 1.5 Identification of Issues above.

A thirty-day public comment period on this environmental assessment was available from August 4, 2018 to September 6, 2018. To see public comments and responses see Appendix 8.

### 5.2 List of Preparers and Contributors

Table 5.1 identifies the individuals who took part in the preparation and review of this document, while Table 5.2 identifies individuals consulted during the development of this document.

**Table 5.1. List of BLM Preparers/Reviewers**

Name	Title	Resource
Gloria Benson	Tribal Liaison	Native American Religious Concerns
Brian Bock	Fuels / Fire Management	Fuels / Fire Management
Rody Cox	Geologist	Geology, Minerals
Jannice Cutler	Rangeland Management Specialist	Project Lead, Rangeland Health, Livestock Grazing, Vegetation, Invasive, Non-native Species
Shawna Dao	Lands and Realty	Lands and Realty
Amber Hughes	NEPA Planner	NEPA Compliance
Jace Lambeth	Rangeland Management Specialist	Special Status Plants
Brian McMullen	Soil Scientist	Soils, Water, Air
David Van Alfen	Archaeologist	Cultural Resources
Mark Wimmer	Grand Canyon-Parashant Monument Manager	Project oversight, NEPA Compliance
Braden Yardley	Outdoor Recreation Planner	Recreation, Visual Resources, Wilderness
Jeff Young	Wildlife Team Lead	Special Status Animals, Wildlife

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

Name	Agency/Organization	Consulted for the Following Resource
Collin Bowler	Grazing Permittee	Livestock Grazing
Daniel Bulletts	Kaibab Paiute Tribe	Tribal/Cultural/Environmental Concerns
Peter Bungart	Hualapai Tribe	Tribal/Cultural/Environmental Concerns



Dawn Hubbs	Hualapai Tribe	Tribal/Cultural/Environmental Concerns
Luke Thompson	Arizona Game and Fish Department	Wildlife
Brian Wooldridge	US Fish and Wildlife Service	Threatened and Endangered Wildlife

### 5.3 US Fish and Wildlife Service Consultation

Formal consultation under section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) was initiated on July 11, 2018. This consultation concerned the possible effects of renewing the grazing permit for the Mosby-Nay Allotment on the Grand Canyon-Parashant National Monument in Mohave County, Arizona on the threatened Mojave desert tortoise (*Gopherus agassizii*) and its designated critical habitat. The biological opinion states that the action, as proposed, is not likely to jeopardize the continued existence of the Mojave desert tortoise, and is not likely to destroy or adversely modify designated critical habitat for Mojave desert tortoise. See Appendix 9 US Fish and Wildlife Service Biological Opinion (02EAAZ00-2018-F-1089) signed 11/21/2018. Desert tortoise conservation measures from 2007 RMP Biological Opinion for the Arizona Strip BLM Resource Management Plan (22410-2007-F-0463) are incorporated by reference.

### 6.0 Literature Cited

- Allison, L.J. and A.M. McLuckie. 2018. Populations trends in Mojave desert tortoises (*Gopherus agassizii*). *Herpetological Conservation and Biology* 13(2):433-452.
- 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.
- Avery, H.W., and A.G. Neibergs. 1993. Interactions of range cattle and desert tortoises at Ivanpah Valley, California: 1993 observations. Page 2 in B. Bartholomew (ed), Proc. Desert Tortoise Counc. Symp. 1993 (abstract).
- Balda, R.P. and G.C. Bateman. 1971. Flocking and Annual Cycle of the Piñon Jay (*Gymnorhinus cyanocephalus*). *The Condor* 73:287-302.
- Beatley, J. C. 1974. Phenological events and their environmental triggers in Mohave Desert ecosystems. *Ecology* 55:865-863.
- Berry, K.H. 1989. The status of the desert tortoise in California in 1989. Report to the US Fish and Wildlife Service. 94 pp.

- Berry, K.H. and L.L. Nicholson. 1984. A summary of human activities and their impacts on desert tortoise populations and habitat in California. In Berry, K.H., ed. The status of the desert tortoise (*Gopherus agassizii*) in the United States. U.S. Department of the Interior, Bureau of Land Management. Riverside, California.
- Bighorn Sheep Core Team. 2011. *Arizona Strip Desert Bighorn Sheep Management Plan, as Amended*. Prepared for the Bureau of Land Management, U.S. Forest Service and Arizona Game and Fish Department, 18 pp.
- Burge, B.L. 1977. A survey of the present distribution of the desert tortoise (*Gopherus agassizii*) in Arizona. Contract No. YA-512-CT8-108. Bureau of Land Management.
- Burge, B.L., and W.G. Bradley. 1976. Population density, structure and feeding habitats of the desert tortoise, *Gopherus agassizii*, in a low desert study area in southern Nevada. Proceedings 1976 Desert Tortoise Council Symposium. Pages 51-74.
- Burkhardt, J.W., and D. Chamberlain. 1982. Range cattle food habits on the Mojave Desert. Project 617 of the Nevada Agricultural Experiment Station. 8 pp.
- Callison, Jim & D. Brotherson, Jack. (1985). The Effects of Fire on the Blackbrush [*Coleogyne ramosissima*] Community of Southwestern Utah. *Journal of Range Management*. 38. 10.2307/3899747.
- Coffeen, M.P. 1990. Letter to Sid Slone, Bureau of Land Management, Las Vegas, NV, dated 31 January 1990.
- Coombs, E.M. 1979. Food habits and livestock competition with the desert tortoise on the Beaver Dam Slope, Utah. Pages 132-147 in Proceedings of the Desert Tortoise Couc. Symp. 1979.
- Davies, Kirk W., J.D. Bates, T.J. Svejcar, and C.S. Boyd, 2010. Effects of Long-Term Livestock Grazing on Fuel Characteristics in Rangelands: An Example From the Sagebrush Steppe. *Journal of Rangeland Ecology and Management* 63(6): 662-669.
- Doswell, C. 1997. Misconceptions about what is "normal" for the atmosphere. Cooperative Institute for Mesoscale Meteorological Studies, National Severe Storms Laboratory, Norman, Oklahoma.
- Douglas, B.J. A.G. Thomas, and D.A. Derkson. 1990. Downy Brome (*Bromus tectorum*) Invasion into Southwestern Saskatchewan. *Canadian Journal of Plant Science* 70:1143-1151.
- Eakle, W.L. and T.G. Grubb. 1986. Prey Remains from Golden Eagle Nests in Central Arizona. *Western Birds* 17:87-89.
- Ernst, C.H., J.E. Lovich, and R.W. Barbour. 1994. *Turtles of the United States and Canada*. Smithsonian Institution Press, Washington D.C.

- Esque, T. 1994. Diet and diet selection of the desert tortoise (*Gopherus agassizii*) in the northeastern Mojave Desert. Masters Thesis, Colorado State University, Ft. Collins.
- Gabalton, D.J. 1979. Factors Involved in Nest Site Selection by Piñon Jays. Ph.D. Dissertation, Northern Arizona University, Flagstaff, AZ.
- Henen, B.T. 1992. Desert tortoise diet and dietary deficiencies that may limit egg production of Goffs, California. Abstracts of the 17th Annual Symposium and Meeting of the Desert Tortoise Council, Las Vegas, Nevada, March 6-9, 1992.
- Hohman, J., and R.D. Ohmart. 1980. Ecology of the desert tortoise (*Gopherus agassizii*) on the Beaver Dam Slope, Arizona. Unpubl. Rept. submitted to the Bureau of Land Management, Arizona Strip District, St. George, Utah. Cont. No. YA-510-PH7-54.
- Hunter, Richard. 1991. Bromus Invasions on the Nevada Test Site: Present Status of *B. rubens* and *B. tectorum* with Notes on their Relationship to Disturbance and Altitude. Great Basin Naturalist 51(2): 176-182.
- Jarchow, J.L., and C.J. May. 1989. Report on investigation of desert tortoise mortality on the Beaver Dam Slope, Arizona and Utah. Prepared for Arizona Game and Fish Department, Bureau of Land Management, Arizona Strip and Cedar City Districts, and Utah Division of Wildlife Resources. Neglected Fauna International, Tucson, Arizona.
- 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.
- Lei, S.A., 1999. Postfire woody vegetation recovery and soil properties in blackbrush (*Coleogyne ramosissima*) shrubland ecotones. Journal of the Arizona-Nevada Academy of Science 32, 105–115.
- Lovich, J. E. and D. Bainbridge. 1999. Anthropogenic degradation of the southern California desert ecosystem and prospects for natural recovery and restoration. Environmental Management 24:309-326.
- McClaran, M.P. and M.E. Anable. 1992. Spread of introduced Lehmann lovegrass along a grazing intensity gradient. *J. Appl. Ecol.*, 29:92-98.
- Minden, R.L. 1980. Investigations of the desert tortoise (*Gopherus agassizii*) on the Beaver Dam Slope, Washington County, Utah. Utah Division of Wildlife Resources. Public. No. 80-21.
- Nagy, K.A., and P.A. Medica. 1986. Physiological ecology of desert tortoises in southern Nevada. *Herpetologica* 42(1):73-92.
- National Drought Mitigation Center. 2015. From "*Understanding Weather Normals*" by Jack Williams, USA Today.com; NDMC "Drought Indices". Accessed at:

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

- 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.
- Reid, C.R., S. Goodrich, J. Bowns. 2008. *Cheatgrass and Red Brome: History and Biology of Two Invaders*. USDA Forest Service Proceedings RMRS--52. 27-32.
- Soil Survey Staff. 2014. *Keys to Soil Taxonomy, 12th ed.* USDA-Natural Resources Conservation Service, Washington, DC
- Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. *Web Soil Survey*. Available at: <https://websoilsurvey.sc.egov.usda.gov/> Accessed [04/15/2018]
- Sprinkle, J., M. Holder, C. Erickson, A. Medina, D. Robinett, G. Ruyle, J/ Maynard, S. Tuttle, J. Hays Jr., W. Meyer, S. Stratton, A. Rogstad, K. Eldredge, J. Harris, L. Howery, W. Sprinkle. 2007. *Dutchman Butte Revisited – Examining Paradigms for Livestock Grazing Exclusion*. Society for Range Management: Vol. 29, No. 6, pp. 21-34.
- 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.
- Turner, F.B., P.A. Medica, and C.L. Lyons. 1984. Reproduction and survival of the desert tortoise (*Scaptochelys agassizii*) in Ivanpah Valley, California. *Copeia* 1984(4):811-820.
- 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.
- University of Idaho, Rangeland Center. 2011. *Rangelands – An Introduction to Wild Open Spaces*. Prepared in collaboration with the Idaho Rangeland Resource Commission. Moscow, Idaho. pp. 12.
- U.S. Department of Agriculture, Forest Service. 2014. *Field Guide for Managing Red Brome in the Southwest*. United States Department of Agriculture, Forest Service, Southwest Region. TP-R3-16-19. Pp 12.
- U.S. Department of the Interior, Bureau of Land Management (BLM). 1991. Final Environmental Impact Statement: Vegetation treatment on BLM Lands in Thirteen Western States. Wyoming State Office.

- 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). 2005. *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). 2006. *Standards for Rangeland Health and Guidelines for Grazing Administration Implementation Project: Allotment Assessment Mosby-Nay Allotment – 4836*. Unpublished report on file at the BLM Arizona Strip Field Office, St. George, Utah.
- 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). 2011. *Land Health Evaluation for the Mosby Allotment – 4835*. Unpublished report on file at the BLM Arizona Strip Field Office, St. George, Utah.
- U.S. Department of the Interior, Bureau of Land Management (BLM). 2012. *Land Health Evaluation for the Pakoon Springs Allotment (04800) and Pakoon Allotment (04802)*. Unpublished report on file at the BLM Arizona Strip Field Office, St. George, Utah.

- U.S. Department of the Interior, Bureau of Land Management (BLM). 2017. Updated Bureau of Land Management (BLM) Sensitive Species List for Arizona.  
<https://www.blm.gov/policy/az-im-2017-009>
- 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. Department of the Interior. Fish and Wildlife Service (USFWS). 1989. Endangered and Threatened Wildlife and Plants; Desert Tortoise. Federal Register 54:42270-42278.
- U.S. Department of the Interior. Fish and Wildlife Service (USFWS). 1990. Determination of Threatened Status for the Mojave Population of the Desert Tortoise. Federal Register 55:12178-12191.
- U.S. Department of the Interior. Fish and Wildlife Service (USFWS). 1994a. Desert tortoise (Mojave population) recovery plan. Portland, Oregon. 73 pages plus appendices.
- U.S. Department of the Interior. Fish and Wildlife Service (USFWS). 1994b. Determination of Critical Habitat for the Mojave Population of the Desert Tortoise. Federal Register 59:5820-5866.
- U.S. Department of the Interior. 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. Fish and Wildlife Service (USFWS). 2011. Revised Recovery Plan for the Mojave Population of the Desert Tortoise (*Gopherus agassizii*). Region 8, Pacific Southwest Region, Sacramento, California. 227 pages.
- U.S. Department of the Interior. Fish and Wildlife Service (USFWS). 2018. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2017 Annual Reporting. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada.
- Whitson, Tom D. (editor) et al. 2001. *Weeds of the West*. Western Society of Weed Science. Pp. 628.
- Wiggins, D.A. 2005. Pinyon Jay (*Gymnorhinus cyanocephalus*): a Technical Conservation Assessment. [Online]. USDA Forest Service, Rocky Mountain Region.



## **7.0 Appendices**

Appendix 1. Elements/Resources of the Human Environment

Appendix 2. Figures

Appendix 3. Arizona Standards for Rangeland Health and Guidelines for Livestock Grazing Administration.

Appendix 4. BLM Fence, Gate, and Pipeline Specifications for the Mosby-Nay Allotment.

Appendix 5. Vegetation Monitoring and Inventory Data: Including Range Trend, Utilization, Ecological Site Inventory Data – Ecological Condition, and Desired Plant Community Objectives Determination Tables A5.1 – A5.20.

Appendix 6. Historical Precipitation Reports for the Cottonwood Wash Enclosure and Olaf Knolls Rain Gauges.

Appendix 7. Soils: Taxonomic Classification Report Table A7.1 and Hydric Soils Report Table A7.2.

Appendix 8. Public Comment and Response

Appendix 9. USFWS Biological Opinion

## Appendix 1. Elements/Resources of the Human Environment

The affected environment of the project area was considered and analyzed by an interdisciplinary team as documented in the table below. The table indicates which resources of concern are either not present in the project area or would not be impacted to a degree that requires detailed analysis. Resources, which could be impacted to a level that requires further analyses, are described in Chapter 3 and impacts on these resources are analyzed in Chapter 4.

**Table A1. Elements of the Human Environment and Other Resources/Concerns**

NP = not present in the area impacted by the proposed or alternative actions

NI = present, but not affected to a degree that detailed analysis is required

PI = present with potential for impact – analyzed in detail in the EA

Resource	Determination	Rationale for Determination
Air Quality	NI	The proposed action would not measurably impact air quality standards. Moving livestock could produce small amounts of fugitive dust in the short term, but this would cause negligible and localized impacts on air quality.
Areas of Critical Environmental Concern	NP	After review of GIS and the Grand Canyon-Parashant National Monument RMP 2008, there are no Areas of Critical Environmental Concern within the Mosby-Nay and Mosby grazing allotments.
BLM or State Sensitive Plant Species	NI	Joshua Trees occur on both of these allotments, livestock grazing on these allotments would help reduce fuel loads, which would help reduce fires occurring on the allotments. Fire is the biggest threat to the Joshua Tree, thus livestock grazing would help reduce the threat of fire to this sensitive plant species.
Cultural Resources	NI	All new ground-disturbance (fences, cattleguards, water line) were all inventoried at Class III level. Two sites identified-avoided by reroute.
Environmental Justice	NI	The alternatives would have no disproportionately high or adverse human health or other environmental effects on minority or low income segments of the population. Also, continued livestock grazing would have no effect on low income and minority populations.
Farmlands (Prime or Unique)	NP	There are no prime or unique farmlands within either the Mosby-Nay or Mosby Allotments. (USDA Natural Resources Conservation Service – Web Soil Survey accessed on 8/30/2017)
Floodplains	NP	None of the alternatives 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 these allotments.
Fuels / Fire Management	NI	Continuing properly managed livestock grazing would likely not increase the threat of wildfire to this allotment. Therefore, the alternatives would have no disproportionately high or adverse effects on fire management or fuels.
Geology / Mineral Resources / Energy Production	NI	Continuing livestock grazing would not alter geological features or affect mineral resources. Upon designation, Grand Canyon-Parashant National Monument lands were withdrawn from location, entry, and patent under the mining laws, subject to valid existing rights and from disposition under all laws relating to mineral and geothermal leasing. There are no active mining claims or other minerals related authorizations in the Monument.

Resource	Determination	Rationale for Determination
Invasive, Non-native Species	PI	<p>There are a few documented locations of weeds that have been treated. These areas would continue to be monitored and treated as needed.</p> <p>Red brome, cheatgrass, and common Mediterranean grass are present in some areas across both the Mosby-Nay and Mosby Allotments. These invasive, non-native annual grasses combined with wildfires have affected the current condition of Mosby-Nay Allotment.</p> <p>Invasive, Non-native Species will be discussed further in the Vegetation section in Chapter 3 below.</p>
Lands / Access	NI	Access to public lands would not be altered or impaired by implementation of the alternatives. No other issues have been identified in connection with the alternatives.
Livestock Grazing	PI	Permit renewal is required to allow continued livestock use on the allotment; this issue is therefore analyzed in detail later in this EA.
Native American Religious Concerns	NI	This project would not “limit access to any ceremonial use of Indian sacred sites on Federal lands by Indian religious practitioners or significantly adversely affect the physical integrity of such sacred sites” EO 13007
Paleontology	NI	There are no known significant paleontological resources on the allotments. Common invertebrate fossils may be present in Paleozoic limestone. Invertebrate and vertebrate fossils could occur in Triassic and Jurassic sediments. Continuing livestock grazing would have no effect on any potential paleontological resources.
Recreation	NI	The project area is within the Grand Canyon-Parashant Special Recreation Management Area (SRMA) and part of the Shivwits Frontier Recreation Management Zone (RMZ). Continuing livestock grazing would not impact the opportunities for visitors to recreate in the area. Recreation goals and objectives within the SRMA and RMZ would continue to be achieved in coordination with livestock grazing operations.
Socio-economic Values	NI	Issuance of a new term grazing permit would allow the permittee to continue grazing operations with some degree of predictability during the 10-year period of the term. The proposed action would have no overall effect on the economy of the county since tourism and recreational uses are contributing increasing amounts to the economy of the region and cattle ranching is no longer a significant contributor.
Soils	PI	The continuance of grazing is likely to impact soils through ground disturbance and vegetation community changes typically associated with this activity. Effects to soils from range improvements should be minor if pipeline installation is limited to existing disturbed areas and fencing improvements follows best management practices detailed in the EA.
Threatened, Endangered, or Candidate Animal Species	PI	Desert tortoise critical habitat is present within the Mosby-Nay Allotment and is impacted by livestock grazing. This issue is therefore analyzed in detail later in this EA.
Threatened, Endangered, or Candidate Plant Species	NP	No known threatened, endangered, or candidate plant species occur in the Mosby-Nay or Mosby Allotments.

Resource	Determination	Rationale for Determination
Vegetation	PI	Grazing has a direct impact on vegetation resulting from livestock eating and trampling plants within the allotment. This issue is therefore analyzed in detail later in this EA. Invasive, Non-native species will also be discussed in the Vegetation section in later in Chapter 3.
Visual Resources	NI	The project area includes VRM Class 2, 3, and 4. Livestock grazing would not create significant changes to the basic elements of form, line, color, and texture found in the predominant natural features of the landscape. Therefore, the alternatives are not expected to impact the various VRM class objectives.
Wastes (hazardous or solid)	NP	No known hazardous or solid waste issues occur in the Mosby-Nay or Mosby Allotments. No hay or solid wastes would be produced by any of the alternatives.
Water Quality (drinking/ground)	NI	Site visits to the allotments (during rangeland health evaluations and subsequent monitoring) did not indicate that current livestock use is altering water quality – no surface water within this allotment is used for domestic drinking water. Thus, no effect to water quality is expected from the alternatives. The results of water chemistry testing from Middle Spring (on the Mosby Allotment) sample collected on 8/30/2017 showed an unimpacted aquifer. There were no volatile organic compounds (VOC's) and no mercury detected. Safe levels of chlorine, calcium, sodium, nitrates and sulfates were found.
Wetlands/Riparian Zones	NI	There are several springs in the allotments that have small riparian areas. All the springs are fenced to exclude livestock. Thus, no effect to riparian habitat is expected from the alternatives.
Wild and Scenic Rivers	NP	There are no river segments within the allotment 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 Grand Canyon-Parashant National Monument RMP 2008, there is no designated wilderness within these allotments.
Wilderness Characteristics	NI	The project area contains three separate units of lands with wilderness characteristics (Billy Goat Peak West, 857 acres; Billy Goat Peak East, 2050 acres; Mud Mountain 1709 acres). There are no new developments proposed within these lands. Approximately 2 miles of fence would be removed from Billy Goat Peak West. The alternatives are not anticipated to impact lands possessing wilderness characteristics.
Wild Horses and Burros	NI	There are no wild horse or burro herd areas or herd management areas within the Mosby-Nay and Mosby Allotments. Burros are occasionally seen on the allotment. Burros may be removed from the allotment, as funding allows, since the allotment is outside of the herd management area. The herd management level for the nearby Tassi-Gold Butte Herd Management Area is set at zero on BLM administered lands (BLM 2008a).
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 allotment, but are not largely impacted by livestock grazing based on the lack of regular use. No forestry (timber) resources occur on this allotment.

## Appendix 2. Figures

Figure A2.1. Mosby-Nay Allotment (AZ04836) and Mosby Allotment (AZ04835) Fire History.

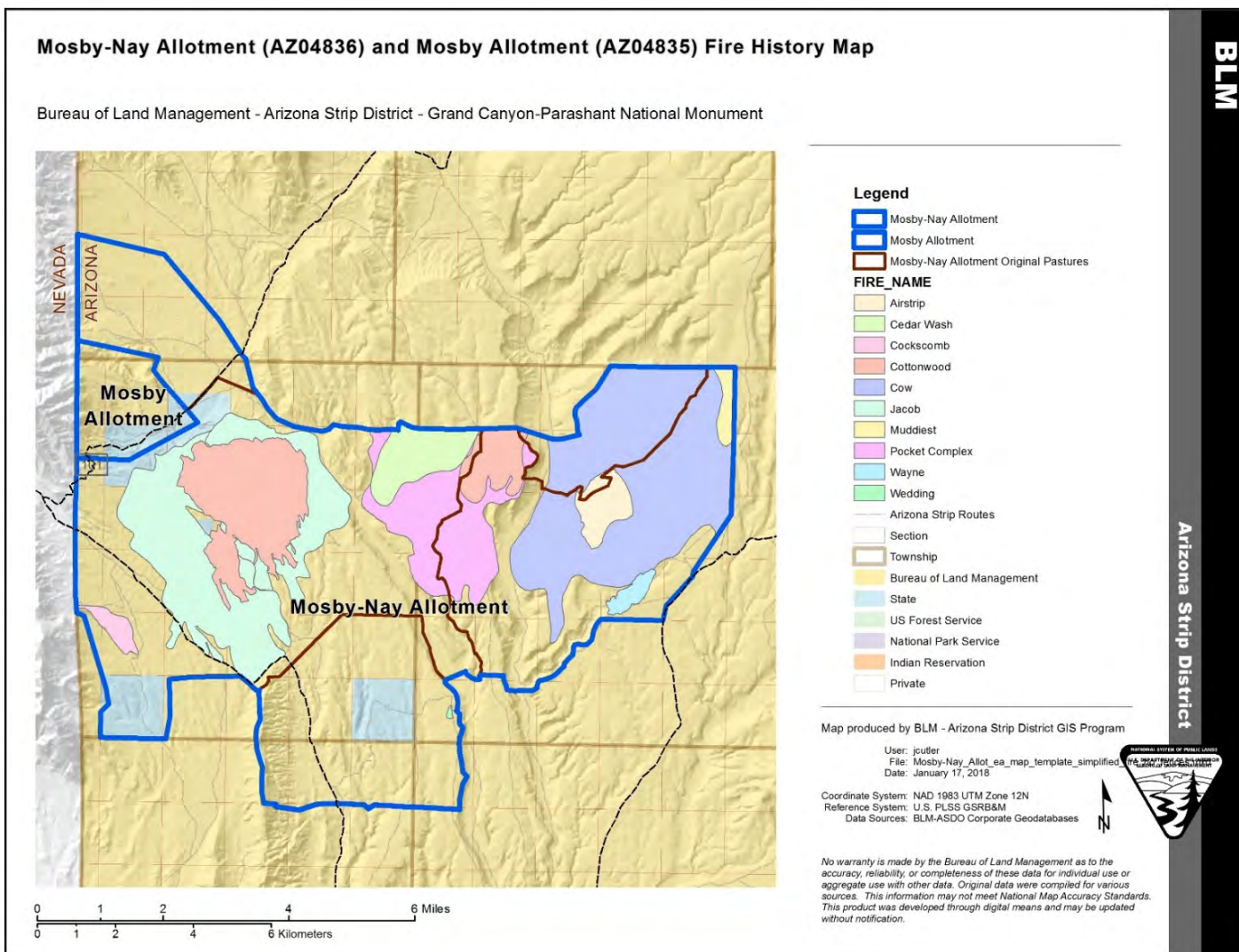




Figure A2.2. Proposed Fence Segments & Old Fire Fence Segments to be Removed to create Pasture System.

