

Sonoran Desert National Monument Livestock Grazing

Draft Resource Management Plan Amendment/Environmental Assessment

DOI-BLM-AZ-P040-2024-0001-RMP-EA

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May 2024



It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

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1.0 INTRODUCTION/PURPOSE AND NEED

1.1 Introduction

The Sonoran Desert National Monument (SDNM) was designated by Presidential Proclamation 7397 on January 17, 2001 (Proclamation), which stated that “[l]aws, regulations, and polices followed by the Bureau of Land Management in issuing and administering grazing permits or leases on all lands under its jurisdiction shall continue to apply with regard to the lands in the monument; provided, however, that grazing permits on Federal lands within the monument south of Interstate 8 shall not be renewed at the end of their current term; and provided further, that grazing on Federal lands north of Interstate 8 shall be allowed to continue only to the extent that the Bureau of Land Management determines that grazing is compatible with the paramount purpose of protecting the objects identified in this proclamation.”

In 2016, the U.S. District Court – District of Arizona issued a ruling concluding that the Bureau of Land Management (BLM) did not provide adequate explanations for determining livestock grazing compatibility on the SDNM for the 2012 SDNM, Resource Management Plan/Record of Decision (RMP/ROD) (BLM 2012a). The court found the administrative record did not support the analysis that led to the decisions in the ROD to make grazing available on five allotments north of Interstate-8 (I-8) and ordered the BLM to complete a new Land Health Evaluation (LHE) and Grazing Compatibility Analysis (GCA) to be incorporated into the SDNM RMP by September 30, 2020.

In 2020, a revised GCA, LHE, and an RMP Amendment/Environmental Assessment (RMPA/EA) were completed to address the Court remand. The 2020 RMPA/EA evaluated whether any allotments on the SDNM north of I-8 would be “available” or “unavailable” for livestock grazing, and whether any changes are needed to the available Animal Unit Months (AUMs). The selected alternative in the Draft RMPA/EA included all allotments as available for grazing with a range of use from ephemeral only to a maximum number of 4,232 AUMs authorized across the six allotments (BLM 2020).

In 2023, the U.S. District Court – District of Arizona issued another ruling concluding that the LHE and RMPA/EA included errors in the analysis and ordered the plaintiffs and the BLM to come to an agreement on a path forward (Western Watersheds Project, et al., v. United States Bureau of Land Management, Case No. 2:21-CV-01126-PHX-SRB (Dist. Ct. Ariz), Order dated August 9, 2023). The parties agreed to additional NEPA analysis followed by a Record of Decision or other appropriate decision document and, as necessary, revise the Land Health Evaluation, Compatibility Determination, and RMP Amendment to address the Court’s Order. This agreement was filed with and approved by the Court in October 2023 (Western Watersheds Project et al v. United States Bureau of Land Management (21cv01126-PHX-SRB, Dkt. 51).

The BLM has drafted a new Resource Management Plan Amendment for grazing in the Sonoran Desert National Monument. In May 2024, the BLM invited public comment on the Environmental Analysis and supporting analysis.

1.2 Planning Area

The Planning Area for this Draft RMPA/EA is defined as approximately 252,460 acres of public land managed by the BLM within the SDNM north of I-8 (Figure 1).

1.3 Purpose and Need

The purpose of this action is to consider the compatibility of livestock grazing with monument objects for which the SDNM was established and to amend the 2012 SDNM RMP/ROD. “Objects” identified in the Proclamation were not provided in a single table or list. Table 1 is a representative list of the objects and their associated elements.

Table 1. Objects and Elements of the Proclamation.