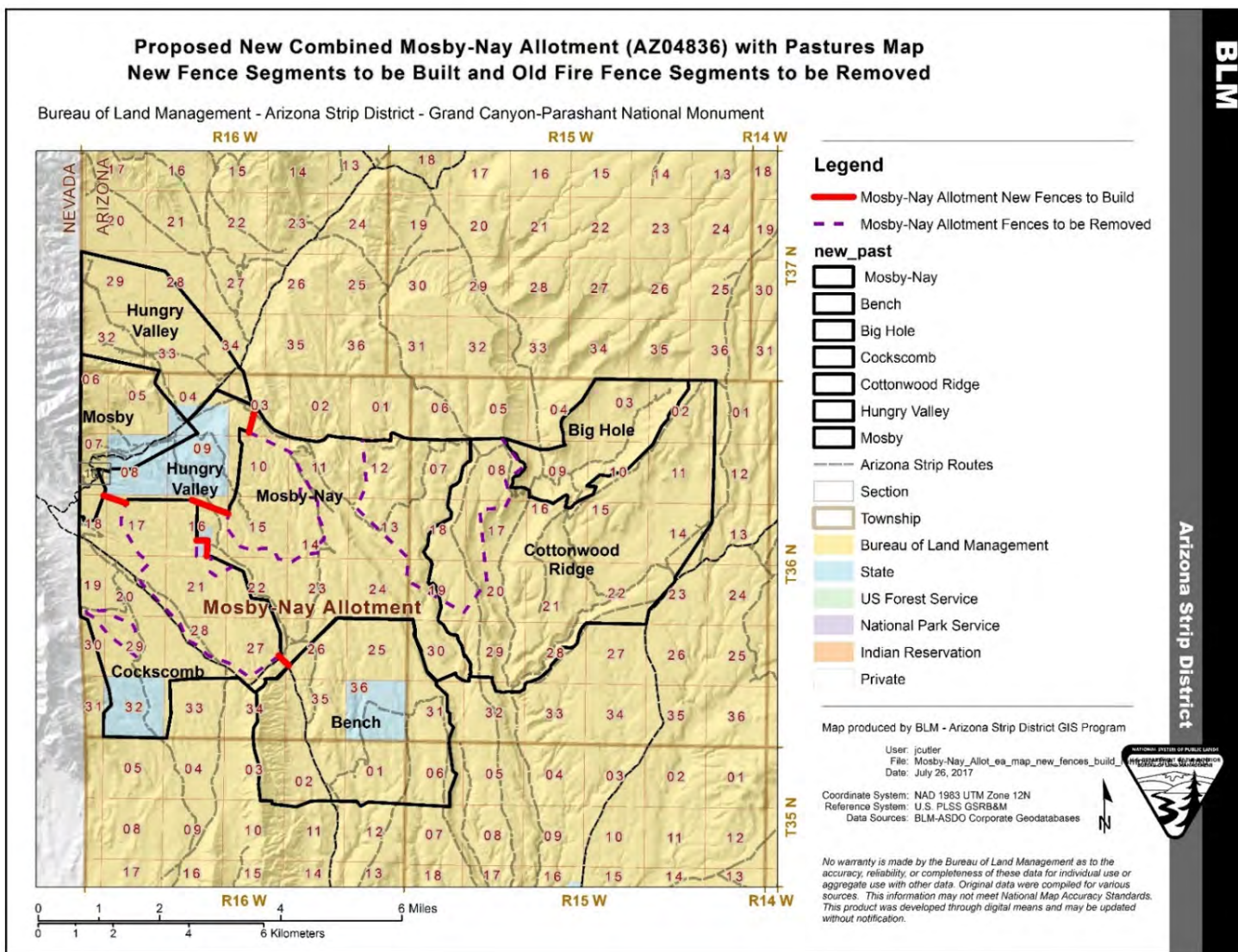




Figure A2.3. Proposed Fence Segments to Create Seven Pasture sSystem.

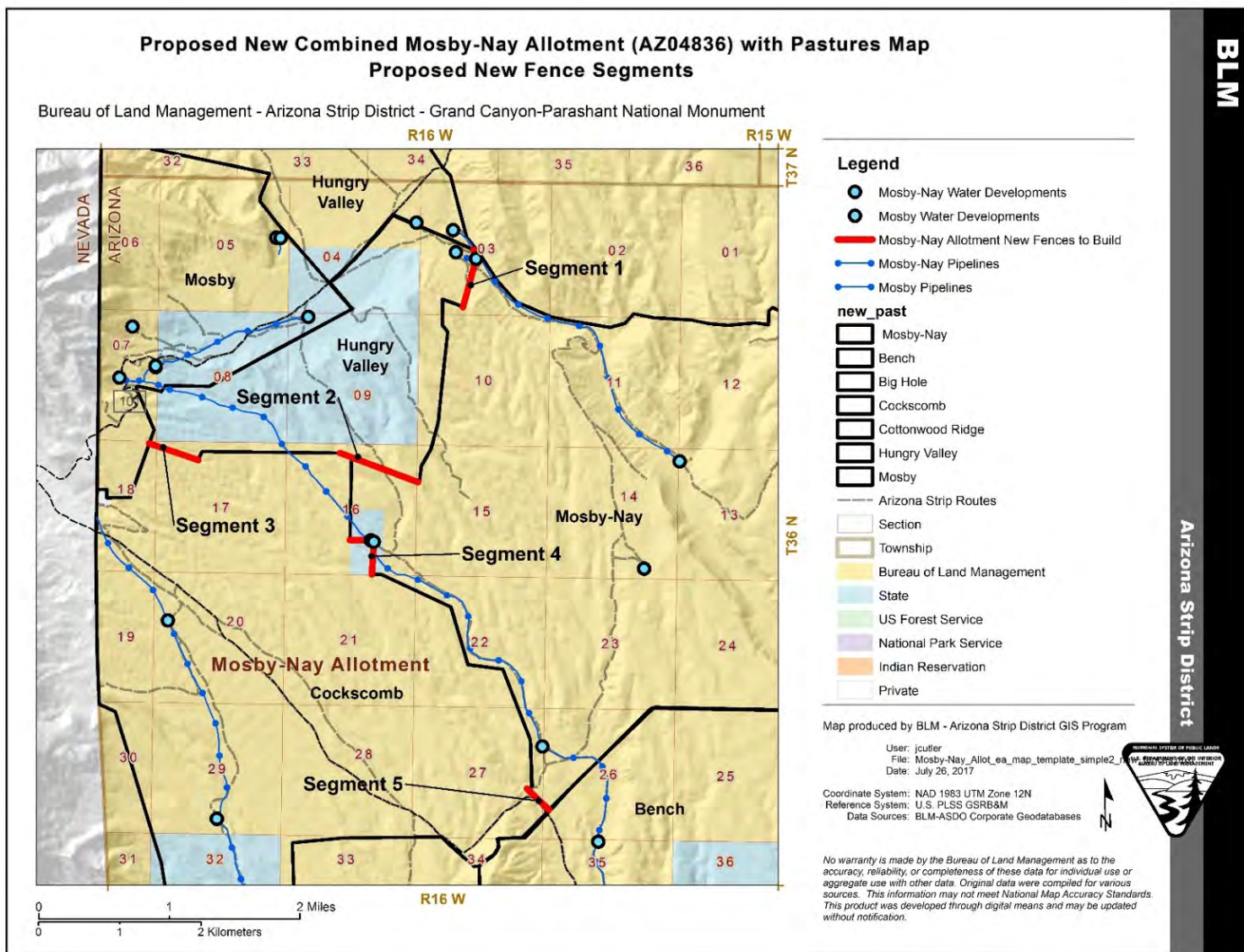


Figure A2.4. Two Proposed Cattleguards or Wire Gates in Fence Segments Two & Five.

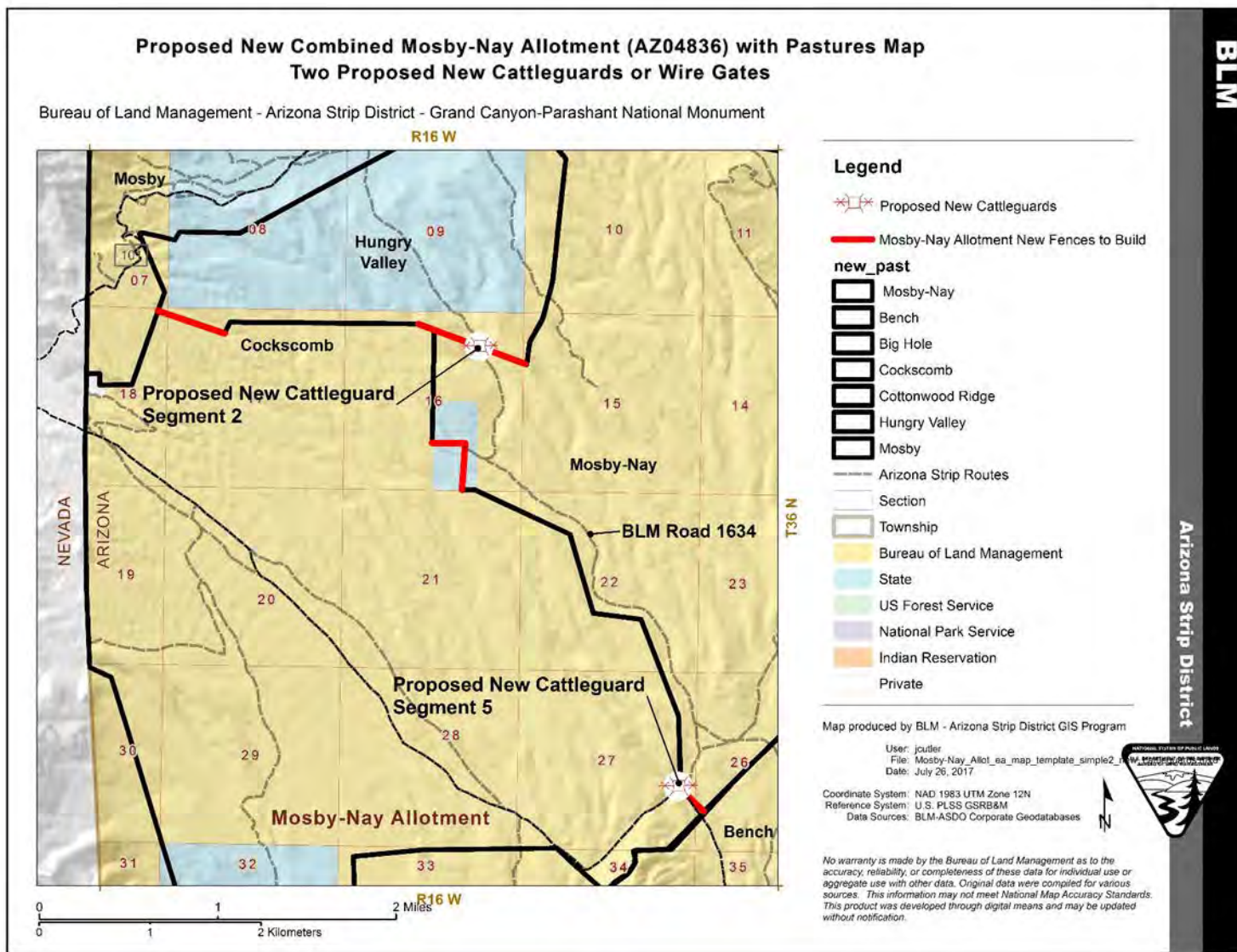




Figure A2.5. Proposed Water Pipeline.

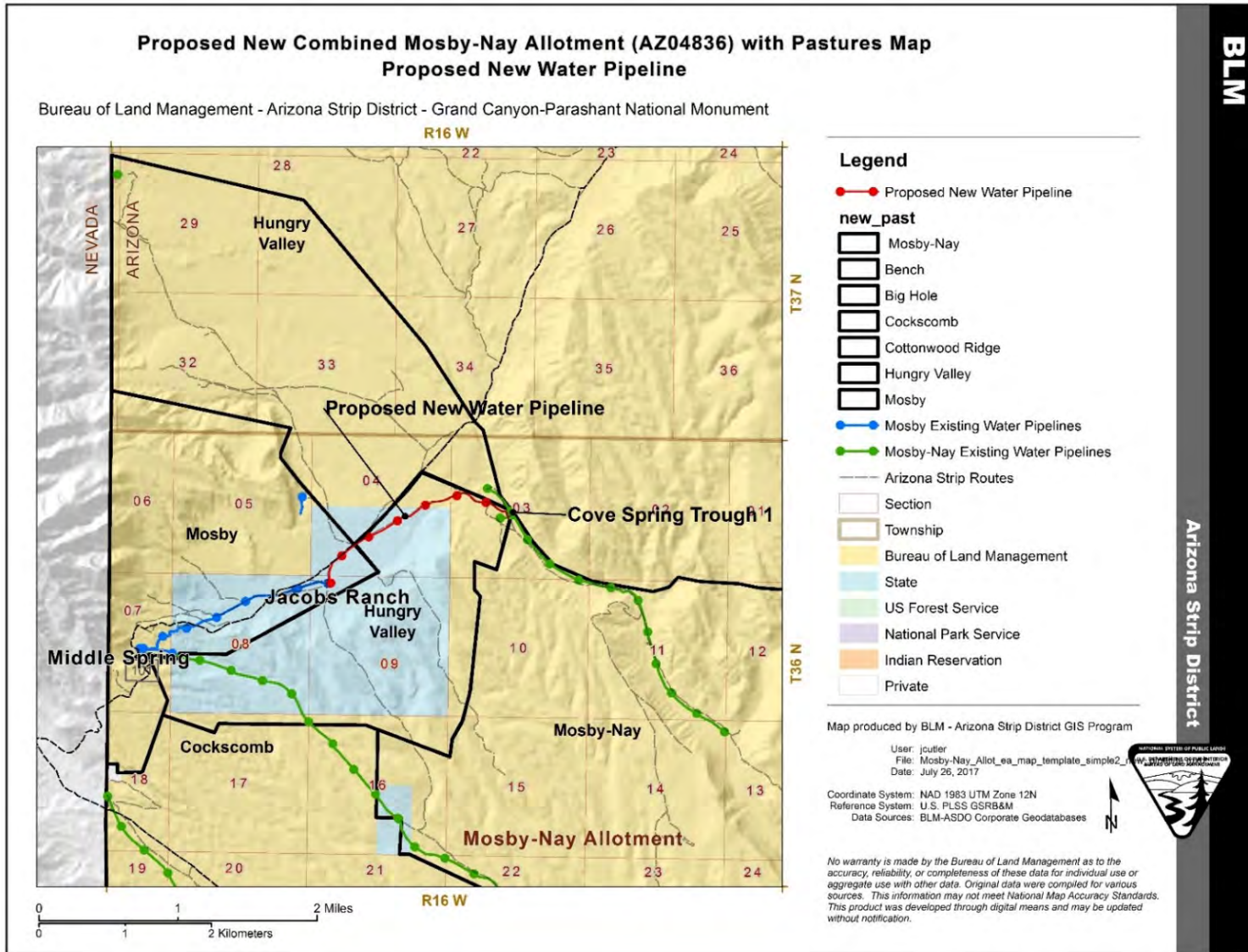


Figure A2.6. Existing Range Improvements on the Mosby-Nay and Mosby Allotments.

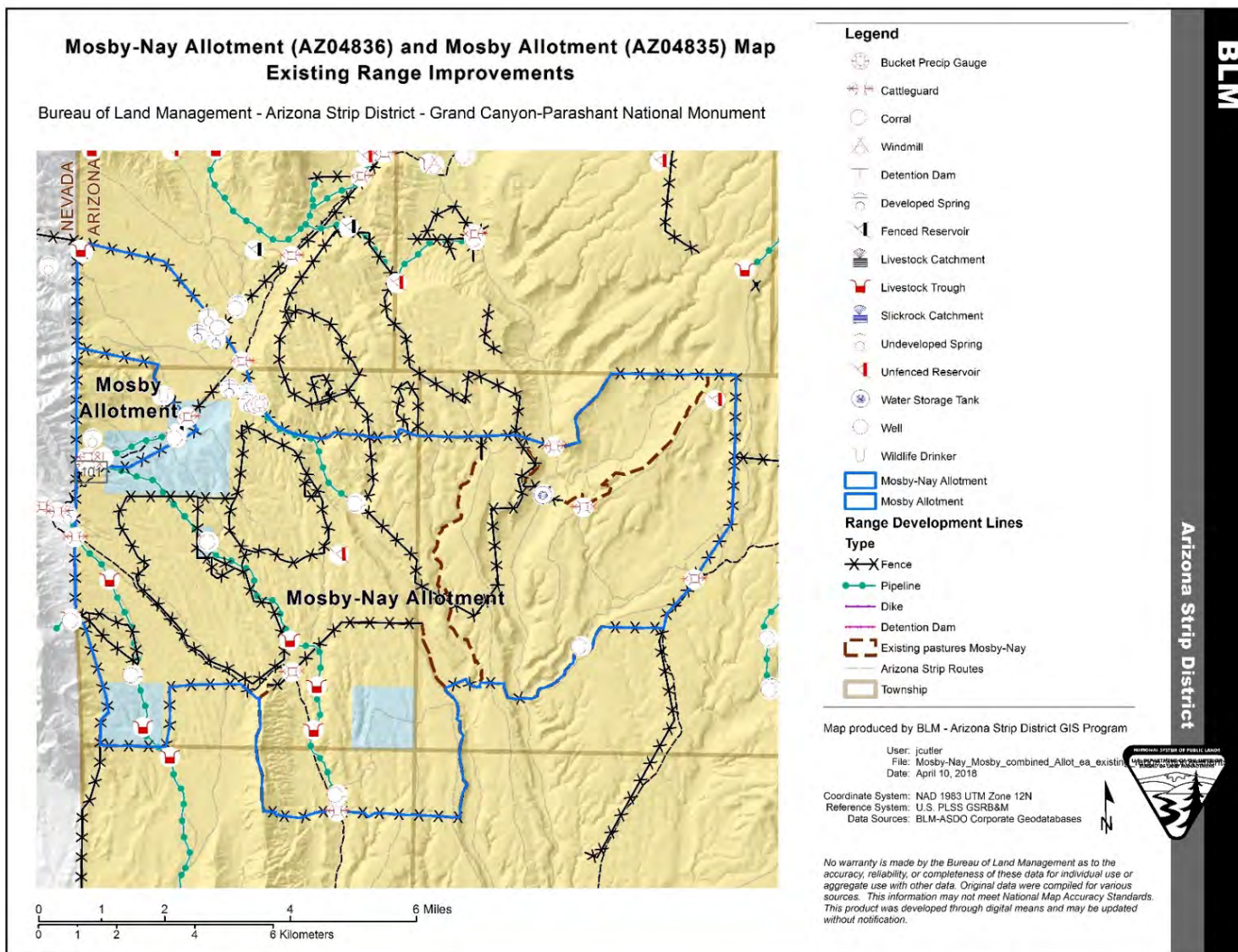




Figure A2.7. Major Vegetation Types – Shows Major Vegetation Types Prior to 2005 and 2006 Wildfires.

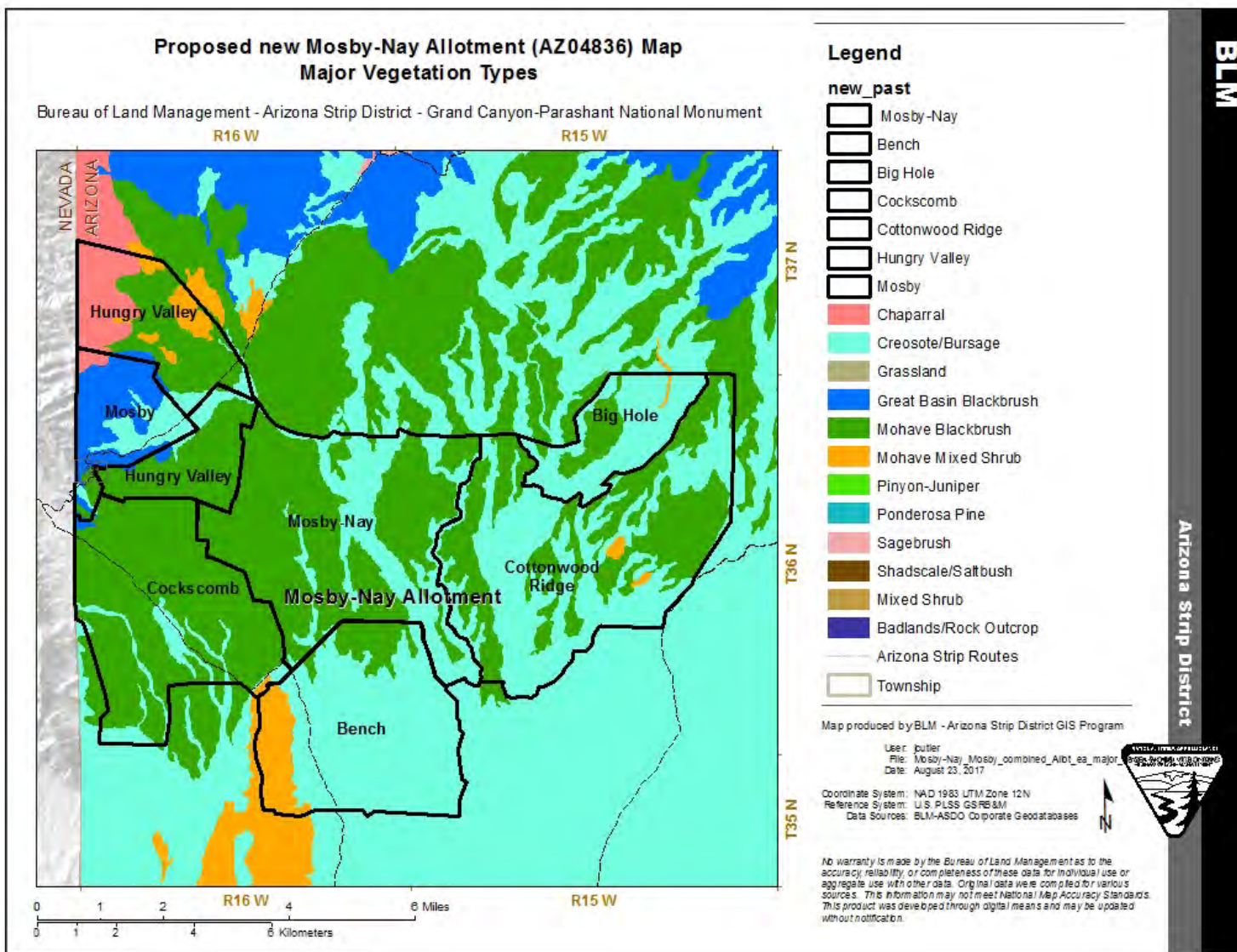
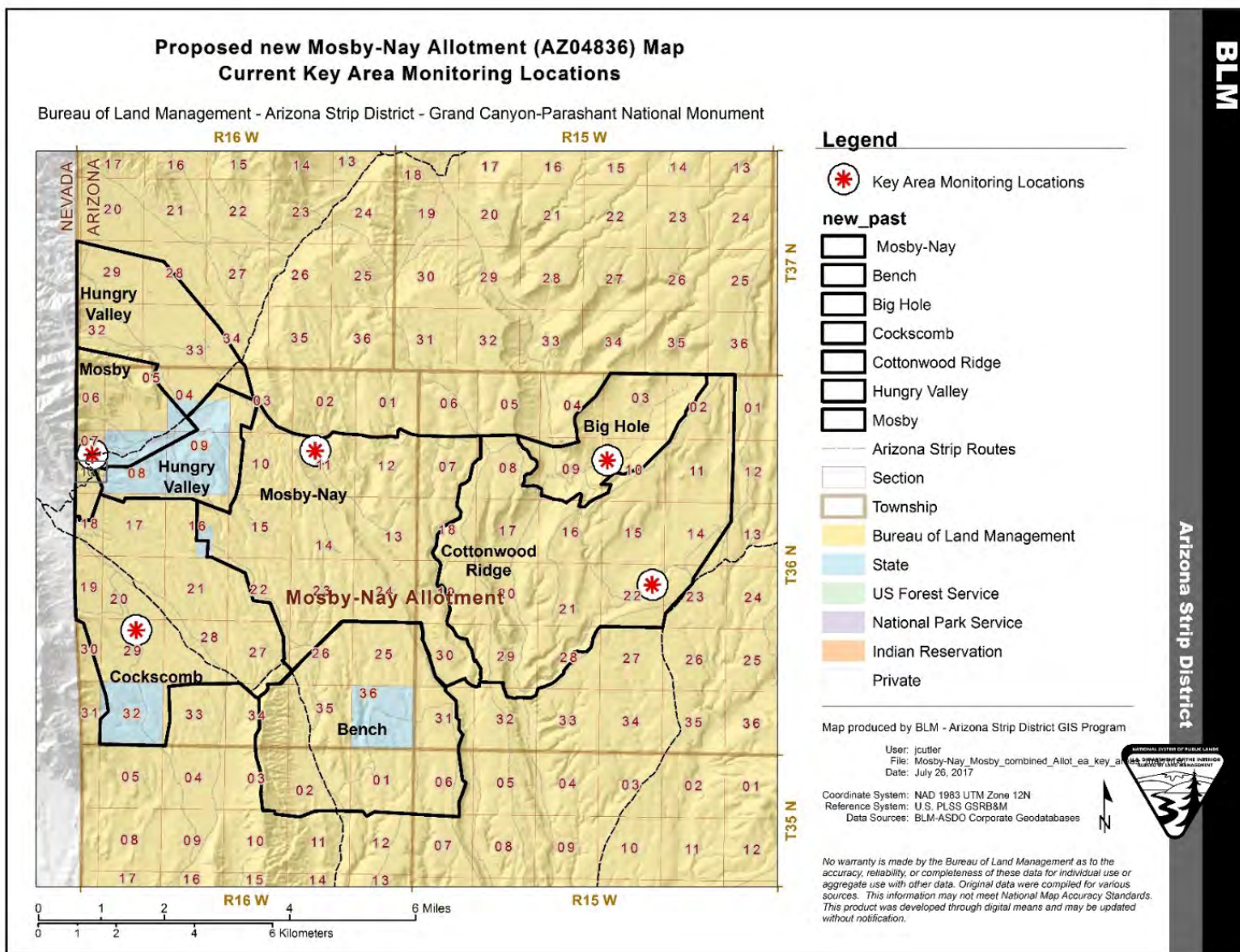


Figure A2.8. Current Key Area Monitoring Locations on Mosby-Nay and Mosby Allotments.





## Appendix 3. Arizona Standards for Rangeland Health and Guidelines for Grazing Administration

### 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 that 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

litter

live vegetation, amount and type (e.g., grass, shrubs, trees, etc.)

rock

Signs of erosion

flow pattern

gullies

rills

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 4. BLM Fence, Gate, Pipeline Specifications for Mosby-Nay Allotment**

The fence shall be constructed and maintained to the original BLM specifications listed below. The new fence segments will be built by the grazing permittee and maintained by the grazing permittee under a cooperative agreement. The BLM will supply the fence materials.

Construction of the new fences may be done over a 2 year period with work being done during the tortoise inactive season October 15 through March 15. The removal of the fences will be done by the grazing permittee, BLM fire crew, or youth crew and may take a period of years. Removal of the fencing will be done during the tortoise inactive season October 15 through March 15.

Clearing of the site or construction of new range improvements shall not begin before the Environmental Assessment and required surveys, clearances, and consultation are completed. The BLM Authorized Officer shall advise the permittee when construction can begin. When construction is completed any extra materials and trash will be removed from the allotment and disposed of properly.

**New range improvements on or crossing State lands will be subject to approval from the Arizona State Land Department. The State of Arizona requires an application from the permittee and will be coordinated with the BLM.**

Copies of the map, fence, gate, and pipeline specifications will be provided to the fence construction crew before construction starts. The location of the fences, gates, and cattleguards will be staked and or flagged on the ground prior to construction.

### **Methods for Clearing Brush and Trees Along the Fence Line During Construction and Maintenance:**

- No new access roads shall be constructed along fence lines or to the jobsite.
- No cross-country travel with motorized vehicles shall take place when the ground is muddy and visible ruts can be created 4 inches deep or greater.
- The BLM allows the use of hand clearing methods including chainsaws. It also allows the use of a brush mower as long as no ground disturbance is created.
- The fence line may be cleared of brush, trees, rocks, or debris 4 feet on each side of the fence centerline. A total maximum clearing width of 8 feet.
- **No blading, dozing, or scraping of the ground along the fence line on any Bureau of Land Management administered land is permitted.**
- When brush or trees are cleared from the fence line they shall be moved far enough away from the fence line to prevent it from blowing back onto the fence. Debris shall be lop and scattered and not left in a pile. Juniper trees cut during the clearing of the fence line may be used for fence posts on this project.
- Construction of new fences, cattleguards, and pipelines, and removal of old fences will be done between 10/15 – 3/15 during desert tortoise inactive season.

- If cultural materials are discovered during construction, the fence construction crew shall immediately stop work that might further disturb or move such materials and contact the Authorized Officer (AO) of the BLM within 48 hours of the discovery. A determination will be made by the AO as to necessary mitigation for the discovered cultural material.

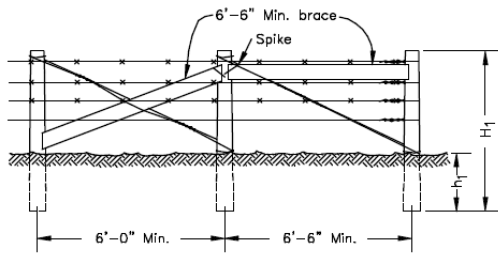
### **Fence Specifications:**

- The start and end of the fence will tie into an existing fence. See map.
- Four strand wire fence. See Barbed Wire Fence (4 – Wire) drawing. Use END PANEL-TYPE I.
- Bottom wire 16” from the ground made of smooth wire.
- The second wire from the bottom shall be barbed wire and 22” from the ground.
- The third wire from the bottom shall be barbed wire and 28” from the ground.
- The top wire is barbed wire and shall be 40” from the ground.
- The fence posts and braces shall be steel posts, steel pipe, treated wood or juniper.
- 16 foot spacing between posts with at least two wooden or metal fence stays in between posts.
- Steel posts may be used but every fifth post should be wooden. Steel drill pipe may be substituted for wooden posts, especially for braces and gate posts.
- It is recommended that fence segments that cross major washes or creek beds be tied off as separate segments to avoid damaging the entire fence if the fence blow outs due to high flows or flash floods. Construct breakaway fence sections.
- Extra fencing materials and trash shall be removed from the allotment and disposed of properly.

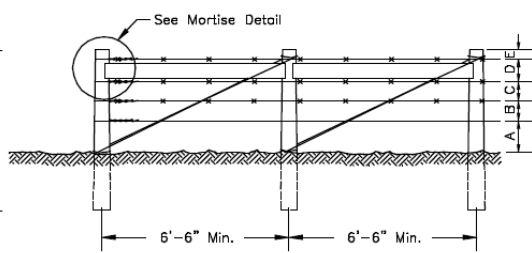
### **Fence Tie-off and Bracing Specifications:**

- Fence braces shall be constructed using the END PANEL – TYPE I style shown in the attached drawings.
- Corner bracing use 5-POST CORNER PANEL (TYPE I).
- The fence shall be braced before going down into canyons or draws. It shall also be braced at the bottom of canyons or draws, before going back up the other side. It shall be braced once the fence reaches the top of the canyon or draw.
- Wooden gate posts, or brace posts shall be a minimum of 6 inch diameter green treated or juniper posts. Wooden top rail posts shall be a minimum of 4 inch diameter.
- Steel pipe fence braces shall be a minimum of 2 7/8 or 2 3/8 inch outside diameter (od) steel pipe, in order to reduce the need for maintenance and to increase the life of the fence.
- The fence braces shall consist of 3 steel or wooden posts and 2 top rail braces.

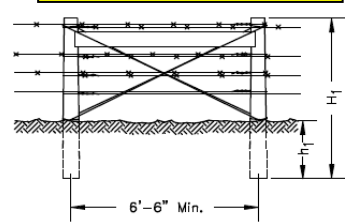
- The steel pipe fence brace posts shall be cemented in the ground at a minimum of at least 3 feet deep, and welded with a 2 7/8 or 2 3/8 inch od top rail. Any open pipe ends shall be capped.
- The height of the brace posts shall be at least 40 inches from the ground to the top of the brace.



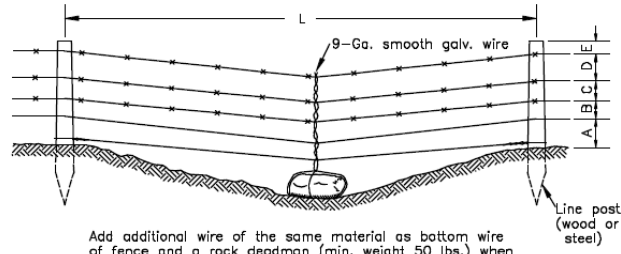
**END PANEL -  
TYPE I**  
**Use this style**



END PANEL - TYPE II

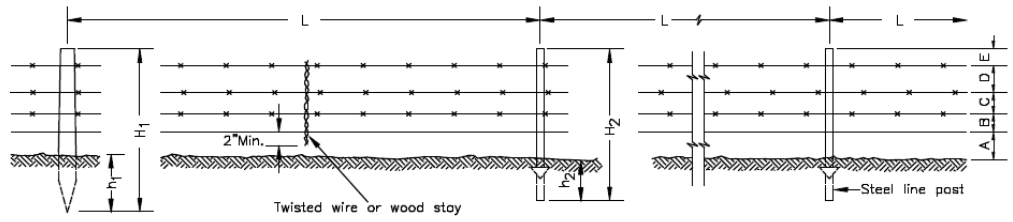


STRESS PANEL



Add additional wire of the same material as bottom wire of fence and a rock deadman (min. weight 50 lbs.) when space between bottom wire and ground exceed 20 inches.

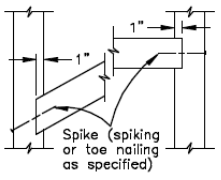
PANEL AT MINOR DEPRESSION



LINE PANELS

**NOTE:**

1. See specifications for the following:
  - a. Ratio of steel to wood line posts.
  - b. Post spacing, length and depth in ground.
  - c. Type of end panel to be used.
  - d. Type of wire to be used.
  - e. Spacing between wires.
  - f. Number of stays per span (L).

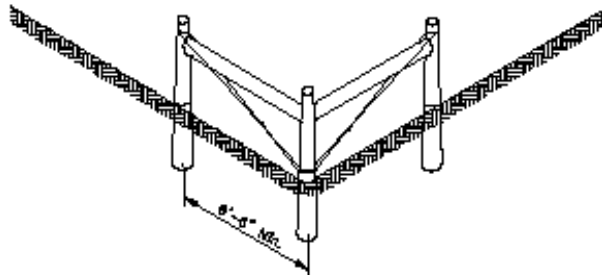


MORTISE DETAIL

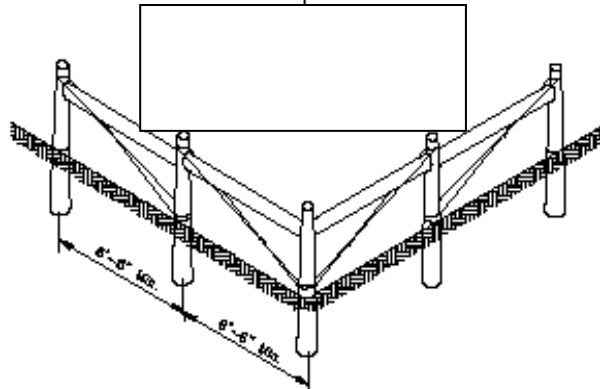
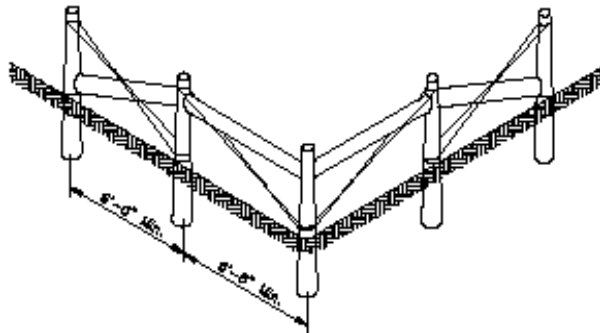
ALWAYS THINK SAFETY

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT DIVISION OF TECHNICAL SERVICES SERVICE CENTER	
TYPICAL <b>BARBED WIRE FENCE</b> (4-WIRE)	
DESIGNED	by others
REVIEWED	
APPROVED	
DRAWN	SCALE NONE
DATE FEBRUARY 25, 1991	SHEET OF
DRAWING NO. 02834-1	





3-POST  
CORNER PANEL



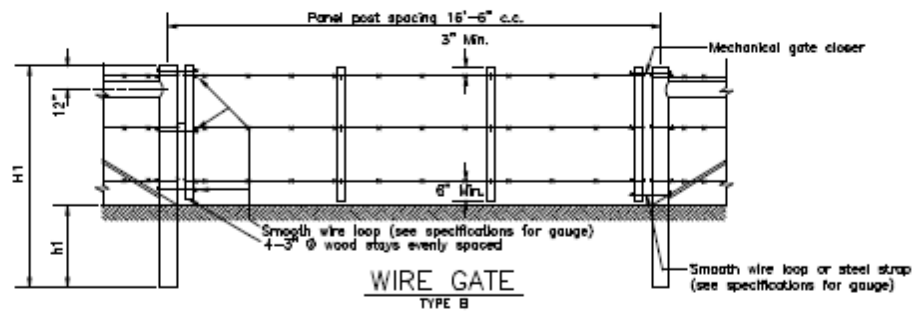
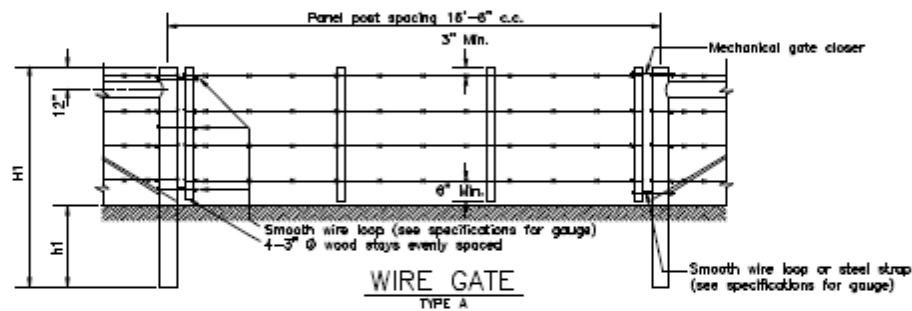
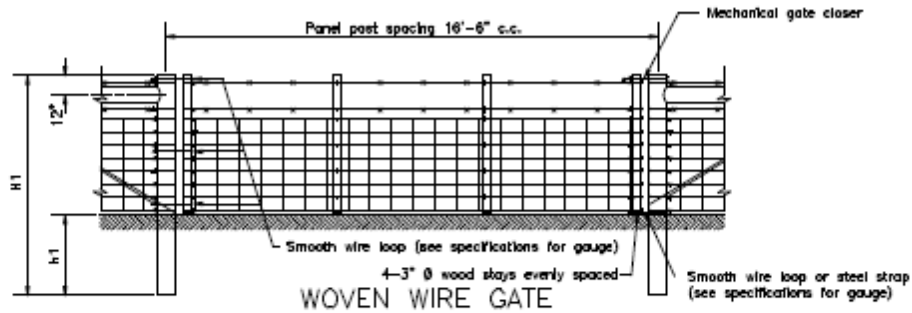
5-POST  
CORNER PANEL  
(TYPE II)

NOTES:

1. Refer to the specifications for type of corner panels to use.
2. Number of wires, type of wire, and wire spacing same as for fences. Posts shall be set 8 inches deeper than line posts.
3. Use spikes at junctures and mortise 1" deep at junctures of posts and braces.
4. Maximum spacing between posts shall be 8'-3" e.o.

ALWAYS THINK SAFETY

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT DIVISION OF TECHNICAL SERVICES SERVICE CENTER	
CORNER PANELS	
DESIGNED	by others
REVIEWED	
APPROVED	
DRAWN	SCALE NONE
DATE FEBRUARY 25, 1991	SHEET OF
DRAWING NO. 60031-B	



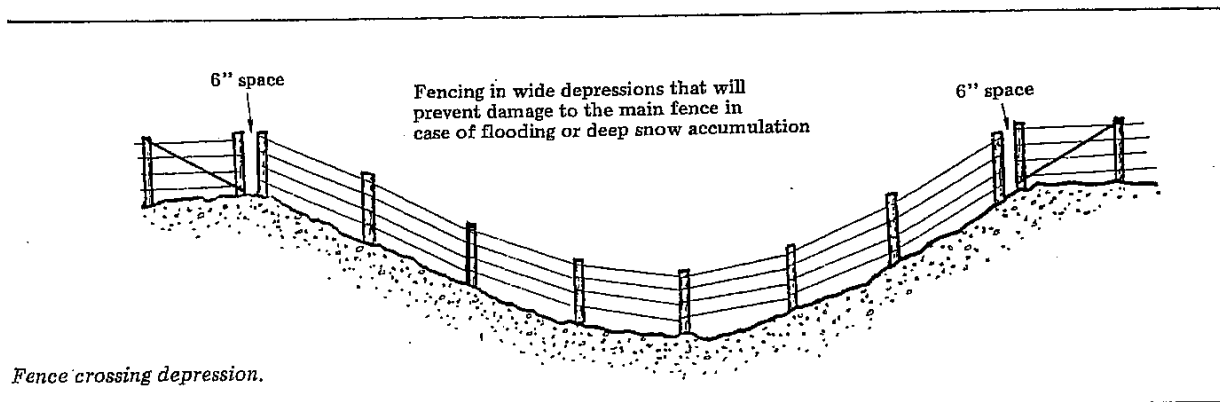
**NOTES:**

1. The opening end of gate shall be provided with smooth wire loop at bottom of end stay as is common practice for fastening wire gap gates or as modified for gates with mechanical gate closers.
2. Construct an end or stress panel on each side of type required in the specifications.

ALWAYS THINK SAFETY

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT DIVISION OF TECHNICAL SERVICES SERVICE CENTER	
TYPICAL <b>WIRE GATES</b>	
DESIGNED <u>by others</u>	
REVIEWED _____	
APPROVED _____	
DRAWN: _____	SCALE NONE
DATE: FEBRUARY 25, 1991	SHEET OF
DRAWING NO. 02834-8	

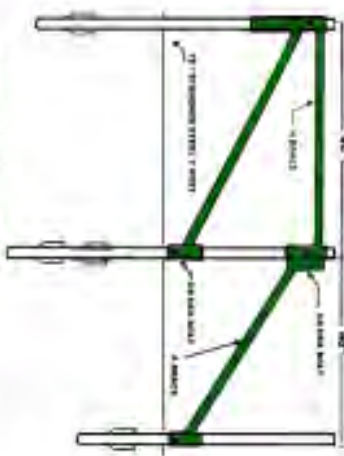
## Breakaway fence section specifications for washes:



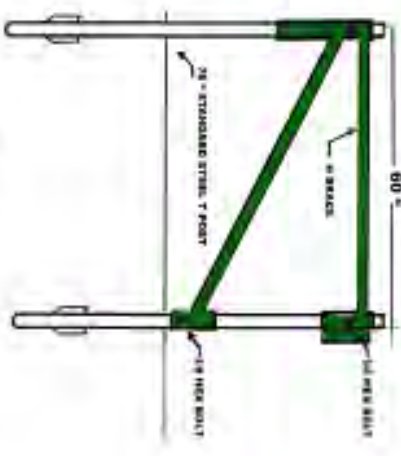
Drawing from Fences, USDI-BLM, USDA-USFS, Society for Range Management, 1999.

**Breakaway Fence.** Fence segments that cross major washes shall be tied off as separate segments to avoid damaging the entire fence if the fence blow outs due to high flows or flash floods. Tie off each side using Standard End Panel design or using Bar None pre-made metal braces. See Bar None attachment. Using both the "A" brace and a diagonal brace making up two fence sections for one end panel. See Breakaway Fence Diagram. Middle of breakaway fence you may use a large juniper post in the wash. Leave about a 6" gap between main fence and breakaway section. DO NOT TIE them together with wire. Use metal T-posts at about 16 foot spacing depending on the size of the breakaway section for the rest of the breakaway fence.

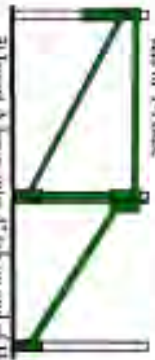
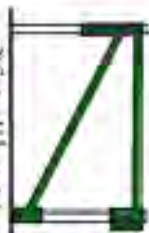
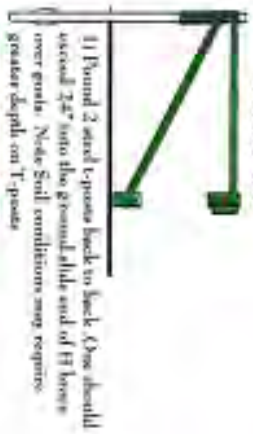
### Standard Range Fence End Panel



### Stress / Inline Panel



### Brace Installation Instructions



4) Once the brace is positioned and leveled use a 9/16" wrench to tighten the bolt snug. Excessive tightening is not needed.

### Stress Panel / Inline Panel Instructions



### Advantages

- No extra hardware needed.
- 40' lbs steel strength only tool necessary.
- Diameter if metal exceeds the competition
- In the durability and strength
- No bending or popping of the brace.
- No damage when stretching the wire.
- Paint is a dipped green enamel.
- Assembles in minutes.
- Five year warranty.

### Warranty

Braces are warranted for One full year from the date of purchase. Not valid when misused or abused. email: barnone@barnone.com Phone: 1-970-859-7374 Mobile: 1-970-4287-374



Bar None Fence is a registered trademark. ©

**Pipeline Specifications:**

Water pipeline extension from Jacob Ranch to Cove Spring Trough 1.

The water source is Middle Spring, which is already piped to the Jacob Ranch on State land. Middle Spring and Cove Spring Trough 1 are both on BLM administered lands (Figure A2.5). The new pipeline would be placed underground in the existing road that runs to Cove Spring Trough 1 corral and water facilities, giving it a more reliable source of water. The proposed pipeline would be approximately 1.6 miles of new pipeline but would be placed in or right beside an existing dirt road, BLM 1634, BLM 101, BLM 1633, BLM 1633A, (Figure A2.5). The majority of the proposed pipeline would be on State land. Proposed range improvements on or crossing State lands would be subject to approval from the Arizona State Land Department. The State of Arizona requires an application from the permittee and would coordinate with the BLM. The permittee would provide the materials and complete the installation. The pipeline would be 1¼ – 1½ inch poly pipeline that would be buried. The trench would be excavated by a backhoe, ditch witch, or similar equipment. Poly pipe would be placed in the trench and excavated material would be used to backfill. All work would done during the tortoise inactive season October 15 through March 15. Maintenance of the pipeline extension would be the responsibility of the permittee by cooperative agreement.

**Contact BLM Archaeologist before trenching to see exact route cleared for pipeline trenching.**

## Appendix 5. Vegetation Monitoring and Inventory Data

### Trend Data:

Tables showing trend data for Mosby-Nay and Mosby Allotments. Trend studies are long term monitoring. Overall trend at the 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. See Chapter 3 Section 3.2.4 Trend for more information on the methodology and interpretation of trend monitoring data for each key area.

**Table A5.1. Trend Data**

Mosby-Nay Allotment				
Mosby-Nay Key Area # 1				
Year	Percent Frequency of Key Species	Percent Live basal Vegetation	Percent Litter	Total
1982	8	1	11	20
1986	10	2	33	45
1990	10	2	29	41
1998	6	8	13	27
2001	11	10	12	33
2004	5.5	3	16	24.5
2006	10	3	39	52
2011	9	2	29	40
2016	9	6.5	14.33	29.83
<b>Overall Trend for Mosby-Nay Key Area # 1: (→) Static</b>				

Key Area # 1 was burned by a wildfire during the summer of 2005. Trend was static from 1982 and 2016. The threshold for a change in tend being +/- 10%. 2016 data showed a slight increase in percent frequency of key species, live basal vegetation, and an increase in litter. The 2016 reading was just under the 10% threshold. Almost an upward trend.



**Table A5.2. Trend Data**

<b>Mosby-Nay Allotment</b>				
<b>Mosby-Nay Key Area # 3</b>				
<b>Year</b>	<b>Percent Frequency of Key Species</b>	<b>Percent Live basal Vegetation</b>	<b>Percent Litter</b>	<b>Total</b>
1982	3	1	32	36
1986	8	3	40	51
1990	12	3	37	52
1998	12	11	30	53
2001	26	16	38	80
2004	13	5	50	68
2006	T (trace)	0	42	42
2011	13	1	47	61
2016	12.5	2	52.67	67.17
<b>Overall Trend for Mosby-Nay Key Area # 3: (↗) Upward</b>				

Key Area # 3 was burned by a wildfire during the summer of 2005. The threshold for a change in trend being +/- 10%. 2016 data showed an increase in percent frequency of key species, slight increase in live basal vegetation, and a large increase in litter. Resulting in an upward trend compared to the 1982 data.

**Table A5.3. Trend Data**

<b>Mosby-Nay Allotment</b>				
<b>Mosby-Nay (Big Hole) Key Area # 1</b>				
<b>Year</b>	<b>Percent Frequency of Key Species</b>	<b>Percent Live basal Vegetation</b>	<b>Percent Litter</b>	<b>Total</b>
1982	16	0.5	71.5	88
1985	9	0.5	44	53.5
1987	4.5	0	29	33.5
1993	16.5	1	92	109.5
1994	18	55	42	115
1996	9	10	73	92
1998	10	3	81	94
1999	57	7	82	146
2001	24.5	3	84	111.5
2003	6.5	4	52	62.5
2004	3.5	0.5	65	69
2005	5.2	1	11	17.2
2006	7	2	3	12
2007	6	0	53	59
2008	7.5	0.5	60.2	68.2
2009	8	1	42.5	51.5
2013	7.5	0	73.33	80.83
2018	10	0.3	63.5	73.8
<b>Overall Trend for Mosby-Nay (Big Hole) Key Area # 1: (∨) Downward</b>				

Big Hole Key Area # 1 was burned by a wildfire during the summer of 2005. Also burned in 1980. Trend was slightly downward from 1982 and 2018. The threshold for a change in trend being +/- 10%. The 2018 reading was just over a 10% change at 14.2% thus resulting in a slight downward trend. There was a decrease in percent frequency of key species, very slight decrease in live basal vegetation, and a decrease in litter.

**Table A5.4. Trend Data**

<b>Mosby-Nay Allotment</b>				
<b>Mosby-Nay (Waynes Well) Key Area # 2</b>				
<b>Year</b>	<b>Percent Frequency of Key Species</b>	<b>Percent Live basal Vegetation</b>	<b>Percent Litter</b>	<b>Total</b>
1982	24.5	0.5	18.5	43.5
1985	24.5	3	16.5	44
1989	21	2	36	59
1998	32	10.5	29.5	72
2000	28.5	13	32	73.5
2003	30.5	7	48	85.5
2004	20.5	5	69	94.5
2005	0	0	0	0
2007	4.5	2	10	16.5
2008	5	0	48.5	53.5
2009	2.5	1	59	62.5
2013	5	0.7	56.67	62.37
2018	7	4.67	18.17	29.84
<b>Overall Trend for Mosby-Nay (Waynes Well) Key Area # 2: (∨) Downward</b>				

Waynes Well Key Area #2 was burned by a wildfire during the summer of 2005. Trend was slightly downward from 1982 and 2018. The threshold for a change in trend being +/- 10%. The 2018 reading was just over a 10% change at 13.7% thus resulting in a slight downward trend. There was a decrease in percent frequency of key species, an increase in live basal vegetation, and a very slight decrease in litter.

**Table A5.5. Trend Data**

Mosby Allotment				
Mosby Key Area # 5				
Year	Percent Frequency of Key Species	Percent Live basal Vegetation	Percent Litter	Total
1984	24.5	2.5	24	51
1988	13	4	17	34
1991	45	25	14	84
2001	48.5	25.5	21	95
2008	43	2.5	44	89.5
2013	73.5	1	44	118.5
2018	73	2.83	37.67	113.5
<b>Overall Trend for Mosby Key Area # 5: (↗) up</b>				

The upward trend at Mosby # 5 is largely due to the increase in blackbrush (*Coleogyne ramosissima*) in 1984 it was 22.5% in 2018 it had increased 69%. Blackbrush is the dominate species over much of the Mosby Allotment. Another sign that this area has not burned in recent times. Stansbury cliffrose (*Purshia stansburiana*) was 1% in 1984 and increased slightly to 1.5 %. Mormon tea (*Ephedra nevedansis*) was 0.5% in 1984 and increased to 2.5% by 2018.

**Utilization:**

Tables showing percent utilization of key forage species by year read. Readings are percent utilization of the current year's growth. The tables below show the utilization levels recorded on an individual perennial key forage plant species for the years the studies were completed. The column Average Utilization by Species shows the long term average use of the species. Blank cells indicate no plants of that species were encountered in the transect. See Chapter 3 Section 3.2.4 Utilization for more information on the methodology and interpretation of utilization monitoring data for each key area.

**Table A5.6. Utilization Summary**

Mosby-Nay Allotment																		
Species	Mosby-Nay Key Area # 1 - Utilization																	
	Year Data Collected																	
	84	85	86	88	88	89	90	91	96	99	00	06	07	08	09	10	16	Average Utilization by Species
<b>Shrubs</b>																		
<i>Encelia frutescens</i>											20	30			23			24%
<i>Ephedra nevadensis</i> *	32	32	26	45	44	25	40	18	15	8	28	24	26	29	44	48	19	30%
<i>Krameria grayi</i> *														10		21	13	15%
<i>Krameria erecta</i> *														10	23			17%
<i>Krascheninnikovia lanata</i> *											10							10%
<b>Grasses</b>																		
<i>Achnatherum hymenoides</i> *																4		4%
<i>Aristida longiseta</i>				32	30			9	2	4	11							15%
<i>Tridens pulchellus</i>			45	59	48			8		2	3							28%
<b>Forbs</b>																		
<i>Sphaeralcea ambigua</i>				44	36		28	21	12	11								25%

In 1989 there were comments about drought with the only use on *Ephedra nevadensis*. In 1990 there were also comments about drought conditions. This key area was burned in 2005. \* Key forage species for monitoring.



**Table A5.7. Utilization Summary**

Mosby-Nay Allotment											
Species	Mosby-Nay Key Area # 3 - Utilization										
	Year Data Collected										
	1986	1987	1988	1989	1990	2007	2008	2009	2010	2016	Average Utilization by Species
<b>Shrubs</b>											
<i>Encelia frutescens</i>									5	20	13%
<i>Ephedra nevadensis*</i>	49	43	39	16	37	31	50	32	27	12	34%
<i>Krameria parvifolia*</i>						5	17	5	11	3	8%
<b>Grasses</b>											
<i>Aristida longiseta</i>	47	30	73		26						44%
<i>Tridens pulchellus</i>	46	29	57		25						39%

This key area was burned in 2005. \* Key forage species for monitoring.