Objects	Elements
Functioning Desert Ecosystem	Saguaro cactus (<i>Carnegiea gigantea</i>) forests Habitat for a wide range of wildlife species
Diversity of Plant and Animal Species	Woodland assemblages Palo verde-mixed cacti vegetation community Tinajas
Saguaro Cactus Forest	Saguaro cactus and nurse plants
Scientific Analysis of Plant Species and Climates in Past Eras ¹	Packrat middens Kofa mountain barberry (<i>Berberis harrisonianai</i>) Juniper (<i>Juniperus</i> spp.) Arizona rosewood (<i>Vauquelinia californica</i>)
Vegetation Communities: Creosote-Bursage, Desert Grassland, and Washes	Creosote-bursage vegetation community Washes
Wildlife	Sonoran desert tortoise (<i>Gopherus morafkai</i>) Desert bighorn sheep (<i>Ovis canadensis mexicana</i>) Raptors Owls (including elf owl (<i>Micrathene whitneyi</i>) Cactus ferruginous pygmy owl (<i>Glaucidium brasilianum cactorum</i>) Western screech owl (<i>Megascops kennicottii</i>) Mule deer (<i>Odocoileus hemionus</i>) Javelina (<i>Pecari tajacu</i>) Lesser long-nosed bat (<i>Leptonycteris yerbabuenae</i>) California leaf-nosed bat (<i>Macrotus californicus</i>) Cave myotis bat (<i>Myotis velifer</i>)
Archaeological and Historic Sites	Rock art sites Lithic quarries Scattered artifacts Vekol Wash Juan Bautista de Anza National Historic Trail Mormon Battalion Trail Butterfield Overland Stage Route

Sources: Adapted from Table E-2 in BLM 2012b and the Proclamation.

¹ The Proclamation lists these elements under “Sand Tank Mountains,” which is not in the Analysis Area.

The need for this action is established in the Proclamation, Taylor Grazing Act of 1934, the Federal Land Policy and Management Act of 1976, Fundamentals of Rangeland Health (43 Code of Federal Regulation (CFR) 4180), the SDNM RMP, and the March 31, 2016 ruling by the U.S. District Court – District of Arizona concluding that the BLM did not provide adequate explanations for determining livestock grazing compatibility on the SDNM in the 2012 SDNM RMP/ROD (Western Watersheds Project, et al., v. United States Bureau of Land Management, Case No. CV-13-01028-PHX-PGR (Dist. Ct. Ariz), Order dated March 31, 2016).

1.4 Scoping and Issue Identification

On January 12, 2020 the BLM sent Cooperating Agency invitations to 16 potential government organizations and tribal governments to participate in this RMPA/EA (BLM 2020). Under the National Environmental Policy Act (NEPA), State agencies, local governments, and tribal governments may serve as a Cooperating Agency for a planning effort. Criteria for being a Cooperating Agency is: a) jurisdiction by law or b) special expertise. Listed below in the Table 2 is their status.

Table 2. Cooperating Agencies.

Government/Organization	Invited	Participated
Arizona Game and Fish Department, Region 4	✓	✓
Arizona Game and Fish Department, Region 6	✓	
U.S. Fish and Wildlife Service, Arizona Ecological Services	✓	
Arizona State Land Department	✓	
Arizona Department of Transportation	✓	
Arizona Department of Agriculture	✓	
Ak-Chin Indian Community	✓	
Hopi Tribe	✓	
Tohono O’odham Nation	✓	
Pascua Yaqui Tribe	✓	
Salt River Pima-Maricopa Indian Community	✓	
Gila River Indian Community	✓	
Maricopa Department of Transportation	✓	
Maricopa County	✓	
Pinal County	✓	

On March 6, 2020 tribal governments with an affiliation with the Planning Area were notified and provided early information on this RMPA/EA under the provisions of Section 106 of the National Historic Preservation Act (BLM 2020). Affected tribes were notified of the current RMPA/EA effort on April 30, 2024.

Public scoping for this RMPA/EA was initiated with the publication of a Notice of Intent in the *Federal Register* on March 26, 2020 (Vol. 89, No. 59, 17095). The BLM notified 57 individuals, organizations and agencies by email and postcard of the scoping period on March 25, 2020. The BLM also published an updated LHE and draft GCA for public input. The 30-day public scoping period ended on April 27, 2020. Approximately 55 comment emails were of similar nature-opposed to livestock grazing within the SDNM. There were requests that the BLM complete an environmental impact statement and suggested that the review period for the Draft RMPA/EA should be 90-days in length. The BLM received approximately 62 comment letters and emails to consider (BLM 2020).