**Table A5.8. Utilization Summary**

Mosby-Nay Allotment											
Species	Mosby-Nay (Big Hole) Key Area # 1 - Utilization										
	Year Data Collected										
	1982	1983	1984	1985	1987	1988	1989	1989	1993	2016	Average Utilization by Species
<b>Shrubs</b>											
<i>Ephedra nevadensis*</i>	39	41	41	63	22	53	59	42		No Use	40%
<b>Grasses</b>											
<i>Aristida longiseta*</i>			55		61	71	58	67		No Use	52%

<i>Pleuraphis rigida</i> *	10	23	45	53	30		56	58		No Use	34%
<i>Sporobolus cryptandrus</i> *	43	26	25	55	63	70	66	76	3	No Use	43%

This key area was burned in 2005. This key area was visited but there was no recorded use by livestock in 2016. \* Key forage species for monitoring.

**Table A5.9. Utilization Summary**

Mosby-Nay Allotment											
Species	Mosby-Nay (Waynes Well) Key Area # 2 - Utilization										
	Year Data Collected										
	1982	1983	1984	1985	1987	1988	1989	1989	1993	2016	Average Utilization by Species
<b>Shrubs</b>											
<i>Ephedra nevadensis</i> *	55	46	37	50	36	47	46	58			47%
<b>Grasses</b>											
<i>Achnatherum hymenoides</i> *		10	14	70	45		32	55			38%
<i>Pleuraphis rigida</i> *	50	54	44	62	37	56	53	60	2	10	43%
<i>Muhlenbergia porter</i> *						40	50	43			44%
<i>Sporobolus cryptandrus</i> *	35										35%

This key area was burned in 2005. \* Key forage species for monitoring.

**Table A5.10. Utilization Summary**

Mosby Allotment										
Species	Mosby Key Area # 5 - Utilization									
	Year Data Collected									
	1983	1983	1985	1987	1988	1989	1990	1991	2015	Average Utilization by Species
<b>Shrubs</b>										
<i>Coleogyne ramosissima</i> *					12	No Use	18	No Use	5	7%
<i>Ephedra nevadensis</i> *	21	25	10	6	17	No Use	14	No Use	7	11%
<i>Purshia stansburiana</i> *	15	23	10	10	10	No Use		No Use	4	9%
<b>Grasses</b>										
<i>Elymus elymoides</i>	26				9	No Use	13	No Use		10%

This key area has not burned in recent years. This key area was visited but there was no recorded use by livestock in 1989 and 1991. \* Key forage species for monitoring.

**Ecological Site Inventory Data – Ecological Condition:**

See Chapter 3 Section 3.2.4 Land Health Evaluations for more information on the methodology and interpretation of ecological condition data for each key area.

**Table A5.11. Mosby-Nay Allotment Ecological Site Inventory Data – Ecological Condition**

Mosby-Nay Allotment			
Mosby-Nay Key Area # 1			
Limy Upland 9 – 12 inch precipitation zone (p.z.) 030XB240AZ			
Most recent monitoring data collected in 2016.			
Plant Species	Current Composition	Site Guide Composition	Current Score <sup>1</sup>
<b>Shrubs</b>		<b>50 – 60%</b>	
<i>Acacia greggii</i>	1%	0	0
<i>Acamptopappus spherocephalus</i>	2%	5 – 10%	2
<i>Coleogyne ramosissima</i>	4%	0 – 10%	4

<sup>1</sup> “Current score” = lower of either Column 2 (current composition) or Column 3 (site guide composition)

<i>Ephedra nevadensis</i>	12%	1 – 5%	5
<i>Ericameria laricifolia</i>	4%	0	0
<i>Eriogonum fasciculatum</i>	<1%	0 – 5%	<1
<i>Gutierrezia microcephala</i>	17%	0	0
<i>Gutierrezia sarothrae</i>	0	1 – 3%	0
<i>Hymenoclea salsola</i>	8%	0	0
<i>Larrea tridentate</i>	2%	10 – 15%	2
<i>Lycium andersonii</i>	1%	1 - 5%	1
<i>Opuntia acanthocarpa</i>	<1%	0	0
<i>Thamnosma montana</i>	7%	0	0
<i>Tiquilia canescens</i>	39%	0	0
<i>Yucca baccata</i>	1%	0 – 3%	1
<i>Yucca brevifolia</i>	1%	0	0
<b>Grasses</b>		<b>30 – 40%</b>	
Perennial Grasses	0	1 – 5 %	0
<b>Forbs</b>		<b>5 – 10%</b>	
<i>Baileya multiradiata</i>	1%	0	0
<i>Eriogonum inflatum</i>	<1%	1 – 2%	<1
<i>Sphaeralcea sp.</i>	<1%	0	0
<b>Ecological Condition: Total of Current Score = 15 Early Seral</b>			

Key Area # 1 was burned by a wildfire during the summer of 2005.

**Table A5.12. Mosby-Nay Allotment Ecological Site Inventory Data – Ecological Condition**

<b>Mosby-Nay Allotment</b>			
<b>Mosby-Nay Key Area # 3</b>			
<b>Limy Upland 6 – 9 inch p.z. 030XB214AZ</b>			
<b>Most recent monitoring data collected in 2016.</b>			
<b>Plant Species</b>	<b>Current Composition</b>	<b>Site Guide Composition</b>	<b>Current Score<sup>2</sup></b>
<b>Shrubs</b>		<b>53 – 100%</b>	

<sup>2</sup> “Current score” = lower of either Column 2 (current composition) or Column 3 (site guide composition)

<i>Encelia frutescens</i>	4%	1 – 6%	4
<i>Ephedra nevadensis</i>	1%	1 – 6%	1
<i>Krameria parvifolia</i>	11%	1 – 6%	6
<i>Larrea tridentata</i>	2%	19 – 32%	2
<i>Lycium andersonii</i>	1%	1 – 4%	1
<i>Psilostrophe cooperi</i>	7%	1 – 6%	6
<i>Tiquilia canescens</i>	5%	0	0
<b>Grasses</b>		<b>1 – 7%</b>	
<i>Aristida longiseta</i>	3%	0 – 1%	1
<i>Tridens muticus</i>	<1%	0 – 1%	<1
Other Perennial Grasses		0 – 1%	
<i>Sporobolus cryptandrus</i>	<1%	0 – 1%	<1
<i>Tridens pulchellus</i>	39%	0 – 1%	1
<b>Forbs</b>		<b>2 – 7%</b>	
<i>Baileya multiradiata</i>	20%	0 – 3%	3
<i>Eriogonum inflatum</i>	1%	0 – 3%	1
<i>Sphaeralcea sp.</i>	3%	1 – 4%	3
<b>Ecological Condition: Total of Current Score = 29 Mid Seral</b>			

Key Area # 3 was burned by a wildfire during the summer of 2005.

**Table A5.13. Mosby-Nay Allotment Ecological Site Inventory Data – Ecological Condition**

<b>Mosby-Nay Allotment</b>			
<b>Mosby-Nay (Big Hole) Key Area # 1</b>			
<b>Limy Upland (Deep), (6 to 9 inch p.z.) 030XB215AZ</b>			
<b>Most recent monitoring data collected in 2018.</b>			
<b>Plant Species</b>	<b>Current Composition</b>	<b>Site Guide Composition</b>	<b>Current Score<sup>3</sup></b>
<b>Shrubs</b>		<b>80 – 90%</b>	
<i>Cylindropuntia acanthocarpa</i>	1%	0	0

<sup>3</sup> “Current score” = lower of either Column 2 (current composition) or Column 3 (site guide composition)

<i>Gutierrezia sarothrae</i>	10%	0	0
<i>Prunus fasciculata</i>	4%	0	0
<b>Grasses</b>		<b>5 – 15%</b>	
<i>Aristida longiseta</i>	39%	0 – 2%	2
<i>Hilaria rigida</i>	0	1 – 5%	0
<i>Sporobolus contractus</i>	8%	0	0
<i>Sporobolus cryptandrus</i>	20%	0	0
<i>Sporobolus flexuosus</i>	10%	0	0
<i>Tridens pulchellus</i>	4%	0	0
<b>Forbs</b>		<b>5 – 10%</b>	
<i>Baileya multiradiata</i>	4%	0	0
<b>Ecological Condition: Total of Current Score = 2 Early Seral</b>			

Big Hole Key Area # 1 was burned by a wildfire during the summer of 2005. Also burned in 1980.

**Table A5.14. Mosby-Nay Allotment Ecological Site Inventory Data – Ecological Condition**

<b>Mosby-Nay Allotment</b>			
<b>Mosby-Nay (Waynes Well) Key Area # 2*</b>			
<b>Limy Upland (Deep), (6 to 9 inch p.z.) 030XB215AZ</b>			
<b>Most recent monitoring data collected in 2018.</b>			
<b>Plant Species</b>	<b>Current Composition</b>	<b>Site Guide Composition</b>	<b>Current Score<sup>4</sup></b>
<b>Shrubs</b>		<b>80 – 90%</b>	
<i>Encelia frutescens</i>	2%	0	0
<i>Ephedra nevadensis</i>	9%	1 – 3%	3
<i>Larrea tridentata</i>	5%	25 – 35%	5
<i>Psilostrophe cooperi</i>	2%	0	0
<i>Salvia dorrii</i>	4%	0	0
<i>Thamnosma montana</i>	2%	0	0
<i>Yucca brevifolia</i>	0	0 – 1%	0

<sup>4</sup> “Current score” = lower of either Column 2 (current composition) or Column 3 (site guide composition)



<b>Grasses</b>		<b>5 – 15%</b>	
<i>Aristida longiseta</i>	12%	0 – 2%	2
<i>Hilaria rigida</i>	19%	1 – 5%	5
<i>Oryzopsis hymenoides</i>	0	1 – 5%	0
<b>Forbs</b>		<b>5 – 10%</b>	
<i>Baileya multiradiata</i>	10%	0	0
<b>Ecological Condition: Total of Current Score = 15 Early Seral</b>			

Waynes Well Key Area # 2 was burned by a wildfire during the summer of 2005. Also burned in 1980.

**Table A5.15. Mosby Allotment Ecological Site Inventory Data – Ecological Condition**

<b>Mosby Allotment</b>			
<b>Mosby Key Area # 5</b>			
<b>Ecological site: Shallow Upland 10 to 12 inch p.z. 030XB253AZ</b>			
<b>Most recent monitoring data collected in 2018.</b>			
<b>Plant Species</b>	<b>Current Composition</b>	<b>Site Guide Composition</b>	<b>Current Score<sup>5</sup></b>
<b>Shrubs</b>		<b>90 – 95%</b>	
<i>Acacia greggii</i>	4%	0	0
<i>Acamptopappus sphaerocephalus</i>	0	0	0
<i>Chrysothamnus nauseosus</i>	18%	0	0
<i>Coleogyne ramosissima</i>	65%	50 – 70%	65
<i>Cowania mexicana</i>	2%	0	0
<i>Echinocereus</i>	1%	0	0
<i>Encelia frutescens</i>	2%	0	0
<i>Ephedra nevadensis</i>	2%	10 – 15%	2
<i>Gutierrezia sarothrae</i>	2%	0	0
<i>Opuntia</i> group	2%	2 – 6%	2
<i>Prunus fasciculata</i>	0	0	0
<i>Thamnosma montana</i>	2%	0	0
<i>Yucca baccata</i>	1%	5 – 10%	1

<sup>5</sup> “Current score” = lower of either Column 2 (current composition) or Column 3 (site guide composition)

<b>Grasses</b>		<b>1 – 5%</b>	
Perennial Grasses	0	0	0
<b>Forbs</b>		<b>1 – 5%</b>	
Perennial Forbs	1%	0	0
<b>Ecological Condition: Total of Current Score = 70 Late Seral</b>			

Mosby Key Area # 5 has not burned in recent history.

**Desired Plant Community Objectives Determination:**

Desired Plant Community (DPC) Objectives for each key area are listed in the tables below. These tables compare the most recent plant composition data from the trend plots to the desired plant community objectives that were established for each key area. The objectives were developed during the allotment evaluation for each allotment. Mosby-Nay Key Area # 1 and # 3 can be found in the Mosby-Nay Allotment Evaluation (BLM 2006). Mosby-Nay (Big Hole) Key Area #1 and Mosby-Nay (Waynes Well) Key Area # 2 can be found in the Pakoon Springs and Pakoon Allotment Evaluation (BLM 2012). Mosby Key Area # 5 can be found in the Mosby Allotment Evaluation (BLM 2011). See Chapter 3 Section 3.2.4 Desired Plant Community Objectives for more information on the methodology and interpretation of the objectives for each key area.

**Table A5.16. Desired Plant Community Objectives Determination Table**

Mosby-Nay Key Area # 1 (Limy Upland 9 -12 inch precipitation zone.)

This site burned prior to the mid-seventies and again in 2005, which set the ecological processes on the site back to an earlier successional stage. The most recent data was collected in 2016.

- Attain overall grass composition by dry weight of 5-10% or above.
- Maintain overall shrub composition by dry weight of 50-60% or above.
- Maintain *Ephedra nevadensis* composition by dry weight of 1 – 5%.
- Increase *Krameria erecta* composition by dry weight to 1-5%.
- Maintaining forbs composition by dry weight of 5-10% or above.
- Maintain vegetation cover (basal) between 3-5%.

<b>Mosby-Nay Allotment</b>			
<b>Mosby-Nay Key Area # 1</b>			
<b>Ecological site: Limy Upland 9 – 12 inch precipitation zone (p.z.)</b>			
<b>Most recent monitoring data collected in 2016.</b>			
<b>Plant Group (or Ground Cover)</b>	<b>Current Composition</b>	<b>Desired Plant Composition</b>	<b>Objective Met or Not Met</b>
<b>Vegetation live basal cover</b>	<b>7%</b>	<b>3 – 5%</b>	<b>Met (Exceeds)</b>
<b>Shrubs</b>	<b>75%</b>	<b>50 – 60%</b>	<b>Met (Exceeds)</b>

<i>Acacia greggii</i>	1%		
<i>Acamptopappus sphaerocephalus</i>	2%		
<i>Coleogyne ramosissima</i>	4%		
<i>Ephedra nevadensis</i>	12%	1 – 5%	
<i>Ericameria laricifolia</i>	4%		
<i>Ergonum fasciculatum</i>	<1%		
<i>Hymenoclea salsola</i>	8%		
<i>Krameria erecta</i>	0	1 – 5%	
<i>Larrea tridentata</i>	2%		
<i>Lycium andersonii</i>	1%		
<i>Opuntia acanthocarpa</i>	<1%		
<i>Thamnosma montana</i>	7%		
<i>Tiquilia canescens</i>	39%		
<i>Yucca baccata</i>	1%		
<i>Yucca brevifolia</i>	1%		
<b>Perennial Native Grasses</b>	<b>0</b>	<b>5 – 10%</b>	<b>Not Met</b>
Perennial Native Grasses	0		
<b>Perennial Forbs</b>	<b>1 %</b>	<b>5 – 10%</b>	<b>Not Met</b>
<i>Baileya multiradiata</i>	1%		
<i>Eriogonum inflatum</i>	<1%		
<i>Sphaeralcea sp.</i>	<1%		

The objective for vegetation live basal cover met (exceeds). The objective for shrubs was met (exceeds) there were a diverse group of shrubs recorded in the 2016 data. The objective for perennial native grass was not met there were none recorded in the data from 2016. The objective for perennial forbs was not met. This key area was burned by wildfire in 2005.

**Table A5.17. Desired Plant Community Objectives Determination Table**

Mosby-Nay Key Area # 3 (Limy Upland 6-9 inch pz.)

This site was burned by a wildfire in 2005. The most recent data was collected in 2016.

- Attain an overall perennial native grass composition by dry weight of 1-5%.
- Increase *Pleuraphis rigida* composition by dry weight to 1-2% CBW.
- Increase Shrub composition by dry weight to 40-60%.
- Increase *Krascheninnikovia lanata* composition by dry weight to 1-5%.
- Maintain *Ephedra nevadensis* composition by dry weight of 1-5%.
- Increase *Krameria erecta* / *Krameria grayi* composition by dry weight to 1-5%.
- Maintaining forbs composition by dry weight of 3-5% or above.

- Increase vegetation cover (basal) between 3-8%.

<b>Mosby-Nay Allotment</b>			
<b>Mosby-Nay Key Area # 3</b>			
<b>Ecological site: Limy Upland 6 – 9 inch p.z.</b>			
<b>Most recent monitoring data collected in 2016.</b>			
<b>Plant Group (or Ground Cover)</b>	<b>Current Composition</b>	<b>Desired Plant Composition</b>	<b>Objective Met or Not Met</b>
<b>Vegetation live basal cover</b>	<b>2%</b>	<b>3 – 8%</b>	<b>Not Met</b>
<b>Shrubs</b>	<b>31%</b>	<b>40 – 60%</b>	<b>Not Met</b>
<i>Encelia frutescens</i>	4%		
<i>Ephedra nevadensis</i>	1%	1 – 5%	
<i>Krameria erecta/Krameria parvifolia</i>	11%	1 – 5%	
<i>Krameria grayi</i>	0	1 – 5%	
<i>Krascheninnikovia lanata</i>	0	1 – 5%	
<i>Larrea tridentata</i>	2%		
<i>Lycium andersonii</i>	1%		
<i>Opuntia acanthocarpa</i>	0		
<i>Psilostrophe cooperi</i>	7%		
<i>Thamnosma montana</i>	0		
<i>Tiquilia canescens</i>	5%		
<i>Yucca brevifolia</i>	0		
<b>Perennial Native Grasses</b>	<b>42%</b>	<b>1 – 5%</b>	<b>Met (Exceeds)</b>
<i>Aristida longiseta</i>	3%		
<i>Pleuraphis rigida</i>	0	1 – 2%	
<i>Sporobolus cryptandrus</i>	<1%		
<i>Tridens muticus</i>	<1%		
<i>Tridens pulchellus</i>	39%		
<b>Perennial Forbs</b>	<b>23%</b>	<b>3 – 5%</b>	<b>Met (Exceeds)</b>
<i>Baileya multiradiata</i>	20%		
<i>Eriogonum inflatum</i>	1%		
<i>Sphaeralcea sp.</i>	3%		

The objective for vegetation live basal cover was not met. The current percent composition from the 2016 data had 2% slightly below the 3 – 8% objective. The shrub objective was not met. The perennial native grass objective was met (exceeded). The perennial forb objective was met (exceeded). This key area burned during a 2005 wildfire.

**Table A5.18. Desired Plant Community Objectives Determination Table**

Mosby-Nay (Big Hole) Key Area # 1 (Limy Upland (Deep) 6 to 9 inch p.z.) (Formerly Pakoon Springs Allotment)

This area was burned by a wildfire around 1980 and again in 2005. The most recent data was collected in 2018.

- Maintain total ground cover at 25-40%.
- Maintain native perennial grass at 5-15% CBW (includes *Pleuraphis rigida*, *Achnatherum hymenoides*, *Sporobolus flexuosus*, *Aristida longiseta* and *Dasyochloa pulchella*).
- Increase total shrubs/trees to 65-80% CBW (includes *Psilostrophe cooperi*, *Opuntia sp.*, *Krameria grayi*, *Acamptopappus sphaerocephalus*, *Ambrosia dumosa*, *Ephedra nevadensis*, *Krascheninnikovia lanata*, *Lycium andersonii*, *Yucca brevifolia*, *Yucca schidigera*, *Larrea tridentata*, and other shrubs except *Gutierrezia*).
- Maintain forbs at 5-10% CBW (excludes non-native invasive species).

<b>Mosby-Nay Allotment</b>			
<b>Mosby-Nay (Big Hole) Key Area # 1 (Formerly Pakoon Springs Allotment)</b>			
<b>Ecological site: Limy Upland (Deep), (6 to 9 inch p.z.)</b>			
<b>Most recent monitoring data collected in 2018.</b>			
<b>Plant Group (or Ground Cover)</b>	<b>Current Composition</b>	<b>Desired Plant Composition</b>	<b>Objective Met or Not Met</b>
<b>Ground Cover</b>	<b>64%</b>	<b>25 – 40%</b>	<b>Met (Exceeds)</b>
<b>Total Shrubs and Trees (excludes <i>Gutierrezia sarothrae</i>)</b>	<b>0</b>	<b>65 – 80%</b>	<b>Not Met</b>
<i>Acamptopappus sphaerocephalus</i>	0		
<i>Ambrosia dumosa</i>	0		
<i>Encelia farinosa</i>	0		
<i>Ephedra nevadensis</i>	0		
<i>Krameria grayi</i>	0		
<i>Krascheninnikovia lanata</i>	0		
<i>Larrea tridentata</i>	0		

<i>Lycium andersonii</i>	0		
<i>Opuntia sp.</i>	0		
<i>Psilostrophe cooperi</i>	0		
<i>Yucca brevifolia</i>	0		
<i>Yucca schidigera</i>	0		
<b>Native Perennial Grasses</b>	<b>69%</b>	<b>5 – 15%</b>	<b>Met (Exceeds)</b>
<i>Achnatherum hymenoides</i>	0		
<i>Aristida longiseta</i>	39%		
<i>Dasyochloa pulchella</i>	0		
<i>Pleuraphis rigida</i>	0		
<i>Sporobolus cryptandrus</i>	20%		
<i>Sporobolis flexuosus</i>	10%		
<b>Forbs (excludes non-native invasives)</b>	<b>4%</b>	<b>5 – 10%</b>	<b>Not Met</b>
<i>Baileya multiradiata</i>	4%		

The ground cover objective was met (exceeded). Ground cover is dominated by litter at 64% and live basal vegetation is less than 1% cover. Total shrubs and trees objective (excludes *Gutierrezia sarothrae*) does not meet the objective. There were no shrubs or trees recorded in the 2018 data. The native perennial grass objective was met (exceeds) with 69%. The forb objective was not met it is slightly below the desired range of 5 – 10%. This key area burned in 2005 and the shrub and tree component has been slow to recover. It also burned in 1980. It was determined during the Pakoon and Pakoon Springs Allotment Evaluation that that causal factor for not meeting the shrub objective is wildfire (BLM 2012).

**Table A5.19. Desired Plant Community Objectives Determination Table**

Mosby-Nay (Waynes Well) Key Area # 2 (Limy Upland (Deep) 6 to 9 inch p.z.) (Waynes Well) (Formerly Pakoon Springs Allotment).

This area was burned by a wildfire around 1980 and again in 2005. The most recent data was collected in 2018.

- Maintain total ground cover at 25-40%.
- Maintain native perennial grass at 5-15% CBW (includes *Pleuraphis rigida*, *Achnatherum hymenoides*, *Sporobolis flexuosus*, *Aristida longiseta* and *Dasyochloa pulchella*).
- Increase total shrubs/trees to 65-80% CBW (includes *Psilostrophe cooperi*, *Encelia frutescens*, *Opuntia sp.*, *Thamnosma sp.*, *Krameria grayi*, *Acamptopappus sphaerocephalus*, *Ambrosia dumosa*, *Ephedra nevadensis*, *Krascheninnikovia lanata*, *Lycium andersonii*, *Yucca brevifolia*, *Yucca schidigera*, *Yucca baccata*, *Coleogyne ramosissima*, *Larrea tridentata*, and other shrubs except *Gutierrezia*).
- Maintain forbs at 5-10% CBW (excludes non-native invasive species).



<b>Mosby-Nay Allotment</b>			
<b>Mosby-Nay (Waynes Well) Key Area # 2 (Formerly Pakoon Springs Allotment)</b>			
<b>Ecological site: Limy Upland (Deep), (6 to 9 inch precipitation zone)</b>			
<b>Most recent monitoring data collected in 2018.</b>			
<b>Plant Group (or Ground Cover)</b>	<b>Current Composition</b>	<b>Desired Plant Composition</b>	<b>Objective Met or Not Met</b>
<b>Ground Cover</b>	<b>23%</b>	<b>25 – 40%</b>	<b>Not Met</b>
<b>Total Shrubs and Trees (excludes <i>Gutierrezia sarothrae</i>)</b>	<b>22%</b>	<b>65 – 80%</b>	<b>Not Met</b>
<i>Acamptopappus sphaerocephalus</i>	0		
<i>Ambrosia dumosa</i>	0		
<i>Coleogyne ramosissima</i>	0		
<i>Encelia farinosa</i>	0		
<i>Encelia frutescens</i>	2%		
<i>Ephedra nevadensis</i>	9%		
<i>Krameria grayi</i>	0		
<i>Krascheninnikovia lanata</i>	0		
<i>Larrea tridentata</i>	5%		
<i>Lycium andersonii</i>	0		
<i>Opuntia sp.</i>	0		
<i>Psilostrophe cooperi</i>	0		
<i>Salvia dorrii</i>	4%		
<i>Thamnosma sp.</i>	2%		
<i>Yucca baccata</i>	0		
<i>Yucca brevifolia</i>	0		
<i>Yucca schidigera</i>	0		
<b>Native Perennial Grasses</b>	<b>33%</b>	<b>5 – 15%</b>	<b>Met (Exceeds)</b>
<i>Achnatherum hymenoides</i>	0		
<i>Aristida longiseta</i>	12%		
<i>Dasyochloa pulchella</i>	0		
<i>Pleuraphis rigida</i>	19%		

<i>Sporobolus flexuosus</i>	2%		
<b>Forbs (excludes non-native invasives)</b>	<b>10%</b>	<b>5 – 10%</b>	<b>Met</b>
<i>Baileya multiradiata</i>	10%		

The ground cover objective was not met. The current composition is 23% which is slightly below the objective of 25 – 40%. The total shrubs and trees objective, which excludes *Gutierrezia sarothrae*, was not met. This key area burned in 1980 and 2005. Native perennial grass objective is met (exceeds) the objective. The forb objective is met. It was determined during the Pakoon and Pakoon Springs Allotment Evaluation that that causal factor for not meeting the shrub objective is wildfire (BLM 2012).

**Table A5.20. Desired Plant Community Objectives Determination Table**

Mosby Key Area # 5 (Shallow Upland 10”-12” p.z.)

This area has not burned in recent history. The most recent data was collected 2018.

- Maintain total ground cover at between 15-30%.
- Maintain native perennial grass (includes *Achnatherum hymenoides*, *Achnatherum speciosum*, *Aristida*, *Dasyochloa pulchella*, *Elymus elymoides ssp. elymoides*, *Muhlenbergia porteri* and *Tridens muticus*) at between 1-3% CBW.
- Maintain browse composition at between 50-70% CBW (includes *Ephedra nevadensis*, *Coleogyne ramosissima* and *Purshia stansburiana*).
- Maintain other shrubs / trees at between 20-30% CBW (includes *Yucca baccata*, *Larrea tridentata*, *Opuntia sp.*, *Acamptopappus sphaerocephalus*, *Echinacea*, *Encelia frutescens*, *Ephedra viridis*, *Ferocactus*, *Hymenoclea salsola*, *Lycium andersonii*, *Mortonia utahensis*, *Psoralea fremontii*, *Yucca brevifolia* and other shrubs except *Gutierrezia sarothrae*).
- Maintain forbs composition at between 1-3% CBW (excludes non-native invasive species).

<b>Mosby Allotment</b>			
<b>Mosby Key Area # 5</b>			
<b>Ecological site: Shallow Upland 10-12” precipitation zone.</b>			
<b>Most recent monitoring data collected in 2018.</b>			
<b>Plant Group (or Ground Cover)</b>	<b>Current Composition</b>	<b>Desired Plant Composition</b>	<b>Objective Met or Not Met</b>
<b>Ground Cover</b>	<b>43%</b>	<b>15-30%</b>	<b>Met (Exceeds)</b>
<b>Browse</b>	<b>69%</b>	<b>50 – 70%</b>	<b>Met</b>
<i>Coleogyne ramosissima</i>	65%		
<i>Ephedra nevadensis</i>	2%		
<i>Purshia stansburiana</i>	2%		

( <i>Cowania mexicana</i> )			
<b>Other Shrubs and Trees (excludes <i>Gutierrezia sarothrae</i>)</b>	<b>32%</b>	<b>20 – 30%</b>	<b>Met (Exceeds)</b>
<i>Acacia greggii</i>	4%		
<i>Acamptopappus sphaerocephalus</i>	0		
<i>Chrysothamnus nauseosus</i>	18%		
<i>Echinacea sp.</i>	0		
<i>Echinocereus sp.</i>	1%		
<i>Encelia frutescens</i>	2%		
<i>Ephedra viridis</i>	0		
<i>Ferocactus sp.</i>	0		
<i>Hymenoclea salsola</i>	0		
<i>Larrea tridentata</i>	0		
<i>Lycium andersonii</i>	0		
<i>Mortonia utahensis</i>	0		
<i>Opuntia sp.</i>	2%		
<i>Prunus fasciculata</i>	0		
<i>Psoralea fremontii</i>	0		
<i>Thamnosma montana</i>	2%		
<i>Yucca baccata</i>	1%		
<i>Yucca brevifolia</i>	2%		
<b>Native Perennial Grasses</b>	<b>0</b>	<b>1 – 3%</b>	<b>Not Met</b>
<i>Acnatherum hymenoides</i>	0		
<i>Achnatherum speciosum</i>	0		
<i>Aristida sp.</i>	0		
<i>Dasyochloa pulchella</i>	0		
<i>Elymus elymoides ssp.elymoides</i>	0		
<i>Muhlenbergia porteri</i>	0		
<i>Tridens muticus</i>	0		
<b>Forbs (excludes non-native invasives)</b>	<b>1%</b>	<b>1 – 3%</b>	<b>Met</b>
<i>Calochortus sp.</i>	1%		

The ground cover objective was met (exceeded), ground cover is dominated by litter. The browse objective was met. The other shrubs and trees objective which excludes *Gutierrezia sarothrae*, was met and slightly exceeds. This key area does not meet native perennial grass

objective, none were recorded in 2018. The forb objective was met. This key area is dominated by blackbrush. This key area has not burned in recent history.

## Appendix 6. Historical Precipitation Reports

**Table A6.1 Cottonwood Wash Exclosure Rain Gauge Historical Precipitation Report.**

Cottonwood Wash Exclosure					Rain Gauge Number: 04	
Year	Fall	Winter	Spring	Summer	Annual Total	Annual Percentage
1978	1.14	15.41	2.91	2.66	22.12	188%
1979	3.88	5.14	4	2.25	15.27	130%
1980	0.5	0.9	1.09	3.04	5.53	47%
1981	1.59	2	3	2.9	9.49	81%
1982	0.98	2.75	2.4	5.63	11.76	100%
1983	3.95	5.75	2.86	4.16	16.72	142%
1984	2.38	0.98	0.55	7.28	11.19	95%
1985	1.93	6.5	0.75	2.15	11.33	96%
1986	3.25	2.1	3.7	3.33	12.38	105%
1987	1.19	4.38	1.8	3.19	10.56	90%
1988	3.94	3.12	3.07	4.12	14.25	121%
1989	0.6	4.14	0.64	3.52	8.90	76%
1990	0.43	2.6	2.17	3.9	9.10	77%
1991	1.32	3.36	1.91	4.62	11.21	95%
1992	1.17	5.5	5.16	1.45	13.28	113%
1993	3.2	12.3	1.88	1.24	18.62	158%
1994	2	2.4	1.36	7.75	13.51	115%
1995	1.54	9.46	1.5	2.5	15.00	128%
1996	1.12	2.88	0.63	2.37	7.00	60%
1997	2.25	4.85	1.15	5.5	13.75	117%
1998	1	5.52	2.4	5.33	14.25	121%
1999	2.8	1.45	2.25	4	10.50	89%
2000	0	3.87	0.26	3.1	7.23	62%
2001	3.45	8.45	4.1	5.5	21.50	183%
2002	0.5	0.88	0.63	1.74	3.75	32%
2003	1.13	3.37	2.495	1	8.00	68%
2004	0.7	4.42	1.01	0.87	7.00	60%
2005	6.5	12.25	2.75	2.75	24.25	206%
2006	1.25	0.5	2.5	4.25	8.50	72%
2007	1.25	1	0.375	2.875	5.50	47%

<b>Cottonwood Wash Exclosure</b>					<b>Rain Gauge Number: 04</b>	
<b>Year</b>	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>	<b>Summer</b>	<b>Annual Total</b>	<b>Annual Percentage</b>
2008	0	6.5	0.25	1.88	8.63	73%
2009	1.38	4.12	0.5	0.5	6.50	55%
2010	0.25	7.63	4.37	0.58	12.83	109%
2011	2.675	9.075	1.25	1.8	14.80	126%
2012	2	3	1.5	5	11.50	98%
2013	2	2.375	0.625	6.5	11.50	98%
2014	1.25	0.25	1.25	2.75	5.50	47%
2015	0.25	4.5	2.25	4.75	11.75	100%
2016	1	3.5	3.5	5.5	13.50	115%
2017	0.875	8.125	2.5	4.25	15.75	134%

All precipitation readings are in inches. The most complete data through 2017. For a summary of this report see Section 3.1 Climate.

Olaf Knolls Rain Gauge Historical Precipitation Report.

Olaf Knolls					Rain Gauge Number: 09	
Year	Fall	Winter	Spring	Summer	Annual Total	Annual Percentage
1988	0	1.84	2.6	3.1	7.54	84%
1989	0.54	2.02	0.77	3.1	6.43	72%
1990	0.33	2.27	1.48	3.64	7.72	86%
1991	0.99	1.84	2.93	1.08	6.84	77%
1992	0.67	4.33	3.85	1.71	10.56	118%
1993	2.17	10.31	1.52	0.5	14.50	162%
1994	1.89	2.45	1.47	0.69	6.50	73%
1995	0.8	4.95	5.23	1.75	12.73	142%
1996	0.53	3	0.52	1.68	5.73	64%
1997	2.25	3.8	0.57	2.96	9.58	107%
1998	0.93	4.36	2.52	4.74	12.55	140%
1999	2.88	1.17	1.46	5.34	10.85	121%
2000	0	2.82	1.01	1.85	5.68	64%
2001	3.99	3.88	3.65	1.48	13.00	145%
2002	0.14	1.1	0.11	0.34	1.69	19%
2003	0.33	2.77	3.59	1.38	8.07	90%
2004	0.59	3.48	0.6	1.81	6.48	73%
2005	6.67	9.31	2.56	2.35	20.89	234%
2006	1.05	0.55	3.06	1.64	6.30	70%
2007	1.84	0.94	0.51	2.3	5.59	63%
2008	0	2.42	0.28	1.88	4.58	51%
2009	1.41	3.93	0.57	0.72	6.63	74%
2010	0.32	6.76	1.91	1.04	10.03	112%
2011	1.71	8.92	2.55	1.87	15.05	168%
2012	2.8	1.52	1.49	4.94	10.75	120%
2013	1.84	3.83	0.46	3.65	9.78	109%
2014	0.56	0.43	0.91	3.96	5.86	66%
2015	0.11	3.48	2.46			
2016						
2017	0.66	6.12	1.49	3.66	11.93	124%

All precipitation readings are in inches. The most complete data through 2017. For a summary of this report see Section 3.1 Climate.



## Appendix 7. Soils Tables

**Table A7.1 – Excerpts from NRCS Web Soil Survey Taxonomic Classification Report (Soil Survey Staff, 2018)**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
3	Arada family loamy fine sand, 1 to 10 percent slopes	Sandy, mixed, thermic Typic Haplocalcids	471.3	1.0%
4	Arizo gravelly sandy loam, 1 to 5 percent slopes, nonflooded	Sandy-skeletal, mixed, thermic Typic Torriorthents	271.8	0.6%
5	Arizo very gravelly sandy loam, 1 to 5 percent slopes, flooded	Sandy-skeletal, mixed, thermic Typic Torriorthents	2,217.5	4.7%
12	Blind family-Shelley complex, 5 to 15 percent slopes, moist	Loamy-skeletal, mixed, superactive, thermic Typic Haplargids	632.2	1.3%
13	Blind family-Shelley complex, 5 to 15 percent slopes, stony	Loamy-skeletal, mixed, superactive, thermic Typic Haplargids	1,325.3	2.8%
27	Grapevine-Shelley complex, 1 to 5 percent slopes	Coarse-loamy, mixed, superactive, thermic Typic Haplocalcids	56.7	0.1%
28	Gypill-Badland association, 10 to 70 percent slopes	Loamy, gypsic, thermic, shallow Typic Torriorthents	1,264.3	2.7%
34	Hindu-Rock outcrop-Gypill complex, 35 to 70 percent slopes	Loamy-skeletal, mixed, superactive, calcareous, thermic Lithic Torriorthents	3,528.9	7.4%
38	Hobog-Tidwell family complex, 8 to 35 percent slopes	Loamy-skeletal, mixed, superactive, thermic Lithic Haplocalcids	1,256.8	2.6%
39	Hobog very gravelly sandy loam, 5 to 30 percent slopes	Loamy-skeletal, mixed, superactive, thermic Lithic Haplocalcids	583.3	1.2%
44	Meadview very gravelly sandy loam, 2 to 18 percent slopes	Sandy-skeletal, mixed, thermic Durinodic Haplocalcids	1,999.8	4.2%
52	Meriwhitica-Rock outcrop-Strych complex, 35 to 70 percent slopes, warm	Loamy-skeletal, mixed, superactive, calcareous, mesic Lithic Ustic Torriorthents	700.0	1.5%
64	Riverwash-Torrifluvents complex, 1 to 3 percent slopes		17.0	0.0%
67	Ruesh very gravelly fine sandy loam, 3 to 20 percent slopes	Coarse-loamy, gypsic, thermic Typic Calcigypsid	331.3	0.7%
77	Tonopah gravelly loamy fine sand, 1 to 10 percent slopes	Sandy-skeletal, mixed, thermic Typic Haplocalcids	1,193.6	2.5%
78	Torriorthents-Calciorthids-Rock outcrop complex, 10 to 40 percent slopes	Torriorthents	7,863.1	16.5%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
81	Tsezhin very cobbly sandy loam, 5 to 15 percent slopes	Loamy-skeletal, mixed, superactive, mesic Aridic Haplustalfs	714.7	1.5%
86	Winkel-Rock outcrop complex, 2 to 35 percent slopes	Loamy-skeletal, mixed, superactive, thermic, shallow Calcic Petrocalcids	612.8	1.3%
87	Winkel-Rock outcrop complex, 2 to 35 percent slopes, moist	Loamy-skeletal, mixed, superactive, thermic, shallow Calcic Petrocalcids	2,654.4	5.6%
88	Winkel very gravelly loam, 2 to 25 percent slopes	Loamy-skeletal, mixed, superactive, thermic, shallow Calcic Petrocalcids	1,519.6	3.2%
89	Winkel very gravelly loam, 2 to 25 percent slopes, moist	Loamy-skeletal, mixed, superactive, thermic, shallow Calcic Petrocalcids	2,411.7	5.1%
94	Yumtheska-Katzine-Rock outcrop complex, 5 to 50 percent slopes, moist	Loamy-skeletal, mixed, superactive, mesic Lithic Calciustolls	241.8	0.5%
96	Yurm family-Meadview association, 15 to 40 percent slopes	Loamy-skeletal, mixed, superactive, thermic, shallow Calcic Petrocalcids	5,147.6	10.8%
97	Yurm family-Meadview association, 15 to 40 percent slopes, moist	Loamy-skeletal, mixed, superactive, thermic, shallow Calcic Petrocalcids	535.1	1.1%
98	Yurm family very gravelly loam, 15 to 35 percent slopes	Loamy-skeletal, mixed, superactive, thermic, shallow Calcic Petrocalcids	9,025.6	19.0%
99	Yurm family very gravelly loam, 15 to 35 percent slopes, moist	Loamy-skeletal, mixed, superactive, thermic, shallow Calcic Petrocalcids	633.8	1.3%
<b>Subtotals for Soil Survey Area</b>			<b>47,210.0</b>	<b>99.3%</b>
<b>Totals for Area of Interest</b>			<b>47,520.5</b>	<b>100.0%</b>

**Table A7.2 – Excerpts from Hydric Soils Report for Mosby-Nay Combined Allotments (Soil Survey Staff, 2018)**

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor not hydric components in the higher positions on the landform, and map units that are made up dominantly of not hydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color-coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column, the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

## Appendix 8. Public Comment and Response

A thirty-day public comment period on this environmental assessment was available from August 4, 2018 to September 6, 2018. 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 A8.1. Public Comment and Response**

Commenter	Comment Number	Comment	Comment Response
Borg, Spotts, Western Watersheds Project (WWP)	1	Fire threats should be addressed in the EA, including conversion of native to non-native plant communities	Although fire effects and impacts from past fires are important to the background of the project area, they are outside the scope of the EA. The Purpose and Need of the EA is used to focus the document on issues that are ripe for decision. In this EA, the Purpose and Need is for BLM to respond to a grazing application and to provide for public lands grazing through FLPMA and associated laws and regulations (see Section 1.2 of the EA). Fire effects and related fire history are described to help explain the background of the area and can be found in Sections 2.3.2, 3.2.3, 3.2.4, 4.4.1, 4.4.2, 4.4.3 and 4.6.
Spotts	2	The EA does not properly acknowledge the ongoing role of livestock grazing in creating and maintaining favorable conditions for the colonization and spread of these invasive plants (red brome and cheatgrass).	The EA discusses the role of livestock grazing in Section 4.4.1 and 4.4.2. Historical information is discussed in Section 3.2.4 under the Invasive Species and Non-native Plant section.
Spotts	3	There is no acknowledgement in the EA that grazing is prohibited over the nearby stateline.	The National Environmental Policy Act (NEPA) requires that authorized officers consider decisions that are within the scope and decision authority of the agency (40 CFR §1505.1(e)). The scope of the decision maker in this EA is within Arizona, therefore there is no need to acknowledge other areas where grazing is not allowed as it is beyond the scope of the EA.
Spotts	4	There is no analysis regarding impacts to tortoise as a Monument object.	Although, neither the NEPA nor the Antiquities Act specifically require an analysis of impacts to Monument objects, Section 1.4 of the EA describes relationships to related statutes. The analysis of impacts to desert tortoise are disclosed in Section 4.3 of the EA. Note

			that the provisions of the Endangered Species Act specifically address impacts to desert tortoise through the EA, established recovery plans, and by the consultation process with the U.S. Fish and Wildlife Service (see Chapter 5 Section 5.3, Appendix 9).
Spotts, WPP	5	Monitoring is inadequate or inconsistent, there is no guarantee that future monitoring will be adequate.	Monitoring does vary across the years based on funding and workload priorities, however, the available monitoring data is adequate for analysis and does not indicate substantial problems with vegetation across the allotment. For reference, monitoring is discussed in Sections 2.2.2, 3.2.4, 4.4.1, 4.4.2, 4.7, and in Appendix 5 of the EA.
Borg, Spotts, WWP	6	If BLM intended to seriously consider the No Grazing Alternative as a viable option, then it would have included in this EA notice that it may necessitate a plan amendment, and an associated Federal Register notice may likewise have been done. Since no such intent to potentially amend the GCPNM plan was announced, I think that it is obvious that BLM never intended to honestly consider the No Grazing Alternative.	The incorporation of the No Grazing Alternative is not only used as a baseline to compare other alternatives against but practice based on judicial decisions requiring it. The EA discloses that a land use plan amendment would be required in Section 2.5 of the EA. It was determined to analyze the No Grazing Alternative without going through the land use planning federal register process because it would be considered pre-decisional.
WWP	7	The Mojave desert tortoise continues on its path to extinction and remains seriously imperiled throughout much of its range. Allison and McLuckie 2018. Scientists recommend “more critical evaluation of the suit of future activities and projects in tortoise habitat that may exacerbate ongoing population declines.” Id. The Mosby and Mosby-Nay grazing permit renewal is such a project, and the EA here is insufficiently critical of the purpose and need for grazing in the Grand Canyon-Parashant National Monument within important desert tortoise habitat.	<p>The Purpose and Need of the EA is used to focus the document on issues that are ripe for decision. In this EA, the Purpose and Need is for BLM to respond to a grazing application and to provide for public lands grazing through FLPMA and associated laws and regulations (see Section 1.2 of the EA). The impacts of the proposed action, based on the scope of the purpose and need, are disclosed in the EA. With regard to desert tortoise habitat, those impacts are disclosed in Section 4.3 of the EA.</p> <p>To address the comment regarding declining populations, Allison and McLuckie (2018) state: "Densities of adult <i>G. agassizii</i> were declining, on average, in every recovery unit except the Northeastern Mojave (Table 3, Fig. 4). Average density of adult tortoises increased (emphasis added) in the northeastern Mojave Recovery Unit at 13.1% (SE=4.3%) since 2004 with especially large rates of increase (&gt;13%/y) estimated in BD and GB." Note that GB is the abbreviation</p>

			for the Gold Butte-Pakoon Recovery Unit wherein the project area for this EA lies. Refer to Section 3.2.3 regarding the most current tortoise monitoring data from 2017.D9
WWP	8	The proposed dates are inconsistent with tortoise active season from early March to the end of October or early November.	The season of use and tortoise activity dates are variable (see Section 4.3.1) and can include early March and early November. However, the RMP dates and related Biological Opinion recognize the March 15-Oct 15 dates as acknowledged active season dates for this area. The EA discloses the potential direct effects from livestock trampling and the egg laying time-period in relation to the season of use. The proposed season of use would not occur during the egg-laying period (mid-May-July), where the greatest chance for impacts could occur (see Section 4.3.1).
WWP	9	There were no native perennial grasses on Mosby Key area #5. (This also flags a concern that the BLM's Desired Plant Community Objectives for this key area was to "Maintain native perennial grass at between 1-3 % CBW." EA at 122. Where did all the perennial grass go since those objectives were established? And how can the key area be considered "Late Seral" condition without perennial grasses or perennial forbs present? EA at 115.)	Although the lack of perennial grasses on Mosby Key Area #5 is noted, the Ecological Site: Shallow Upland (10"-12" Precipitation Zone) Desired Plant Composition is 50-70% Browse Species and 15-30% Ground Cover with 20-30% Other Shrubs and Trees. Perennial grasses and forbs only make up to 1-3% of the total, each. The late-seral stage is consistent with increases in blackbrush and decreases in perennial grasses and forbs although Calochorus, a native perennial forb is recorded at 1% composition, within the 1-3% range of expected composition for forbs. Refer to Appendix 5, Table A5.5. where Trend Data indicates an upward trend for this site.
WWP	10	The EA admits that non-native annual plants can increase because of livestock grazing, while native perennial bunchgrasses, which are highly palatable desert tortoise forage species, can become less abundant resulting in habitat degradation, but the EA then provides no analysis of this apparent trend on the Mosby allotment.	Refer to Section 3.2.4 for the affected environment for Vegetation and Invasive, Non-native Species. The analysis of impacts regarding non-native species can be found in Section 4.4 where the summary paragraph above Section 4.4.1 indicates that the analysis area includes the Mosby Allotment.
WWP	11	The desert tortoise would have less perennial forage in the summer when it is needed most if overgrazing occurs.	Although overgrazing could occur, the proposed action does not propose this by using three types of mitigation as described in the proposed action and referenced in Section 4.3.1. First, seasonal restrictions would be used to avoid grazing areas during the active season (March 15-October 15), Second, grazing largely during the



			dormant season of perennial plants would reduce impacts to growing plants, and Third, monitoring and moving livestock based on use standards would assist in reducing impacts to forage that tortoise and livestock both use.
Spotts, WWP	12	BLM states that it will assess resource conditions through field inspections to determine utilization levels. EA at 12. It pledges a more regular schedule for monitoring utilization in the future. EA at 50. Unless the BLM can commit to monitoring utilization several times each year, the promise to move cows out of over-utilized pastures is bald. For example, Key Area #2 on Mosby-Nay was not monitored at all between 1993 and 2016. EA at 110.	Although utilization monitoring is historically inconsistent, the present proposal is to increase monitoring to inform grazing management of the allotment. Long term monitoring and rangeland health information indicates that problems with overgrazing are not widely occurring. Reference the comment response above for comment 11.
WWP	13	The EA is clear that the allotments had burned in 2005 and 2006, but the reseeding that has occurred on this allotment is less clear.	Reseeding efforts are discussed in Section 3.2.3, 3.2.4, 4.4.1, 4.4.2. 4.6.1.
WWP	14	The current utilization limit is 45%. EA at 28. This would seem to indicate that BLM will be allowing heavier use than currently permitted on non-desert tortoise lands, contrary to the statement in the EA that “none of the alternatives propose to increase the level of grazing in the Mosby-Nay and Mosby allotments.” EA at 75.	Refer to Section 2.2.1, where the utilization limit remains at 45%, as proposed. The "level of grazing" on page 75 refers to the proposal that no increase of AUMs would take place. References that state otherwise have been removed from the EA to clarify that the utilization level would remain at 45% allotment-wide.
Spotts, WWP	15	It is also worth noting that the Mosby-Nay allotment has a serious history of grazing trespass and unlawful supplemental feeding. The BLM has not addressed this or disclosed whether the bread deliveries to the allotment resulted in permanent raven increases in desert tortoise habitat or whether there are other artifacts of subsidized predation.	Historic grazing trespass is outside the scope of the current proposal. The permittee acquired the grazing permit in 2012 and does not engage in supplemental feeding. The BLM does not actively monitor raven populations, being a common species. No data is available (see 40 CFR §1502.22) to show any long-term changes to the raven populations in the project area based on historic supplemental feeding.
WWP	16	The current Mosby permit describes a season of use from 10/1 to 2/28 (FONSI 2015), but the	Comment noted, the change in season of use is important. Additional information was added to clarify Section 2.3.1. Additional analysis

		proposed action says that the pasture “maybe (sic) used at any time of the year” but would generally be from 3/15 to 10/15. This is the opposite of what is currently occurring, but the EA fails to analyze how this profound change in season of use would affect the resources.	was added to Section 4.1.1, Impacts of Alternative A for livestock grazing, Section 4.4.1 Impacts of Alternative A for Vegetation and Invasive, Non-native Species and Section 4.5.1 Impacts of Alternative A for Wildlife Species. The analysis discusses the impacts of a more even distribution of use and how the change of season would affect the resources referenced above.
Borg, WWP	17	The EA should analyze the degree to which trespass into the Pakoon Springs ACEC and other riparian exclosures occurs and assess the likelihood of it occurring under each of the alternatives. We are aware that trespass into the exclosures is an ongoing issue.	The Pakoon Springs ACEC was removed from designation in 2008 by decision in the GCPNM RMP ROD. The Pakoon Springs riparian exclosure does not lie in the project area and is outside the scope of the project. The Pakoon Springs riparian exclosure has not been trespassed by livestock in the past 6 years or more.
WWP	18	" The data regarding the rangeland health of the public lands subject of the proposed action are from 2006 (Mosby-Nay), 2011 (Mosby), and 2012 (Pakoon Springs). EA at 47. All of them are outdated, and it is insufficient to predict the environmental impacts of the proposed action on such stale data. On the Mosby-Nay allotment, twelve years have passed since the conclusion that Key Area #3 was making significant progress; has that progress been achieved in the interim?"	The rangeland health assessments are used to identify problem areas and the most recent quantitative data, summarized in Appendix 5 of the EA and Section 3.2.4 Land Health Evaluations, was used to inform alternative development and analysis of impacts to vegetation and soils. Trend data was particularly relied upon to confirm that no substantial changes in vegetative composition have been noted since the rangeland health assessments were conducted.
WWP	19	The EA inadequately analyzes the impacts of livestock grazing to bighorn sheep and a suite of other native wildlife species that are affected by social displacement due to livestock grazing.	Refer to Section 4.5 Wildlife (including Big Game, Migratory Birds, and Sensitive Species) where analysis is focused on a number of native species in the project area, including bighorn sheep.
WWP	20	The EA admits that the proposed action is a part of the permittee’s “larger seasonal operation in Utah and Arizona.” But the EA doesn’t describe what that operation entails, and since this is plainly a connected action, whether the operation includes public lands. The public has a right to know exactly what the big picture plan is for these allotments, and we hope the forthcoming revised	See the above response to Comment #3 regarding the scope of the project and the decision space available to the authorized officer. In terms of Connected Actions, Section 6.5.2.1 of the BLM NEPA Handbook (H-1790-1-Amended by PIM 2018-023) states: "Connected actions are those proposed Federal actions that are “closely related” and “should be discussed” in the same NEPA document (40 CFR 1508.25 (a)(1)). Proposed actions are connected if they automatically trigger other actions that may require an

		EA will disclose this important information.	environmental impact statement; cannot or will not proceed unless other actions are taken previously or simultaneously; or if the actions are interdependent parts of a larger action and depend upon the larger action for their justification (40 CFR 1508.25 (a)(1)). Connected actions are limited to Federal actions that are currently proposed (ripe for decision). Actions that are not yet proposed are not connected actions but may need to be analyzed in the cumulative effects analysis if they are reasonably foreseeable"(emphasis added). The decision to be made in this EA is limited to this part of the permittee's operation related to larger operations that are not interdependent.
WWP	21	The EA mischaracterizes what the Grand Canyon-Parashant National Monument Proclamation said about livestock grazing on the monument. EA at 73. The Monument's proclamation discussed preserving historic ranching infrastructure and identified as objects to be protected a number of outstanding biological resources including the desert tortoise. Proclamation 7265. It further says that, "Laws, regulations, and policies followed by the Bureau of Land Management in issuing and administering grazing leases on all lands under its jurisdiction shall continue to apply to the remaining portion of the monument." Where FLPMA requires that goals and objectives for public lands be established by law as guidelines for public land use planning, and that management is on the basis of multiple use and sustained yield, it adds, "unless otherwise specified by law." §102(a)(7). And "multiple use" is specifically defined in the statute as, in part, "making the most judicious use of the land for some or all of these resources... the use of some land for less than all of the resources... with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest	The full text of the referenced paragraph from Presidential Proclamation 7265 states: "The Bureau of Land Management <i>shall continue</i> (emphasis added) to issue and administer grazing leases within the portion of the monument within the Lake Mead National Recreation Area, consistent with the Lake Mead National Recreation Area authorizing legislation. Laws, regulations, and policies followed by the Bureau of Land Management in issuing and administering grazing leases on all lands under its jurisdiction shall continue to apply to the remaining portion of the monument."  Note that the section of the EA being referred to regarding continuing grazing is the reasonable foreseeable action section of the cumulative impacts portion of the EA. In this part of the EA, estimates are made about future actions that may occur based on known information. Absent a new proclamation, a new law, or revision of the RMP, it is not considered unreasonable to expect grazing to continue in the future.

		unit output.” §103(c). Simply because the overarching RMP describes these allotments as “available” for grazing doesn’t preclude the agency from taking a hard look at the balance of uses at the site-specific level. And it definitely doesn’t preclude the agency from correcting the current language of the EA that says the proclamation “states that livestock grazing would continue on the lands administered by the monument.” EA at 73. It does not, and BLM is skewing the public perception with this incorrect statement.	
Kane County	22	Kane County would still suggest that Alternative A allow for an increase in Animal Unit Months (AUMs) from suspended AUMs as rangeland health continues to improve. There are a considerable number of suspended AUMs on the books and the permittee(s) should be allowed to utilize them as market and rangeland conditions allow.	The permittee's application for grazing permit renewal did not request to reinstate suspended AUMs. In addition, reinstating suspended AUMs was not considered based on a lack of reliable forage inventory to support reinstating suspended AUMs, reducing, or increasing the amount of Active AUMs.

## **Appendix 9. USFWS Biological Opinion**



## United States Department of the Interior

Fish and Wildlife Service  
Arizona Ecological Services Office  
9828 North 31<sup>st</sup> Avenue, Suite C3  
Phoenix, Arizona 85051

Telephone: (602) 242-0210 Fax: (602) 242-2513



**In reply refer to:**

AESO/SE  
02EAAZ00-2018-F-1089

November 21, 2018

Memorandum

To: Monument Manager, Bureau of Land Management, Grand Canyon-Parashant National Monument, St. George, Utah

From: Field Supervisor, Arizona Ecological Service Field Office

Subject: Biological Opinion the Proposed Mosby-Nay Allotment Grazing Permit Renewal

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. § 1531-1544), as amended (Act). We received your July 10, 2018, request for consultation, via electronic mail on the same day. At issue are impacts that may result from the proposed Mosby-Nay Allotment Grazing Permit Renewal located in Mohave County, Arizona. The proposed action may affect the threatened Mojave Desert tortoise (*Gopherus agassizii*) and its designated critical habitat.

You also determined that the action would have “no effect” on the California condor (*Gymnogyps californianus*). “No effect” determinations do not require review from the FWS and we will not address them further in this document.

We base this biological opinion on information provided in the June 2018 biological assessment (BA), the August 1, 2018, electronic mail exchange, telephone conversations, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, livestock grazing, maintenance activities, and their effects, or on other subjects considered in this opinion. A complete record of this consultation is on file at this office.



## **Consultation History**

- June 6, 2018: You submitted a draft BA for our review.
- June 11, 2018: We submitted comments on your draft BA.
- July 11, 2018: You requested initiation of formal consultation.
- August 1, 2018: We exchanged emails clarifying the inclusion of Arizona State Trust managed lands in the proposed action.
- August 6, 2018: We provided you a letter acknowledging receipt of all information.
- October 31, 2018: We submitted the draft BO for your review
- November 9, 2018: We received your comments on the draft BO.
- November 14, 2018: We incorporated your comments into the draft BO.

## **BIOLOGICAL OPINION**

### **DESCRIPTION OF THE PROPOSED ACTION**

Under the proposed action, the Bureau of Land Management (BLM) is proposing to issue a new grazing permit for the combined Mosby-Nay Allotment (AZ04836), for a period of 10-years (Figure 1 below). The existing Mosby Allotment (AZ04835) would become a pasture within the new Mosby-Nay Allotment. The season of use for the new Mosby-Nay Allotment would be year round with a deferred rotation through seven pastures. The proposed action will use five of these pastures outside the desert tortoise active season to promote the conservation of the Mojave desert tortoise. The proposed action combines current AUMs from both allotments and recalculates the percent of public land to reflect the newly combined allotment. The allotment includes lands managed by the BLM and the Arizona State Land Department (ASLD). All ASLD-managed lands within this allotment will be subject to the terms and conditions issued by the BLM and are included as part of this consultation. There is no proposed increase or decrease in total AUMs for this allotment. Allowable use on key forage species in the Mosby-Nay Allotment is 45%.

Proposed range improvements, new fences and cattle guards, would create seven pastures to allow for more flexibility in livestock pasture rotation. The proposed action calls for the construction of approximately 2.14 miles of new fence that will tie into existing fences. We discuss all range improvements in more detail in the Proposed Range Improvements section below.

### **Grazing System**

The Mosby-Nay Allotment is proposing to use a seven-pasture deferred rotation system. The season of use for five of the seven pastures (Cockscomb, Mosby-Nay, Bench, Cottonwood Ridge, and Big Hole) would be October 15 – March 15. Grazing will not occur on these five desert tortoise-managed pastures, during the tortoise active season, which is approximately mid-March – mid-October. During the active tortoise season, the permittee will use the Mosby and Hungry Valley pastures for livestock grazing. The Mosby Pasture does not contain tortoise habitat or designated critical habitat, but the Hungry Valley Pastures contains approximately 33 acres of tortoise habitat along a boundary fence. Management of both of these pastures will occur without tortoise timing restrictions. Use of these pastures could be at any time of the year; however, general use is likely to be from March 15 – October 15, during the tortoise active season. Use of the Mosby and Hungry Valley Pastures would not be continuous, but with rest periods each year, typically during mid-October through early March. BLM will divide the Hungry Valley Pasture into two sections, which the permittee may be utilize at the same or separate times. There is an existing fence and gate between the two sections. The southern portion of the Hungry Valley Pasture is Arizona State Trust land, managed by the ASLD, but subject to the BLM's allotment management plan.

Rotation of livestock between pastures will occur upon reaching the 45% utilization of current year's growth on key forage species, by weight, during the grazing season. The BLM would assess resource conditions through field inspections and determine, in consultation with the

permittee, whether management changes (e.g., changes in livestock numbers, adjustment of move date, etc.) may be implemented prior to reaching maximum utilization. Adjustments of move dates will occur as needed when monitoring indicates reaching maximum utilization, or due to unusual climatic conditions, fire, flood, or other acts of nature. Upon reaching maximum utilization on key species/areas in the allotment before a scheduled move, the permittee may use the salt, herding, water, or other management options to distribute livestock. Additionally, the BLM may require the removal livestock from the use area or allotment.

## **Proposed Range Improvements**

### *Fences and Cattle guards*

In response to wildfires in 2005 and 2006, the BLM built several temporary fences from 2006-2007 meant to aid in vegetation recovery on the original Mosby-Nay Allotment. As a part of the current proposed action, the BLM proposes to remove approximately 21 miles of the existing fencing and build approximately 2.14 miles of new fencing to create seven-pastures. BLM will build five new fence segments to connect existing fences and create functional pastures. Some of the pasture boundaries would use existing natural terrain breaks to restrict livestock movement. The grazing permittee will build the new fence segments under a cooperative agreement and the BLM will supply the fence materials. The grazing permittee, BLM fire crews, or youth crews will remove the obsolete parts of the fences, which may take several years to complete. Construction of the new fences and removal of old fences may occur over a two-year period with work occurring during the tortoise inactive season (October 15 through March 15). The grazing permittee will be responsible for all fence repairs.

The proposed new fences would also allow access to existing waters on both sides of the new pasture fences. Without the proposed fence realignments, there would be areas where water only occurs in one pasture and not in neighboring pastures. This approach helps minimize the number of new water sources required for grazing management. Proposed range improvements on or crossing state lands would be subject to approval from the ASLD; however, those improvements occurring on ASLD land within this allotment are still part of the proposed action and, therefore, subject to this consultation.

The BLM will build all new fences and gates to wildlife specifications. The proposed new pasture fences would be four strand wire fences with the top three strands barbed wire and the bottom wire smooth to allow for wildlife movement. The fence posts and braces would be steel posts, steel pipe, treated wood, or juniper. The permittee would also maintain any new improvements under a cooperative agreement.

Clearing of the site or construction of proposed range improvements would not begin until after all environmental clearances, including required species surveys, are completed. Removal and proper disposal of all extra materials and trash from the allotment will occur upon completion of construction activities.

The following are approved methods for clearing brush and trees from along the fence line during construction and maintenance of the proposed fence.

- The BLM permits the use of hand clearing methods, including chainsaws and brush mowers, as long as these uses do not result in ground disturbance.
- Clearance of brush, trees, rocks, or debris can occur up to four feet on each side of the fence centerline. The total maximum permitted clearing width is eight feet.

The BLM proposes to install two cattle guards or wire gates on the 1634 Road. The BLM would install and maintain any newly installed cattle guards. The permittee would construct and maintain all installed wire gates.

### *Pipeline Extension*

BLM proposes to extend an existing water pipeline extension from the water facilities at Jacob Ranch to Cove Spring Trough 1. The proposed pipeline would include approximately 1.6 miles of new pipeline; however, placement of the new pipeline will occur within or adjacent to existing dirt roads, thus minimizing new ground disturbance. The majority of the new pipeline would be on ASLD-managed land and is subject to approval from the ASLD. If approved, the permittee would provide the materials and complete the installation. A backhoe, ditch witch, or similar equipment would excavate the trench and excavated material would be used to backfill the trench. All work will occur during the tortoise inactive season (October 15 through March 15). The permittee will be responsible for maintenance of the pipeline extension through a cooperative agreement.

### **Monitoring and Adaptive Management**

The proposed action includes adaptive management, which provides a variety of management options to adjust management decisions and actions to meet desired conditions as determined through monitoring. BLM resource specialists would monitor the allotment over the 10-year term of the grazing permit. The University of Arizona reads trend and composition studies at key areas within the allotments at five-year intervals. Modification of livestock grazing management on the allotment will occur in cooperation with the permittee if monitoring indicates a lack of achieving desired conditions and current livestock grazing practices are causing non-attainment of resource objectives. 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 long-term basis.

### **Conservation Measures**

The proposed action includes the following conservation measures for the new grazing permit for the Mosby-Nay Allotment:

- Allowance of nutritional livestock supplements, including protein, minerals and salt. However, dispersal of any supplement must be a minimum of 0.25 mile from any known water sources, riparian areas, populations of special status plant species, winterfat dominated sites, cultural or any sensitive sites.
- Season of use for the Cockscomb, Mosby-Nay, Bench, Cottonwood Ridge, and Big Hole Pastures will be October 15 – March 15 to promote conservation of Mojave desert tortoise.

- Season of use for the Mosby and Hungry Valley Pastures will be March 1 – February 28. The Mosby and Hungry Valley Pastures will include rest periods each year. Use would generally be from March 15 – October 15.
- The BLM will not construct any new access roads along fence lines or to jobsites.
- The BLM will not allow for motorized cross-country travel when the ground is muddy and visible ruts four inches deep or greater may occur.
- No blading, dozing, or scraping of the ground along the fence line on any BLM-administered land is permitted.
- Fence workers will clear brush or trees from the fence line and move the vegetation far enough away from the fence line to prevent it from blowing back onto the fence. Workers will lop and scatter, not pile, vegetation. Workers may use cut juniper trees for fence posts.
- Construction of new fences, cattle guards, and pipelines, and removal of old fences will occur between October 15 and March 15 during desert tortoise inactive season.

In addition to the conservation measures above, several conservation measures were included as part of the proposed action for the 2007 Biological Opinion for the Arizona Strip BLM Resource Management Plan (22410-2007-F-0463). The BLM will automatically carry forward and implement those conservation measures for all site-specific projects and associated consultations; therefore, we consider those conservation measures part of this proposed action (see Appendix A).

### **Action Area**

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR § 402.02). In delineating the action area, we evaluated the farthest-reaching physical, chemical, and biotic effects of the action on the environment.

The proposed Mosby-Nay Allotment encompasses 34,939 acres (141 square kilometers [sq km]) of BLM-managed land and ASLD-managed land located within the Grand Canyon-Parashant National Monument. BLM-managed land includes 32,008 acres (130 sq km) and ASLD-managed lands include 2,931 acres (12 sq km). The allotment is located on the western boundary of the Arizona Strip in northwestern Arizona, approximately 45 air miles southwest of St. George, Utah and 20 air miles southeast of Mesquite, Nevada. The west edge of the proposed allotment is the Nevada state line with Arizona. The topography of the allotment varies from sloping, rolling, or flat terrain to steep canyon walls and rock outcrops. The allotment is within the Pakoon Basin region east of the Virgin Mountains. Elevation ranges in the proposed allotment configuration from 2700 to 5140 feet. A large reservoir fed by a pipeline from Middle Spring, in the former Mosby Allotment, is located at the old Jacobs Ranch on ASLD-managed land. Middle Spring provides most of the livestock water and the water distribution occurs by various pipeline systems to throughout the allotment. The action area includes all 34,939 acres (141 sq km) of land within the proposed allotment. We do not anticipate any effects occurring outside of the allotment boundaries. Areas outside the currently proposed allotment boundaries are also grazing allotments on BLM-managed land. We will address effects from actions associated with those allotments in separate consultations.

## STATUS OF THE SPECIES AND CRITICAL HABITAT

The information in this section summarizes the rangewide status of each species considered in this BO. Further information on the status of these species can be found in the administrative record for this project, documents on our web page ([Arizona Ecological Services Office Documents by Species](#)), and in other references cited in each summary below.

### Mojave Desert Tortoise

We listed the desert tortoise populations north and west of the Colorado River in Arizona and Utah (excluding the Beaver Dam slope population) as endangered under an emergency rule on August 4, 1989 (54 FR 42270). Subsequently, the entire Mojave population of the desert tortoise west of the Colorado River in California and Nevada, and north of the river in Arizona and Utah, including the Beaver Dam slope, was listed as a threatened species on April 2, 1990 (55 FR 12178). A comprehensive status of the species is located in the administrative record for this project.

The FWS signed the Desert Tortoise (Mojave Population) Recovery Plan (Recovery Plan) (USFWS 1994) on June 28, 1994. We signed the revised recovery plan on May 6, 2011 (USFWS 2011). The Recovery Plan (USFWS 2011) contains a complete description of the range, biology, and ecology of the desert tortoise. In the revised recovery plan, we identified five recovery units (RU); the Mosby-Nay Allotment falls within the Northeast Mojave RU. In 2003, the FWS convened the Desert Tortoise Recovery Plan Assessment Committee (DTRPAC) to assess the science supporting the Desert Tortoise Recovery Plan. The DTRPAC Report (Tracy *et. al.* 2004) produced a number of findings and recommendations that served as the basis for the recovery plan revision (USFWS 2011). In particular, this report recognized that threats to the desert tortoise have cumulative, synergistic, and interactive effects, and that tortoise recovery depends on managing multiple threats. The DTRPAC Report also recognized that the distribution of tortoise populations may be in metapopulations rather than in single, large populations within RUs and it is important to protect the corridors between habitat patches, in addition to reducing threats. Tortoise metapopulations require areas of suitable habitat for recovery, but these areas may be periodically vacant of tortoises. The revised recovery plan identifies tortoise conservation areas outside of critical habitat that are essential for the conservation and recovery of the species (USFWS 2011).

The desert tortoise is an arid land reptile associated with desert scrub vegetation types; primarily creosote bush (*Larrea tridentata*) flats, washes, and hillside slopes or bajadas. A robust herbaceous component to the shrubs and cacti of the creosote bush vegetation type is an important component of suitable habitat. Within these vegetation types, desert tortoises potentially can survive and reproduce where their basic habitat requirements are met: a sufficient amount and quality of forage species; shelter sites for protection from predators and environmental extremes; suitable substrates for burrowing, nesting, and over-wintering; various plants for shelter; and adequate area for movement, dispersal, and gene flow.

Desert tortoises are most active during the spring and early summer when annual plants are most



common. Additional activity occurs during warmer fall months and occasionally after summer rainstorms. In Arizona, tortoises are active from approximately March 15 through October 15; however, depending upon weather conditions, they may be active outside of this time as well. Desert tortoises spend the remainder of the year in burrows, escaping the extreme summer conditions of the desert.

Desert tortoise home range sizes vary with respect to location and year. Over its lifetime, each desert tortoise may require more than 1.5 square miles of habitat and make forays of more than seven miles at a time (Berry 1986). During droughts, tortoises forage over larger areas, increasing the likelihood of injury or fatality through encounters with humans and predators. Direct loss of tortoises has occurred from illegal collection by humans for pets or consumption, upper respiratory tract disease (URTD), predation on juvenile desert tortoises by common ravens (*Corvus corax*) and kit foxes (*Vulpes macrotis*), and collisions with vehicles on paved and unpaved roads. Other threats affecting the desert tortoise include loss of habitat from construction projects such as roads, housing and energy developments, and conversion of native habitat to agriculture. Off-highway vehicle (OHV) use is also a threat to the species, resulting in crushed tortoises, crushed burrows, and the destruction of tortoise habitat (USFWS 2011).

Livestock grazing activities have degraded additional habitat throughout the range of the tortoise. Fire is an increasingly important threat because it degrades or eliminates habitat (see Appendix D, USFWS 1994). Following wildfire, native plant species are often replaced by invasive, non-native species such as red brome (*Bromus rubens*) and cheat grass (*Bromus tectorum*), resulting in long-term habitat degradation or loss. Over 500,000 acres of desert lands burned in the Mojave Desert in the 1980s and approximately 500,000 acres burned in the northeastern Mojave Desert, including in Arizona, in 2005. Over 20,000 acres of Mojave desert burned on the Arizona Strip in 2006. No significant fires have burned in the Northeast Mojave RU since 2006.

In the 1970s, tortoise researchers established permanent plots to monitor tortoise populations, and some of these plots were surveyed through 2002; however, they were not monitored using consistent methods; therefore, population trends could not be established (USFWS 2006). The FWS began using line distance sampling to monitor populations across the range of the desert tortoise in 2001 and we have continued using this method, establishing population trends. Based on this data, tortoise populations have declined significantly in four of the five RUs (USFWS 2015). The Northeast Mojave RU is the only recovery unit that has shown an upward trend for tortoise populations; however, population numbers are still low and below viable population levels (USFWS 2015).

Mojave desert tortoise management in Arizona is covered primarily by the Arizona Strip Resource Management Plan for BLM lands in northern Arizona (file number 22410-2007-F-0463), which also considered the effects of BLM actions on the conservation value of critical habitat. The Mojave desert tortoise is the primary species covered by the Clark County Multiple Species Habitat Conservation Plan (HCP) in Clark County, Nevada and critical habitat units in Clark County were evaluated in the analysis for that permit (RECON 2000). Completion of the Washington County HCP in Utah occurred prior to critical habitat designation; however, consultations for Federal actions in that area consider the effects to critical habitat. Effects to critical habitat for Mojave desert tortoise are fully included either by existing section 7

consultations or by the existing HCPs. Conservation actions for the species include protection for individuals and habitat.

### *Critical Habitat*

Critical habitat for this species occurs within the action areas and the proposed action may affect it. The FWS designated critical habitat in 1994 (59 FR 5820-5846, also see corrections at 59 FR 9032-9036). We designated twelve areas in Arizona, California, Nevada, and Utah as critical habitat in 1994 and based these critical habitat units (CHUs) on recommendations for DWMAs outlined in the draft Recovery Plan (USFWS 1993). The BLM also identified these DWMAs as Areas of Critical Environmental Concern (ACECs) for tortoise conservation. Some critical habitat units extend across State lines and we list below for each state in which they occur. The units are:

- Arizona: Beaver Dam Slope, Gold Butte-Pakoon
- California: Fremont-Kramer, Superior-Cronese, Ord-Rodman, Chuckwalla, Pinto Mountain, Chemehuevi, Ivanpah, Piute-Eldorado
- Nevada: Piute-Eldorado, Mormon Mesa, Gold Butte-Pakoon, Beaver Dam Slope
- Utah: Beaver Dam Slope, Upper Virgin River

The FWS drew critical habitat unit boundaries to optimize reserve design; therefore, the CHUs may contain both "suitable" and "unsuitable" habitat. We define suitable habitat as areas that provide the primary biological features (PBFs) of desert tortoise critical habitat:

- Sufficient space to support viable populations within each of the five RUs and provide for movements, dispersal, and gene flow;
- Sufficient quantity and quality of forage species and the proper soil conditions to provide for the growth of such species;
- Suitable substrates for burrowing, nesting, and overwintering;
- Burrows, caliche caves, and other shelter sites;
- Sufficient vegetation for shelter from temperature extremes and predators; and,
- Habitat protected from disturbance and human-caused mortality.

All lands in the CHUs had been impacted by past land management activities to some degree at the time of CHU designation. Designation of most CHUs as DWMAs/ACECs has aided in protection of these areas, particularly by limiting off-highway vehicle use and other ground-disturbing activities, and reducing or eliminating wild burros and livestock grazing in many units. Livestock grazing still occurs throughout critical habitat in Arizona and Utah.

Wildfires in 2005 resulted in significantly detrimental effects to tortoise critical habitat. Much of the Southwest received nearly twice the average annual winter-spring precipitation that year, which resulted in lush vegetative growth during spring and summer. When this grass dried out, it provided extensive fuel for large wildfires that burned across southwestern Utah, southern Nevada, and northwestern Arizona during summer 2005. Wildfires burned 124,782 acres (505 sq km) of critical habitat, approximately 11 percent of the critical habitat in the Northeast Mojave RU. These fires burned off most vegetation in these areas, with a loss of forage

available for Mojave desert tortoise and loss of shrubs to provide shelter from temperature extremes and predators.

### *Previous Consultations*

Given the wide-range of this species, several Federal actions affect this species every year. Section 7 consultations since 1994 on various human actions have addressed the effects of those actions on the conservation value of the critical habitat units. The most recent major consultation on the Mojave desert tortoise in California was on the California Desert Conservation Area Plan (USFWS 2002), which contained a summary of the status of the species and its critical habitat in California. In Nevada, consultations with three BLM offices (Las Vegas, Ely, and Battle Mountain) addressed most impacts to tortoises and designated critical habitat from land management practices. Consultations in Arizona and Utah have been minimal in recent years. These consultations are located at [Arizona Ecological Services Office Documents by Species](#) or by contacting our [Utah Ecological Services Office](#).

## **ENVIRONMENTAL BASELINE**

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions that are contemporaneous with the consultation process. The environmental baseline defines the status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

### **Description of the Action Area**

We previously described the action area above in the “Action Area” section.

### **Status of the desert tortoise and critical habitat within the action area**

The Mosby-Nay Allotment occurs wholly within the Gold Butte-Pakoon CHU, which is in the Northeast Mojave RU. Range wide monitoring data collected in 2017 found that the population density for the Gold Butte-Pakoon CHU is approximately 1.9 tortoises per sq km (USFWS 2018), which is the lowest tortoise density across its range. The 2017 monitoring used nine transects within or adjacent to the project area to measure tortoise density. The monitoring located one tortoise in the southwest corner of the allotment and one tortoise within a mile of the northwest corner of the allotment. Monitoring efforts also found three dead tortoises within two miles of the project area. Using the number of tortoises per sq km (1.9), we can calculate an estimate of how many tortoises may occur within the allotment. There are 22,970 acres (93 sq km) of desert tortoise habitat in the project area based on elevation and other habitat parameters (BLM 2018); therefore, we estimate 177 tortoises may occur within the action area based on the tortoise density data provided from the 2017 range wide monitoring (USFWS 2018). However, there could be more tortoises depending on pockets of higher density areas within the allotment. Tortoises outside the allotment could be using habitat within the action area if it is within their home range or they are foraging, especially during periods of drought (Berry 1986).

Approximately 11,680 acres (47 sq km) of desert tortoise habitat in the project area burned in 2005 and 2006 and those fires severely modified tortoise habitat. The BLM attempted to restore the habitat with seeding; however, these projects were mostly ineffective due to drought conditions that followed the fires. The habitat still has not recovered and areas once dominated by blackbrush, which is an important component of tortoise habitat, now largely consist of invasive annual grasses. Suitable habitat still occurs in these areas, despite the habitat loss resulting from these fires. In addition, tortoises have been documented foraging in burned areas that had abundant annual plant, and then returning to adjacent unburned habitat for cover provided by intact perennial vegetation (Drake *et al* 2015). The BLM consulted on with FWS on these projects in 2006 (22410-2007-F-0011 and 02-21-05-F-0772) and are the last consultations involving tortoises in this area. These two rehabilitation projects have not contributed to the recovery of the tortoise in the action area due to the lack of vegetation establishment.

Livestock grazing has also been ongoing in the action area since before the listing of the tortoise, but the BLM had not conducted formal consultation for this ongoing action. Previous grazing management allowed for year-round grazing with no timing restrictions. This grazing management, combined with the wildfires, has likely contributed to the degradation of tortoise habitat in the action area, and may explain the relatively overall low density of tortoises in the area. Additionally, BLM limits OHV travel to existing roads, trails, and washes in the action area, but occasionally travel occurs off these existing routes.

#### *Critical habitat*

As previously described, the action area occurs wholly within the Gold Butte-Pakoon CHU, within the Northeast Mojave RU. The Gold-Butte Pakoon CHU is one of 12 CHUs throughout the range of the tortoise. The FWS (2010) modeled the habitat throughout all CHUs to determine how many acres actually contain the PBFs and, therefore, are suitable tortoise habitat. All 12 CHUs contain approximately 5,792, 986 acres of suitable tortoise habitat with PBFs. The Gold-Butte Pakoon CHU contains approximately 418,189 acres (86%) of suitable tortoise habitat (with PBFs).

Approximately 29,434 acres within the action area are designated critical habitat for the desert tortoise; however, there are approximately 22,970-acres of desert tortoise habitat within the project area containing PBFs (BLM 2018). The previously mentioned 11,680 acres that burned were wholly within critical habitat with PBFs on the allotment. The action area accounts for approximately six percent of the critical habitat containing PBFs available to tortoises in the CHU and less than one-half percent of the modeled tortoise habitat containing PBFs rangewide. PBFs within the 11,680-acre burn areas are not as abundant or as functional as they are outside of the burn areas; however, they do still contribute to the conservation and recovery of tortoises in the area (Drake *et. al.* 2015, Esque *et. al.* 2010). All but 33 acres of this modeled critical habitat containing PBFs is located in the five pastures that livestock would graze only during the tortoise inactive season, approximately October 15-March 15.

## **EFFECTS OF THE ACTION**

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, which will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

## **Mojave Desert Tortoise**

### *Grazing*

The Revised Recovery Plan for the Mojave Desert Tortoise recommends prohibiting livestock grazing from conservation areas as a recovery action (USFWS 2011). Specifically, the Recovery Plan states that there is no evidence that cattle grazing will restore habitat or prevent fire in Mojave Desert environments. Cattle grazing may help create and maintain habitat for native species where: 1) the grassland ecosystem is highly productive; and 2) native grazers and browsers co-existed with tortoises. The Mojave Desert is neither highly productive, nor is it an environment that historically supported native grazers (USFWS 2011). The Revised Recovery Plan recommends experimentally testing flexible grazing practices, such as allowing or reducing grazing during specific times of the year (e.g., after ephemeral forage is gone or during winter only) or under certain environmental conditions (e.g., grazing following a specified minimum amount of winter rain) (USFWS 2011). The livestock management on the Mosby-Nay Allotment does not follow these recommendations, in that the action area is within a conservation area and the proposed grazing practices are not experimental. However, although the action area includes a designated tortoise conservation area and the livestock grazing is not experimental, the proposed action is making an effort to use seasonal grazing, monitoring, and adaptive management to reduce effects to desert tortoise and their habitat.

In general, grazing practices can change vegetation composition and abundance, cause soil erosion and compaction, reduce water infiltration rates, and increase runoff (Robinson and Bolen 1989, Waser and Price 1981, Holechek *et. al.* 1998, and Loftin *et. al.* 2000), leaving less water available for plant production (Dadkash and Gifford 1980). Fleischner (1994) summarized the ecological impacts of grazing as:

- (1) The alteration of species composition of communities, including decreases in density and biomass of individual species, reduction of species richness, and changing community organization;
- (2) The disruption of ecosystem functioning, including interference in nutrient cycling and ecological succession; and,
- (3) The alteration of ecosystem structure, including changing vegetation stratification, contributing to soil erosion, and decreasing availability of water to biotic communities.

All these ecological impacts have the potential to decrease the fitness of the tortoise through loss of forage, sheltering sites, and nesting sites (Esque *et. al.* 2014).

Both cattle and desert tortoises consume annual forbs and grasses in the spring if winter precipitation is sufficient for annual production (Burkhardt and Chamberlain 1982, Burge and

Bradley 1976, Coombs 1979, Minden 1980, Esque 1994). During dry winters and other seasons, cattle consume primarily perennial shrub and grass species, such as white bursage, range ratany, and big galleta grass. Outside of the spring months or in dry years when winter annual plants are not available, desert tortoise diets comprise a greater percentage of shrubs, perennial grasses, and dried annuals (Henen 1992; Turner *et al.* 1984; Nagy and Medica 1986; Hohman and Ohmart 1980).

Pastures in the Mosby-Nay Allotment with desert tortoise habitat would be available for grazing from October 15 through March 15, which is outside of the tortoise active season. This seasonal restriction would reduce some forage competition for winter annual plants, which exhibit most growth in April and May (Beatley 1974). Livestock would be feeding upon what early winter annual growth may be available, plus perennial shrubs and grasses, at this time. If overgrazing and reduction in availability of perennial plants occurs, desert tortoise would have less perennial forage in the summer when it is needed most (Jarchow and May 1989, Nagy and Medica 1986). If winter precipitation does not produce winter annual growth, desert tortoises exiting hibernation must feed upon perennial shrubs and grasses and what dried annual vegetation is still available after livestock have been grazing in the area. The established forage use threshold of 45 percent current annual growth will help reduce direct competition for forage between cattle and desert tortoises and simultaneously reduce the chances of habitat degradation.

Habitat degradation in the Mojave Desert, through loss of microbiotic soil crusts (soils containing algae, lichen, fungi, etc.) due to livestock grazing, is a great concern (Floyd *et al.* 2003). Grazing can disturb soil crusts and other fundamental physical factors in landscapes. For example, climatologists and ecologists have attributed increasing soil surface temperatures and surface reflectivity in the Sonoran Desert to grazing-related land degradation (Balling *et al.* 1998 in Floyd *et al.* 2003). Biological soil crusts provide fixed carbon on sparsely vegetated soils. Carbon contributed by these organisms helps keep plant interspaces fertile and aids in supporting other microbial populations (Beymer and Klopatek 1991 in Floyd *et al.* 2003). In desert shrub and grassland communities that support few nitrogen-fixing plants, biotic crusts can be the dominant source of nitrogen (Rychert *et al.* 1978 in Floyd *et al.* 2003). Additionally, soil crusts stabilize soils, help to retain moisture, and provide seed-germination sites. Soil crusts are effective in capturing wind-borne dust deposits, and have been documented contributing to a 2- to 13-fold increase in nutrients in southeastern Utah (Reynolds *et al.* 2001 in Floyd *et al.* 2003). The presence of soil crusts generally increases the amount and depth of rainfall infiltration (Loope and Gifford 1972 in Floyd *et al.* 2003). Livestock grazing will likely disrupt soil crusts, thus leading to disruption of habitat for the desert tortoise. As soil crusts are degraded, surrounding soils are likely to decrease in their ability to provide nutrients for the forage and vegetation used by tortoises for shelter. Furthermore, the degradation of soil crusts can lead to a decrease in the recruitment of vegetation that provides both forage and shelter for tortoises. As described above, the degradation of soil crusts has the potential to decrease the fitness of the tortoise through loss of forage and sheltering sites (Esque *et al.* 2014).

Grazing can also lead to the proliferation of nonnative, invasive species such as cheatgrass (*Bromus tectorum*) and red brome (*B. rubens*). Research has implicated livestock in the spread of weeds (Brooks 2009), and both abundance and diversity of native plants and animals is lower in grazed areas as compared to ungrazed habitat in the Mojave Desert (Brooks 2000). The loss



of soils crusts also contributes to the proliferation of nonnative species. Additionally, a significant reduction in the overall resiliency of the tortoise may occur, especially if the spread of these nonnative grasses leads to other stochastic events, such as wildfire. Studies have also shown that, in most cases, dominance of *Bromus* increases following cessation of grazing in Warm Deserts, such as the Mojave Desert, and the net long-term effects of livestock grazing are generally favorable for invasive plants (Brooks and Pyke 2002; Brooks *et. al.* 2007). This also leads to an increased risk of wildfire in tortoise habitat. As described above, wildfires degrade tortoise habitat through the loss of forage and sheltering sites. Although grazing can help promote the spread of nonnative weeds such as cheatgrass and red brome, and their spread is a threat to the tortoise and its habitat, we do not know how much livestock contribute to the spread of nonnative vegetation.

Fire has affected 11,680 acres of suitable tortoise habitat on the Mosby Nay Allotment. These fires have removed forage and vegetation used for shelter by tortoises in this area. Recovery of areas severely degraded by wildfire is a very slow process that can occur faster with sufficient rainfall or slower during drought. Data gathered so far by researchers indicate that the first stage of successful recovery is the appearance of native plant seedlings (Drake *et. al.* 2015, Esque *et. al.* 2010); however, continued disturbance will hinder this process. Data indicate that species composition (diversity) will not recover to unburned levels in the short-term, but plant responses such as canopy cover can recover more quickly (Abella 2009). We anticipate that the proposed action will hinder the recovery of these burned areas by prohibiting regeneration of this vegetation. Although grazing will occur outside of the tortoise active season, thus removing direct competition with tortoises, the degradation of habitat essential to the tortoise will continue during the tortoise inactive season.

The proposed monitoring and adaptive management aspect of the proposed action is anticipated to help reduce the long-term effects of grazing on tortoise habitat. Modification of livestock grazing management on the allotment will occur in cooperation with the permittee if monitoring indicates a lack of achieving desired conditions and current livestock grazing practices are causing non-attainment of resource objectives. 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 long-term basis, thus reducing the long-term effects of grazing on tortoise habitat.

Cattle have trampled desert tortoises and their burrows, but the frequency of trampling, or how this affects tortoise populations is unclear. Direct fatality or injury may occur if cattle step on tortoises, their eggs, tortoise burrows, or shelter sites (Burge 1977; Berry 1989; Avery and Neibergs 1993; USFWS 1994). These direct effects can occur when grazing occurs during the desert tortoise inactive period. We have reports of cases of trampling on the Arizona Strip; however, the frequency with which trampling occurs is unknown. Trampling has been documented twice on the Beaver Dam Slope, within the Beaver Dam Slope CHU, in 1988 (Coffeen 1990) and in 1991 (BLM 1991). Although we have no documentation that trampling has occurred within the action area, it is reasonable to assume it could occur in the action area. We do not anticipate trampling to effect individual tortoises when they are active since grazing in those five pastures will not occur during the tortoise active season. Additionally, livestock are not likely to trample desert tortoise eggs since egg laying occurs from mid-May through July and

most or all would hatch before the permittee puts cattle onto those pastures in mid-October (Ernst et. al. 1994). Crushing burrows could still occur when livestock use these allotments during the tortoise inactive season, resulting in tortoises being crushed inside their burrows, similar to what happened on the Beaver Dam Slope in 1988 (Coffeen 1990). We also anticipate tortoise fatalities and injuries to be low due to the low density of tortoises in this area. As previously noted, the 2017 range wide monitoring data indicate that the population density for the Gold Butte-Pakoon CHU is approximately 1.9 tortoises per sq km, which is the lowest tortoise density of all CHUs throughout the range of the tortoise (USFWS 2018).

#### *Vehicular Access*

Direct fatality or injury of desert tortoises is possible from being struck by vehicles as they ingress and egress from the allotment. We anticipate that the conservation measures (see Appendix A) will reduce the likelihood of fatalities and injuries. Established speed limits and limitations for off-road travel will reduce the chances of tortoise collisions with vehicles, especially with adult tortoises; however, juvenile and hatchling tortoises in the road are hard to see even at low driving speeds. We anticipate that any tortoise fatalities will result from vehicle collisions with juvenile and hatchling tortoises, although we do not expect these fatalities to occur frequently.

#### *Range Improvements*

We anticipate that new range improvement projects (fence removal, new fences, and pipeline extension) will result in discountable effects to desert tortoises since these activities will occur outside the tortoise active season. Vehicles and workers could damage tortoise burrows and vegetation during range improvement projects if they remove or crush vegetation to gain access to fences and pipelines during construction and maintenance. However, no blading, dozing, or scraping of the ground along the fence line on any BLM-administered land is permitted, as described above in the Conservation Measures section. Any vegetation damage would likely be temporary and we would expect vegetative recovery to occur between projects.

Although we do not anticipate human-tortoise encounters to occur due to the timing restrictions, if workers encounter tortoises, qualified biologists (those trained to properly handle and relocate tortoises) will move the tortoises away from danger. Capture, handling, transport, restraint, and release of wild animals cause acute and sometimes chronic stress in vertebrates (Drake et. al. 2012). Handling tortoises can cause them to void their bladder and expel stored water, as well as bring the onset of diseases that are in remission (USFWS 2011). Handling and relocation will be short in both duration and distance, thus minimizing the chances of inducing stress on the individual and, therefore, reducing the likelihood of fatalities.

### **Critical Habitat**

#### *Grazing*

As stated above, the Revised Recovery Plan for the Mojave Desert Tortoise recommends prohibiting livestock grazing from conservation areas (which include critical habitat) as a recovery action (USFWS 2011). Effects to the PBFs of critical habitat would be similar to those habitat-related effects described above. The proposed action may affect the quantity and quality

of forage species and the proper soil conditions to provide for the growth of such species. Damage to burrows, nesting sites, and other shelter sites could occur. Livestock grazing, especially during dry conditions, may affect vegetation for shelter from temperature extremes and predators. Effects to habitat protected from disturbance and human-caused mortality would occur since the effects described above include possible tortoise fatality. Furthermore, invasive plant species may increase, causing additional degradation of critical habitat in the area.

Although 11,680 acres of critical habitat burned previously within the action area, current research has indicated that, in the short-term (less than four years), native plants will recover in burned areas of the Mojave Desert. As described above for tortoise habitat, recovery of areas severely degraded by wildfire is a very slow process that can occur faster with sufficient rainfall or even slower during drought periods. Data gathered so far by researchers indicate that the first stage of successful recovery is the appearance of native plant seedlings (Drake *et. al.* 2015, Esque *et. al.* 2010). However, continued disturbance will hinder this process and slow the process of re-establishing the PBFs of critical habitat associated with forage and shelter. Species composition (diversity) is not expected to recover to unburned levels in the short-term, but plant responses such as canopy cover can recover more quickly (Abella 2009), thus providing shelter sites for tortoises foraging in burned areas. Preliminary observations in the northeast Mojave Desert also indicate that areas seeded with native plants appear to be progressing faster than those areas experiencing natural recovery through the existing seed bank; however, greater establishment within seeded areas has occurred where rainfall is generally higher (Lesley DeFalco, 2009, pers. comm.).

Grazing has continued in the burned areas of the allotment, including within the fire perimeters on burned critical habitat. We think that continued grazing in both burned and unburned desert tortoise critical habitat will adversely affect PBFs of critical habitat within the allotment. As previously described, burned areas in the Mojave Desert can recover; however, continued grazing will hinder specific PBFs, including *sufficient quantity and quality of forage species and the proper soil conditions to provide for the growth of such forage species, and sufficient vegetation for shelter from temperature extremes and predators*. Grazing in the remaining unburned areas of critical habitat within the allotment reduces the quality and function of these same PBFs for those tortoises occupying these areas as well as increasing competition and stress among individuals as tortoises displaced by fire move into unburned areas. The Revised Recovery Plan also states that contiguous native vegetation communities provide shrubs for cover and annuals for forage, both of which are components of these PBFs. The fragmenting of these habitats, including within the allotment, also decreases the functionality of critical habitat. Continued grazing in burned and unburned areas of this allotment retards the development of or maintenance of contiguous habitat within the allotment and thus reduces the first PBF, *sufficient space to support viable populations within each of the five RUs and provide for movements, dispersal, and gene flow*.

Because of the low precipitation and harsh conditions in the Mojave Desert, restoration of burned and disturbed sites is a difficult and long-term process. Site visits have indicated that the PBFs of critical habitat associated with forage, shelter, and soil conditions are either not returning or returning at such a slow rate that the functionality of critical habitat in those areas is not reestablishing. Drake *et. al.* (2015, 2016) have documented the importance of maintaining

these unburned habitats within burned areas in the Mojave Desert. Desert Tortoises will venture into burned areas to forage on newly sprouted vegetation (Drake *et. al.* 2015, 2016). This highlights the importance of maintaining the PBFs within these burn areas in critical habitat.

Despite the negative aspects associated with livestock grazing in critical habitat for the tortoise, livestock grazing in critical habitat will occur outside of the most abundant period for winter annual Mojave Desert vegetation in this area, approximately April-May (Beatley 1974), which is the most important forage source for tortoises. This should reduce the competition for forage between livestock and tortoises as well as allowing some growing-season recovery of the PBFs associated with sufficient forage and shelter sites. We anticipate that the utilization rate of 45 percent will reduce the long-term effects to the PBFs of critical habitat associated with sufficient forage and shelter sites.

The proposed monitoring and adaptive management aspect of the proposed action is anticipated to help reduce the effects of grazing on the PBFs of designated critical habitat. Modification of livestock grazing management on the allotment will occur in cooperation with the permittee if monitoring indicates a lack of achieving desired conditions and current livestock grazing practices are causing non-attainment of resource objectives. 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 long-term basis, thus reducing the long-term effects of grazing on the PBFs of critical habitat.

#### *Range Improvements*

Range improvements, including maintenance operations, may also result in adverse effects to PBFs of critical habitat (e.g., reduced vegetative cover and forage); however, we anticipate that the conservation measures described above in the proposed action will minimize effects to PBFs, especially those associated with forage and cover. We also anticipate that new range improvement projects (fence removal, new fences, and pipeline extension) will result in discountable effects to suitable substrates for burrowing, nesting, and overwintering; burrows and other shelter sites; sufficient quantity and quality of forage species and proper soil conditions; and sufficient vegetation for shelter from temperature extremes and predators. Vehicles and workers could damage tortoise burrows and vegetation during range improvement projects. Vegetation could be removed or crushed to gain access to fences and pipelines during construction and maintenance; however, no blading, dozing, or scraping of the ground along the fence line on any BLM-administered land is permitted, as described above in the Conservation Measures section of the proposed action. Most range improvements will occur in previously disturbed areas and any vegetation damage would likely recover to some extent between projects.

## **CUMULATIVE EFFECTS**

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. We do not consider future Federal actions that are unrelated to the proposed action in this section because they require separate consultation pursuant to section 7 of the Act.

Land management within the action area is by Federal agencies; therefore, most activities that could potentially affect these species are Federal activities and would be subject to additional section 7 consultation. The increasing human population in nearby communities has resulted in an increase in recreational activity in the analysis area. Recreational pursuits, particularly OHV use can cause disturbance to individual tortoises and their habitat. As previously mentioned, BLM limits OHV travel to existing roads, trails, and washes, but occasionally travel occurs off these existing routes. Increased human presence, noise, and harassment can all disturb wildlife, particularly ground dwelling species with low mobility such as the tortoise. In addition, tortoise mortality may increase due to increased predation, primarily in response to human-provided subsidies of food, water, and nesting sites.

Unmanaged OHV use can result in the degradation of the PBFs of critical habitat for the tortoise. Research has documented a decrease in vegetation used for both shelter forage in the presence of OHV use in the Mojave Desert (Vollmer *et. al.* 1976). Soil compaction is one of the first established and most important impacts of OHV use (Luckenbach 1975; Ouren and Coffin 2013). This compaction can lead to the loss of substrates for burrowing, nesting, and sheltering. The loss of PBFs associated with vegetation for sheltering and foraging and substrates used for burrowing, nesting, and sheltering can have significant long-term effects to tortoises using the critical habitat within the action area. Although OHV use off designated routes is likely low, the cumulative effects to critical habitat can increase significantly when combined with the effects of livestock grazing described above. This can have a significant effect on the function of these PBFs within the Gold Butte-Pakoon CHU and, therefore, affect the ability of this CHU to provide conservation and recovery for the tortoise.

## **JEOPARDY AND ADVERSE MODIFICATION ANALYSIS**

Section 7(a)(2) of the ESA requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat.

### **Jeopardy Analysis Framework**

Our jeopardy analysis relies on the following:

“Jeopardize the continued existence of” means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). The following analysis relies on four components: (1) Status of the Species, which evaluates the range-wide condition of the listed species addressed, the factors responsible for that condition, and the species’ survival and recovery needs; (2) Environmental Baseline, which evaluates the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) Effects of the Action (including those from conservation measures), which determines the direct and indirect impacts of the proposed federal action and the effects of any interrelated or interdependent activities on the species; and (4) Cumulative Effects, which

evaluates the effects of future, non-federal activities in the action area on the species. The jeopardy analysis in this biological opinion emphasizes the range-wide survival and recovery needs of the listed species and the role of the action area in providing for those needs. We evaluate the significance of the proposed Federal action within this context, taken together with cumulative effects, for the purpose of making the jeopardy determination.

### **Destruction/Adverse Modification Analysis Framework**

Past designations of CH have used the terms PCEs, PBFs or “essential features” to characterize the key components of CH that provide for the conservation of the listed species. The new CH regulations (79 FR 27066) discontinue use of the terms “PCEs” or “essential features,” and rely exclusively on use of the term “PBFs” for that purpose because that term is contained in the statute. However, the shift in terminology does not change the approach used in conducting a destruction or adverse modification analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. For those reasons, we view references to PCEs or essential features as synonymous with PBFs. All of these terms characterize the key components of CH that provide for the conservation of the listed species.

The final rule revising the regulatory definition of “destruction or adverse modification of critical habitat” became effective on March 14, 2016 (81 FR 7214). The revised definition states: “Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features.”

Similar to our jeopardy analysis, our adverse modification analysis of critical habitat relies on the following four components: (1) the Status of Critical Habitat, which evaluates the range-wide condition of designated critical habitat in terms of PBFs, the factors responsible for that condition, and the intended recovery function of the critical habitat overall; (2) the Environmental Baseline, which evaluates the condition of the critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area; (3) the Effects of the Action, which determine the direct and indirect impacts of the proposed federal action and the effects of any interrelated or interdependent activities on the PBFs and how they will influence the recovery role of affected critical habitat units; and (4) Cumulative Effects, which evaluate the effects of future, non-federal activities in the action area on the PBFs and how they will influence the recovery role of affected critical habitat units.

### **Conclusion**

After reviewing the current status of the Mojave desert tortoise and its designated critical habitat, the environmental baseline for the action area, the effects of the proposed Mosby-Nay Grazing Allotment Permit Renewal and the cumulative effects, it is our biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Mojave desert tortoise, and is not likely to destroy or adversely modify designated critical habitat for Mojave desert tortoise. We base this conclusion on the following:



- All construction activities will occur when tortoises are typically hibernating. Conservation measures should effectively minimize the potential for injury or fatality of tortoises during construction.
- Livestock grazing in allotments with suitable tortoise habitat will occur outside of the tortoise active season, approximately March 15 – October 15. This should reduce the potential for tortoises killed or harmed because of livestock grazing.
- Livestock grazing in critical habitat will occur outside of the most abundant period for winter annual Mojave Desert vegetation in this area (April-May), which is the most important forage source for tortoises. This should reduce the competition for forage between livestock and tortoises.
- The action area accounts for approximately six percent of the critical habitat containing PBFs available to tortoises in the Gold Butte-Pakoon CHU and less than one-half percent of the modeled tortoise habitat containing PBFs rangewide. Therefore, we do not anticipate this project to diminish the ability of critical habitat to recover or conserve the Mojave desert tortoise. Furthermore, there are sufficient PBFs present in the surrounding critical habitat unit; therefore, we expect that the Gold Butte-Pakoon Critical Habitat Unit to continue to contribute to the conservation and recovery of the tortoise at its current level.
- Most construction work associated with range improvements will take place in previously disturbed areas and outside of the tortoise active season. This will minimize the effects to the PBFs of critical habitat and reduce the potential for fatalities and injuries to tortoises.

We base the conclusions of this biological opinion on full implementation of the project as presented in the Description of the Proposed Action section of this document, including any Conservation Measures that the BLM incorporated into the project design.

## **INCIDENTAL TAKE STATEMENT**

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. “Take” is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. “Harm” is further defined (50 CFR § 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. “Harass” is defined (50 CFR § 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. We define “Incidental take” as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the BLM so that they become binding conditions of any grant or permit issued to the livestock permittee, as

appropriate, for the exemption in section 7(o)(2) to apply. The BLM has a continuing duty to regulate the activity covered by this incidental take statement. If the BLM (1) fails to assume and implement the terms and conditions or (2) fails to require the livestock permittee to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the BLM must report the progress of the action and its impact on the species to the FWS as specified in the incidental take statement [50 CFR § 402.14(i)(3)].

## **AMOUNT OR EXTENT OF TAKE**

Take of the Mojave desert tortoise is reasonably certain to occur from vehicle collisions with hatchling and juvenile tortoises as well as during the construction and post-construction maintenance phases of range improvements as tortoises are relocated out of harm's way. We expect the incidental take to be in the form of harassment from handling tortoises during relocations and from direct fatality and harm from vehicle collisions as vehicle traffic increases associated with range improvement construction and maintenance. These situations may result in short-term harassment, possible injury, or death; however, we do not expect tortoise fatalities from handling since qualified biologists will follow proper handling guidelines at all times. Since no burrows have been found within or near the project areas and burrow excavation is not necessary, we do not anticipate any take of tortoises associated with burrow excavation and subsequent moving of tortoises from burrows.

- We are authorizing the lethal take of up to three hatchling or juvenile Mojave desert tortoises in the Mosby-Nay Grazing Allotment as a result of vehicle collisions. We do not anticipate frequent vehicle collisions with young tortoises because tortoise densities are so low in this area and vehicle traffic will not occur regularly in the action area during livestock activities and subsequent maintenance activities. Incidental take would be exceeded if more than three juvenile or hatchling tortoise fatalities occur due to authorized vehicular use activities within the Mosby-Nay Grazing Allotment. These fatalities should be easy to detect since the tortoises will be in the roads and vehicles are supposed to be following established speed limits.
- We are authorizing an unlimited number of non-injury/non-lethal incidental takes of tortoises for the purposes of relocating Mojave desert tortoises from the action area during both construction and future maintenance activities. We expect the number of tortoises relocated will be very small and do not anticipate the relocation of more than 10 tortoises from the project area during the lifetime of this grazing permit. Because tortoise densities are so low in this area, monitoring has indicated very few tortoises, and all activities will be outside of the tortoise active season, we do not anticipate frequent encounters in the action area during range improvement activities and subsequent maintenance activities.

## **EFFECT OF THE TAKE**

In this biological opinion, the FWS determines that this level of anticipated take is not likely to result in jeopardy to the species, or destruction or adverse modification of critical habitat for the reasons stated in the Conclusions section.

## **REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS**

In order to be exempt from the prohibitions of section 9 of the Act, BLM must comply with the following terms and conditions (lettered and Roman numeral items), which implement the reasonable and prudent measures (numbered items) and outline reporting/monitoring requirements. The terms and conditions are non-discretionary.

The following reasonable and prudent measures and implementing terms and conditions are necessary and appropriate to minimize take of desert tortoise:

1. BLM shall implement programs and procedures to minimize injury or fatality of tortoises during project activities.
  - 1.1 Authorized activities will require monitoring of the desert tortoise population throughout the duration of the project construction. The development of the appropriate level of monitoring will occur in coordination with BLM and FWS. To ensure the achievement of desired results, the BLM will evaluate minimization measures and, if necessary, reinstate section 7 consultation.
2. The BLM shall submit a tortoise relocation report to the Arizona Ecological Services Field Office by February 1 of each year. Specifically for this project, the report shall briefly document the number of tortoises relocated, as well as actions taken to implement these terms and conditions, the effectiveness of these terms and conditions at reducing take of desert tortoise, and information on individual desert tortoise encounters. The report shall make recommendations for modifying or refining these terms and conditions to enhance desert tortoise protection and reduce needless hardship on the BLM and users of public lands.
3. The BLM shall notify our office of any post-construction tortoise fatalities documented along these roads. The report should include the estimated age class, size, and sex of the tortoise. Additionally, any circumstances that can be determined regarding the fatalities should be included. The BLM shall notify our office within 72 hours of discovering the fatalities, or as soon as possible.

Review requirement: The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. The BLM must immediately provide an explanation

of the causes of the taking and review with the AESO the need for possible modification of the reasonable and prudent measures.

### **Disposition of Dead or Injured Listed Species**

Upon locating a dead, injured, or sick listed species initial notification must be made to the FWS's Law Enforcement Office, 4901 Paseo del Norte NE, Suite D, Albuquerque, NM 87113; 505-248-7889) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state.

### **CONSERVATION RECOMMENDATIONS**

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. We recommend that BLM continue to assist Lake Mead National Recreation Area; other BLM offices in Utah, Nevada, and California; and other land managers in the Northeast Mojave RU in the development of regional planning efforts to implement the recovery plan, and in the integration of those plans with the Arizona Strip RMP.
2. We recommend that BLM fully implement the Revised Desert Tortoise Recovery Plan and subsequent revisions of the plan.
3. We recommend that BLM manage activities so that they do not contribute to the proliferation of predators within desert tortoise habitat.
4. We recommend that BLM only construct new wildlife guzzlers in desert tortoise habitat that are designed to exclude desert tortoises, and if sufficient forage is available.
5. We recommend that the BLM coordinate and collaborate with other local, State, and Federal agencies as well as private groups to sponsor and/or assist with public education regarding desert tortoise conservation to enhance public support for conservation activities. Target groups for education and outreach may include OHV groups, hunting groups, Home Owner Associations, scout troops, public schools, libraries, and other audiences and venues associated with regional land use and/or educational programming.

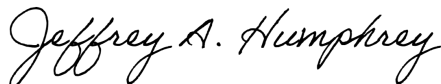
In order to keep the FWS informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the FWS requests notification of the implementation of any conservation recommendations.

## REINITIATION NOTICE

This concludes formal consultation on for the Mosby Nay Allotment. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

In keeping with our trust responsibilities to American Indian Tribes, we encourage you to continue to coordinate with the Bureau of Indian Affairs in the implementation of this consultation. By copy of this biological opinion, are notifying the following Hopi, Chemehuevi, and Colorado River Indian Tribes of its completion. We also encourage you to coordinate the review of this project with the Arizona Game and Fish Department.

We appreciate the BLM's efforts to identify and minimize effects to listed species from this project. For further information, please contact Brian Wooldridge (928) 556-2106 or Shaula Hedwall (928) 556-2118. Please refer to the consultation number 02EAAZ00-2018-F-1089 in future correspondence concerning this allotment.

  
Jeffrey A. Humphrey

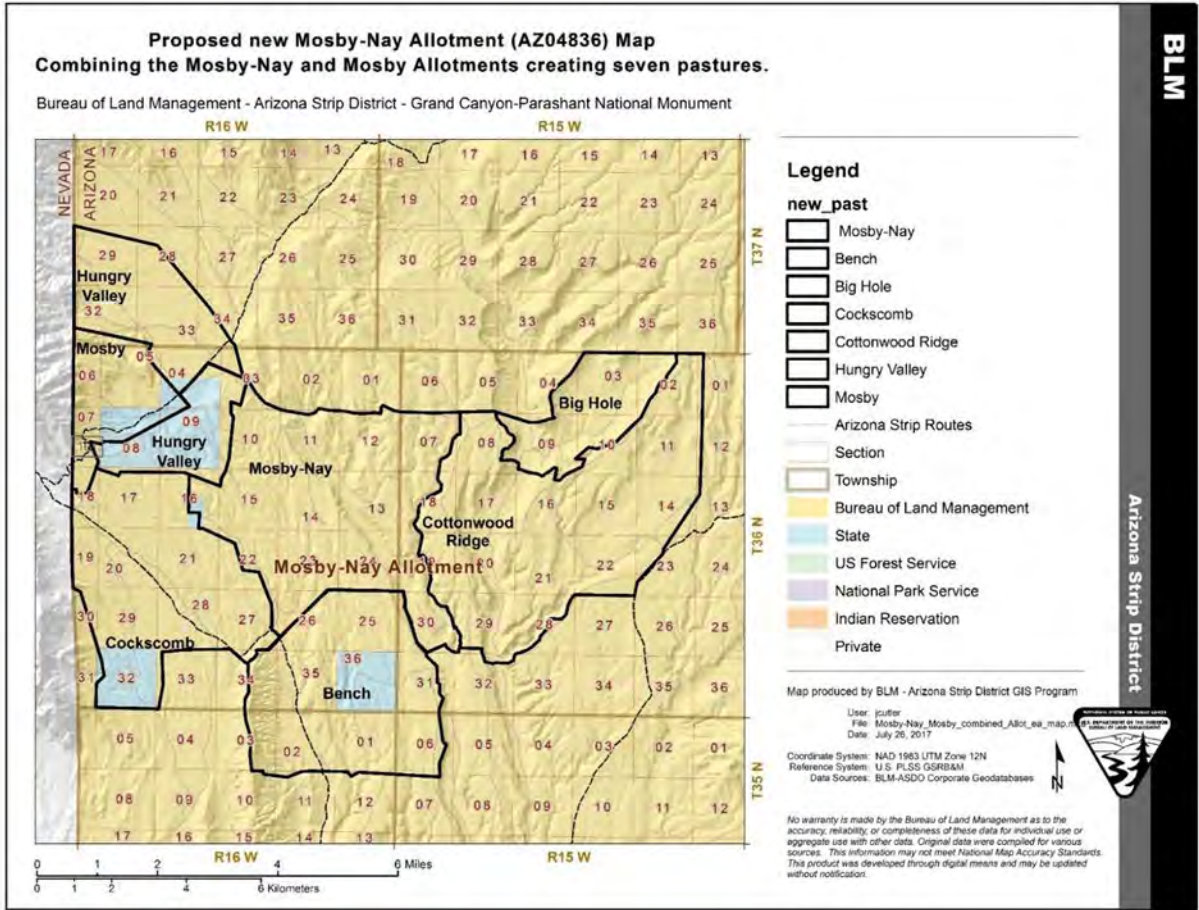
cc (electronic):

Assistant Field Supervisor, USFWS, Flagstaff, AZ  
Monument Manager, Grand Canyon-Parashant National Monument, Bureau of Land  
Management, St. George, UT (Attn: Jeff Young)  
State Director, Bureau of Land Management, Phoenix, AZ

Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ  
Supervisor, Region 2, Arizona Game and Fish Department, Flagstaff, AZ (Attn: Rob Nelson)  
Director, Hopi Cultural Preservation Office, Kykotsmovi, AZ  
Director, Resource Center, Chemehuevi Tribe, Havasu Lake, CA  
Cultural Compliance Technician, Museum, Colorado River Indian Tribes, Parker, AZ  
Environmental Specialist, Environmental Services, Western Regional Office, Bureau of  
Indian Affairs, Phoenix, AZ

# TABLES AND FIGURES

## Figure 1. Map of the Mosby Nay Allotment with Pastures



## LITERATURE CITED

- Abella, S. 2009. Post-fire recovery in the Mojave and Sonoran deserts of western North America. *Journal of Arid Environments* 73: 699–707.
- Avery, H.W., and A.G. Neibergs. 1993. Interactions of range cattle and desert tortoises at Ivanpah Valley, California: 1993 observations. Page 2 in B. Bartholomew (ed), *Proc. Desert Tortoise Counc. Symp. 1993* (abstract).
- Balling Jr., R.C., J.M. Klapotek, M.L. Hildebrandt, C.K. Moritz, and C.J. Watts. 1998. Impacts of land degradation on historical temperature records from the Sonoran Desert. *Climatic Change* 40: 669-681.
- Beatley, J. C. 1974. Phenological events and their environmental triggers in Mohave Desert ecosystems. *Ecology* 55:865-863.
- Berry, K. H. 1986. Desert tortoise (*Gopherus agassizii*) research in California, 1976-1985. *Herpetologica* 42:62-67.
- Berry, K.H. 1989. The status of the desert tortoise in California in 1989. Report to the US Fish and Wildlife Service. 94 pp.
- Beymer, R.J. and J.M. Klopatek. 1991. Potential contribution of carbon mycophytic crusts in pinyon-juniper woodlands. *Arid Soil Research and Rehabilitation* 5: 187-198.
- Brooks, M.L. 2000. Competition between alien annual grasses and native annual plants in the Mojave Desert. *American Midland Naturalist*. 144(1): 92 – 108.
- Brooks, M.L. 2009. Spatial and temporal distribution of nonnative plants in upland areas of the Mojave Desert. Pp. 101 – 124. In: R.H. Webb, L.F. Fenstermaker, J.S. Heaton, D.L. Hughson, E.V. McDonald, and D.M. Miller (eds). *The Mojave Desert: Ecosystem Processes and Sustainability*. 2009. University of Nevada Press. 528 pp.
- Brooks, M.L. and D. Pyke. 2002. Invasive plants and fire in the deserts of North America. p. 1–14 In: K. Galley and T. Wilson (eds.), *Proceedings of the Invasive Species Workshop: The Role of Fire In the Control and Spread of Invasive Species*. Fire Conference 2000: The First National Congress on Fire, Ecology, Prevention and Management. Miscellaneous Publications No. 11, Tall Timbers Research Station, Tallahassee, Florida, USA.
- Brooks ML, Esque TC, Duck T (2007) Creosotebush, blackbrush, and interior chaparral shrublands. In: Hood S, Miller M (eds) *Fire ecology and management of the major ecosystems of Southern Utah*. Gen Tech Rep RMRS-GTR-202. USDA, Forest Service, Rocky Mountain Research Station. Fort Collins, CO, pp 97–110.



- Bureau of Land Management 1991. Final Environmental Impact Statement: Vegetation treatment on BLM Lands in Thirteen Western States. Wyoming State Office.
- Bureau of Land Management. 2018. Biological assessment for the Grazing Permit Renewal Mosby and Mosby-Nay Allotments. Grand Canyon-Parashant National Monument. 26pp.
- Burge, B.L. 1977. A survey of the present distribution of the desert tortoise (*Gopherus agassizii*) in Arizona. Contract No. YA-512-CT8-108. Bureau of Land Management.
- Burge, B.L., and W.G. Bradley. 1976. Population density, structure and feeding habitats of the desert tortoise, *Gopherus agassizii*, in a low desert study area in southern Nevada. Proceedings 1976 Desert Tortoise Council Symposium. Pages 51-74.
- Burkhardt, J.W., and D. Chamberlain. 1982. Range cattle food habits on the Mojave Desert. Project 617 of the Nevada Agricultural Experiment Station. 8 pp.
- Coffeen, M.P. 1990. Letter to Sid Slone, Bureau of Land Management, Las Vegas, NV, dated 31 January 1990.
- Coombs, E.M. 1979. Food habits and livestock competition with the desert tortoise on the Beaver Dam Slope, Utah. Pages 132-147 in Proceedings of the Desert Tortoise Couc. Symp. 1979.
- Dadkhah, M. and G.F. Gifford. 1980. Influence of vegetation, rock cover, and trampling on infiltration rates and sediment production. Water Resources Bulletin. 16(6): 979-986.
- Drake, K.K., K.E. Nussear, T.C. Esque, A.M. Barber, K.M. Vittum, P.A. Medica, C.R. Tracy, and K.W. Hunter Jr. 2012. Does translocation influence physiological stress in the desert tortoise? Animal Conservation 15: 560-570.
- Drake, K.K., T.C. Esque, K.E. Nussear, L.A. DeFalco, S.J. Scoles-Sciulla, A.T. Modlin, and P.A. Medica. 2015. Desert tortoise use of burned babitat in the eastern Mojave Desert. Journal of Wildlife Management 79(4): 618-629.
- Drake, K.K., L. Bowen, K.E. Nussear, T.C. Esque, A.J. Berger, N.A. Custer, S.C. Waters, J.D. Johnson, A.K. Miles, and R.L. Lewison. 2016. Negative impacts of invasive plants on conservation of sensitive desert wildlife. Ecosphere 7(10):e01531. 20pp.
- Ernst, C.H., J.E. Lovich, and R.W. Barbour. 1994. Turtles of the United States and Canada. Smithsonian Institution Press, Washington D.C.
- Esque, T. 1994. Diet and diet selection of the desert tortoise (*Gopherus agassizii*) in the northeastern Mojave Desert. Masters Thesis, Colorado State University, Ft. Collins.

- Esque, T.C., J.A. Young, and C.R. Tracy. 2010. Short-term effects of experimental fires on a Mojave Desert seed bank. *Journal of Arid Environments* 74: 1302-1308.
- Esque, T. C., K. K. Drake, and K. E. Nussear. 2014. Water and food acquisition and their consequences on life history and metabolism of North American tortoises. Chapter 10. Pages 85–95 in D. Rostal, H. Mushinsky, and E. D. McCoy, editors. *Biology and conservation of North American tortoises*. Johns Hopkins Press, Baltimore, Maryland, USA.
- Fleischner, T.L. 1994. Ecological costs of livestock grazing in western North America. *Conservation Biology* 8: 629–644.
- Floyd, M.L., T. L. Fleischener, D. Hanna, and P. Whitfield. 2003. Effects of historic livestock grazing on vegetation at Chaco Culture National Historic Park, New Mexico. *Conservation Biology*. 17(6): 1703 – 1711.
- Henen, B.T. 1992. Desert tortoise diet and dietary deficiencies that may limit egg production of Goffs, California. Abstracts of the 17th Annual Symposium and Meeting of the Desert Tortoise Council, Las Vegas, Nevada, March 6-9, 1992
- Hohman, J., and R.D. Ohmart. 1980. Ecology of the desert tortoise (*Gopherus agassizii*) on the Beaver Dam Slope, Arizona. Unpubl. Rept. submitted to the Bureau of Land Management, Arizona Strip District, St. George, Utah. Cont. No. YA-510-PH7-54.
- Holechek, J.L, R.D. Pieper, and C.H. Herbel. 1998. Range management principles and practices. Prentice-Hall, Inc. 542 p. Upper Saddle River, N.J.
- Jarchow, J.L., and C.J. May. 1989. Report on investigation of desert tortoise mortality on the Beaver Dam Slope, Arizona and Utah. Prepared for Arizona Game and Fish Department, Bureau of Land Management, Arizona Strip and Cedar City Districts, and Utah Division of Wildlife Resources. Neglected Fauna International, Tucson, Arizona.
- Loftin, S.R., Bock, C.E., Bock, J.H., Brantley, S.L. (2000) "Desert grasslands" In: Jemison, R., Raish, C. eds., *Livestock Management in the American Southwest: Ecology, Society, and Economics*, Elsevier, New York, pp 53-96.
- Loope, W.L. and G.F. Gifford. 1972. Influence of a soil microfloral crust on select properties of soils under pinyon-juniper in southeastern Utah. *Journal of Soil Water and Conservation* 27: 164-167.
- Luckenbach, R.A. 1975. What the ORVs are doing to the desert. *Fremonita*. 6pp.

- Minden, R.L. 1980. Investigations of the desert tortoise (*Gopherus agassizii*) on the Beaver Dam Slope, Washington County, Utah. Utah Division of Wildlife Resources. Public. No. 80-21.
- Nagy, K.A., and P.A. Medica. 1986. Physiological ecology of desert tortoises in southern Nevada. *Herpetologica* 42(1):73-92.
- Ouren, D.S. and A.W. Coffin. 2013. Monitoring intensity and patterns of off-highway (ohv) use in remote areas of the western USA. *Oecologia Australis* 17(1): 96-110.
- RECON (Regional Environmental Consultants). 2000. Clark County Multiple Species Habitat Conservation Plan. Prepared for Clark County. Las Vegas, Nevada.
- Reynolds, R., J. Belnap, M. Reheis, P. Lamothe, and F. Luiszer. 2001. Aeolian dust in Colorado Plateau soils: nutrient inputs and recent change in source. *Proceedings of the National Academy of Sciences of the United States of America* 98(13): 7123-7127.
- Robinson, W.L. and E.G. Bolen. 1989. *Wildlife ecology and management*. Second ed. Macmillan Publ. Co., New York, N.Y. 574pp.
- Rychert, R.C., J. Skujins, D. Sorensen, and D. Porcella. 1978. Nitrogen fixation by lichens and free-living microorganisms in deserts. Pages 20-30 in N.E. West and J. Skulins, editors. *Nitrogen in desert ecosystems*. Dowden, Hutchinson, and Ross, Stroudsburg, Pennsylvania.
- Tracy, C.R., R. Averill-Murray, W.I. Boarman, D. Delehanty, J. Heaton, E. McCoy, D. Morafka, K. Nussear, B. Hagerty, and P. Medica. 2004. *Desert tortoise recovery plan assessment*. Prepared for the U.S. Fish and Wildlife Service. Reno, Nevada.
- Turner, F.B., P.A. Medica, and C.L. Lyons. 1984. Reproduction and survival of the desert tortoise (*Scaptochelys agassizii*) in Ivanpah Valley, California. *Copeia* 1984(4):811-820.
- U.S. Fish and Wildlife Service. 1993. *Draft recovery plan for the desert tortoise (Mojave population)*. Portland, Oregon.
- U.S. Fish and Wildlife Service. 1994. *Desert tortoise (Mojave population) recovery plan*. Portland, Oregon.
- U.S. Fish and Wildlife Service. 2002. *Biological opinion for the boundary survey of lands withdrawn pursuant to Fort Irwin Military Lands Withdrawal Act of 2001, San Bernardino County, California (1-8-02-F-27)*. Dated April 19. Ventura, California.

- U.S. Fish and Wildlife Service. 2006. Range-wide Monitoring of the Mojave Population of the Desert Tortoise: 2001-2005 Summary Report. R DesertTortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada.
- U.S. Fish and Wildlife Service. 2010. Mojave population of the desert tortoise (*Gopherus agassizii*). 5-year review: summary and evaluation. Dated September 30. Desert Tortoise Recovery Office. Reno, Nevada.
- U.S. Fish and Wildlife Service. 2011. Revised recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*). Pacific Southwest Region. Sacramento, California.
- U.S. Fish and Wildlife Service (USFWS). 2015. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2013 and 2014 Annual Reports. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada.
- U.S. Fish and Wildlife Service (USFWS). 2018. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2017 Annual Reporting. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada.
- Vollmer, A. T., B. G. Maza, P.A. Medica, F. B. Turner, and S. A. Bamberg. 1976. The impact of off-road vehicles on a desert ecosystem. *Environmental Management* 1:15-129.
- Waser, N.M. and M.V. Price. 1981. Effects of grazing on diversity of annual plants in the Sonoran desert. *Oecologia* 50:407-411.

## **APPENDIX A: DESERT TORTOISE CONSERVATION MEASURES FROM 2007 RMP BIOLOGICAL OPINION**

The following conservation measures were part of the proposed action for the 2007 Biological Opinion for the Arizona Strip BLM Resource Management Plan (22410-2007-F-0463).

- DT-1.A. For each authorized project<sup>1</sup>, BLM and/or NPS will designate a field contact representative (FCR) who will be responsible for overseeing compliance with these conservation measures and for coordination on compliance with the FWS. The FCR will be a qualified biologist approved by BLM and/or NPS, and will have the authority and the responsibility to halt all project activities that are in compliance with these conservation measures. These individuals will have a copy of these conservation measures while on the work site.
- DT-1.B. To the extent possible, project features will be located in previously-disturbed areas or outside of desert tortoise habitat.
- DT-1.C. To the extent possible, project activities will be scheduled when tortoises are inactive (October 15 through March 15). The following project activities will only be authorized between October 15 through March 15: surface disturbance associated with mineral leasing; organized, non-speed vehicular events; construction and non-emergency maintenance activities in rights-of-ways; and non-emergency maintenance of existing roads.
- DT-1.D. Pre-construction surveys will be conducted to locate desert tortoises that may be injured or killed as a result of proposed activities. Projects will be altered or tortoises in harm's way will be relocated to avoid lethal take of tortoises in project areas. Prior to any surface-disturbing activities associated with "projects," work sites will be surveyed for desert tortoises by a qualified biologist approved by BLM and/or NPS. Areas of new disturbance will be surveyed with 100-percent coverage.
- DT-1.D.1. Between October 15 and March 15 any new disturbance will be preceded by 100-percent surveys conducted within one week of the proposed activities. During surveys, occupied desert tortoise burrows in or within 40 feet of areas to be disturbed will be excavated using hand tools under the supervision of an authorized biologist. Tortoises discovered in burrows will be relocated. Burrows will then be collapsed or blocked to prevent entry by tortoises. Desert tortoises and any desert tortoise eggs found in areas to be disturbed will be relocated in accordance with conservation measure DT-1.D.4. All handling of desert tortoises and their eggs will be in accordance with conservation measure DT-1.D.4.
- DT-1.D.2. For project activities occurring during the desert tortoise active season (March 15 through October 15), surveys will be conducted within 24 hours of initiation of surface-disturbing activities. For surface-disturbing activities conducted from March 15 to October 15 in desert tortoise habitat, construction and operation activities will be monitored by a qualified desert tortoise biologist approved by BLM and/or NPS. The

biologist will be present during all activities in which encounters with tortoises may occur. The biologist will watch for tortoises wandering into construction areas, check under vehicles, check at least three times per day any excavations that might trap tortoises, and conduct other activities necessary to ensure that death or injury of tortoises is minimized.

DT-1.D.3. Only biologists authorized and permitted by the Service and Arizona Game and Fish Department will handle desert tortoises. Additional biologists could be authorized if BLM and/or NPS submits the name(s) of the proposed authorized biologist(s) to the Service for review and approval at least 15 days prior to the onset of activities that could result in a take. Minimum requirements for authorized biologists include attending the Desert Tortoise Council's training course for handling desert tortoises and/or training by an authorized biologist. Authorized biologists must have all valid state and federal permits.

DT-1.D.4. The authorized biologist will maintain a record of all desert tortoises encountered during project activities. This information will include for each desert tortoise:

1. The locations and dates of observation
2. General condition and health, including injuries and state of healing and whether animals voided their bladders
3. Location moved from and location moved to
4. Diagnostic markings (i.e. identification numbers of marked lateral scutes)

Desert tortoises that are handled will be marked for future identification. An identification number (using the acrylic paint/epoxy technique) will be placed on the 4th costal scute (Fish and Wildlife Service 1992). No notching of scutes or replacement of fluids with a syringe is authorized.

DT-1.E. If a tortoise or clutch of tortoise eggs is found in a project area, to the extent practicable activities will be modified to avoid injuring or harming it. If activities cannot be modified, the tortoise/clutch will be moved from harm's way by an the authorized biologist the minimum distance possible within appropriate habitat to ensure its safety from death, injury, or collection associated with the project or other activities. The authorized biologist will have some discretion to ensure that survival of each relocated desert tortoise/clutch is likely. Desert tortoises/clutches will not be translocated to lands outside the administration of the Federal government without the written permission of the landowner. Handling procedures for desert tortoises and their eggs will adhere to protocols outlined in Desert Tortoise Council (1994 with 1996 revisions).

DT-1.F. Areas of new construction or disturbance will be flagged or marked on the ground prior to construction. All construction workers will strictly limit their activities and vehicles

to areas that have been marked. Construction personnel will be trained to recognize markers and understand the equipment movement restrictions involved.

DT-1.G. A desert tortoise education program will be presented to all project personnel that may encounter tortoises; such as employees, inspectors, supervisors, contractors, and subcontractors; prior to initiation of activities that may result in disturbance of desert tortoise habitat or death or injury of desert tortoises. The education program will include discussions of the following:

1. legal protection of the desert tortoise and sensitivity of the species to human activities;
2. a brief discussion of desert tortoise distribution and ecology;
3. the terms and conditions of applicable biological opinions;
4. project features designed to reduce adverse effects to desert tortoises and their habitat, and to promote the species' long-term survival;
5. protocols during encounters with desert tortoises and associated reporting requirements; and,
6. the definition of take and penalties for violations of Federal and State laws.

DT-1.H. During the tortoise active season (March 15 through October 15), project features that might trap or entangle desert tortoises such as open trenches, pits, open pipes, etc. will be covered or modified to prevent entrapment.

DT-1.I. Long-term or permanent project sites in which continued encounters with desert tortoises are expected, such as construction of schools under an R&PP lease, roads, power plants, office buildings, and other permanent or long-term projects will be enclosed with desert tortoise barrier fencing to prevent tortoises from wandering onto the project site where they may be subject to collection, death, or injury. Barrier fencing should consist of wire mesh with a maximum mesh size of 1-inch (horizontal) by 2-inch (vertical) fastened securely to posts. The wire mesh will extend at least 18 inches above the ground and preferably 12 inches below the surface of the ground. Where burial is not possible, the lower 12 inches will be folded outward, away from the enclosed site, and fastened to the ground so as to prevent tortoise entry. Any gates or gaps in the fence will be constructed and operated to prevent desert tortoise entry (such as installing "tortoise guards" similar to cattle guards, and/or keeping gates closed). Specific measures for tortoise-proofing gates and gaps will be addressed project by project. Once fence construction is complete, all tortoises within the fence will be relocated outside the fence in accordance with conservation measure DT-1.D.4. If more than 20 tortoises be relocated from any one area enclosed by a fence, the BLM or NPS will contact the Service in regard to disposition of the animals. After the area within the fence has been cleared of tortoises, construction and operation activities may



occur within the fence without the presence and monitoring of a biologist (see conservation measure DT-1.D.).

- DT-1.J. Temporary fencing, such as snow fencing, chain link, and other suitable materials will be used in designated areas as determined by the BLM to reduce encounters with tortoises from March 15 to October 15 on short-term projects, such as construction of power lines, burial of fiber optic cables, etc., where encounters with tortoises are likely.
- DT-1.K. Blading of work areas will be minimized to the extent possible. Disturbance to shrubs will be avoided if possible. If shrubs cannot be avoided during equipment operation or vehicle use, wherever possible they will be crushed rather than excavated or bladed.
- DT-1.L. Project vehicle use will be limited to designated routes (existing routes prior to designation) to the extent possible.
- DT-1.M. At no time will vehicle or equipment fluids be dumped on public lands. All accidental spills must be reported to BLM and NPS and cleaned up immediately, using the best available practices according to the requirements of the law. All spills of federally or State-listed hazardous materials that exceed reportable quantities will be promptly reported to the appropriate State agency and the BLM and NPS.
- DT-1.N. Vehicles associated with BLM-authorized projects traveling on unpaved roads in desert tortoise habitat will not exceed speed limits established by the BLM as necessary to protect desert tortoises. These speed limits will generally not exceed 40 mph even on the best-unpaved roads but may be much less than this on some roads.
- DT-1.O. New paved roads and highways in desert tortoise habitat or major reconstruction or modifications of existing paved roads through desert tortoise habitat will be fenced with desert tortoise barrier fencing (see DT-1.I. and J.). Culverts, to allow safe passage of tortoises, will be constructed approximately every mile of new or reconstructed paved road (culverts can also serve the more typical purpose of conducting water under roads). The culvert diameter needed to encourage tortoise use is correlated with culvert length, but generally short culverts of large diameter are most likely to be used. The floor of the culvert will be covered with dirt and maintenance should be performed as necessary to maintain an open corridor for tortoise movement. Culvert design will be coordinated with and approved by the Service.
- DT-1.P. Unleashed dogs will be prohibited in project areas.
- DT-1.Q. Temporary access routes created during project construction will be modified as necessary to prevent further use. Closure of access routes could be achieved by ripping, barricading, posting the route as closed, and/or seeding and planting with native plants.
- DT-1.R. To reduce attraction of potential desert tortoise predators, project sites in desert tortoise habitat will be maintained in a sanitary condition at all times; waste materials at those

sites will be placed in covered receptacles and disposed of promptly at an appropriate waste disposal site. "Waste" refers to all discarded matter, including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment. All reasonable effort will also be taken to reduce or eliminate water sources associated with project activities that might attract ravens and other predators.

DT-1.S. After completion of the project, trenches, pits, and other features in which tortoises could be entrapped or entangled, will be filled in, covered, or otherwise modified so they are no longer a hazard to desert tortoises.

DT-1.T. After project completion, measures will be taken to facilitate restoration. Restoration techniques will be tailored to the characteristics of the site and the nature of project impacts. Techniques may include removal of equipment and debris, re-contouring; and seeding, planting, transplanting of cacti and yuccas, etc. Only native plant species, preferably from a source on or near the project area, will be used in restoration.