1.4.1 Issues to be Addressed in this Draft RMPA/EA

The BLM through internal scoping and in consideration of public comments, has identified the following issues to be considered in this RMPA/EA:

- Direct, indirect, and cumulative impacts from livestock grazing on monument objects and other resources; and
- Impacts to local economies and livestock operators if allotment(s) are made available or unavailable for livestock grazing.

Appendix 1 contains the justification of which issues were or were not selected for detailed analysis.

1.4.2 Issues Outside the Scope of this Draft RMPA/EA

The BLM also received comments on issues that are beyond or outside the scope of this Draft RMPA/EA. These comments included the following:

- Commenters stated opposition to livestock grazing on public lands, in national monuments, and in deserts;
- Commenters stated opposition to industry/commercial uses of public lands;
- Commenters expressed concern about BLM funding and staffing to effectively manage public lands;
- Commenters stated opposition to sheep grazing;
- Commenters stated concern about the low fees for livestock grazing on public lands;
- Commenter stated that impacts to livestock operators are not relevant to this RMPA/EA as they are not ‘objects’ described in the Proclamation;
- Commenter expressed support for voluntary relinquishment of grazing permits; and
- Commenter expressed support to turn management of national monuments to the National Park Service.

1.5 Planning Criteria

The BLM planning regulations (43 CFR 1610.4-2) require the development of planning criteria to guide the preparation of an RMP Amendment. Planning criteria are the standards, rules, and other guidelines developed by BLM staff, with public input, for use in forming judgements about plan-level decision-making, analysis, and data collection. These criteria are used to establish the parameters for making planning decisions and simplifying RMP Amendment actions.

The BLM identified the following planning criteria:

- The RMPA/EA covers BLM-administered public lands within the SDNM north of I-8;
- The RMPA/EA has considered a range of reasonable alternatives;
- The BLM has considered current scientific information, research, new technologies, monitoring, and coordination; and
- The RMPA/EA has complied as appropriate with all applicable law, regulations, policy, and guidance.

This Draft RMPA/EA is limited in focus, as it is intended to make planning-level decisions for grazing availability and management in response to the U.S. District Court's Order. No planning-level changes to non-grazing programs (e.g. recreation, travel management, etc.) are proposed in this Draft RMPA/EA. Valid existing rights will not be affected by any alternative analyzed in this Draft RMPA/EA. No proposed decision would have any effect on private, county, State, or other federal lands within the Planning Area.

1.6 Legislative Constraints

The multiple-use mandates of the Federal Land Policy and Management Act (FLPMA), the Taylor Grazing Act of 1934 and other applicable laws, regulations and policies will be followed. This Draft RMPA/EA also recognizes the mandates in the Proclamation (Appendix 2).

1.7 Planning Process

Below is the planning process being followed for a land use plan amendment (BLM 2005):

- As described in Section 1.4, the BLM provided a 30-day public scoping period in 2020 after publication of a Notice of Intent in the *Federal Register*. The BLM provided notification to approximately 57 individuals, organizations and agencies in addition to publication of a news release. The BLM received 62 comment letters or emails to consider (Appendix 2, BLM 2020). After also including internal scoping comments, issues were identified for detailed consideration or dismissed with justification (Appendix 3, BLM 2020);
- The BLM released the Draft RMPA/EA and unsigned Finding of No Significant Impact (FONSI) on May 8, 2020 for a 30-day public review and comment. The BLM provided notification to individuals, organizations and agencies on the mailing list. The BLM also published a news release and legal notice in the *Arizona Business Gazette* on May 14, 2020 announcing the comment period. There was also an article on the RMPA/EA in the *Arizona Republic* on May 27, 2020. The comment period ended on June 7, 2020. The BLM received approximately 137 comment emails and letters from individuals, seven comment letters from organizations, and approximately 8,945 form letters with substantially similar content from individuals, to consider (Appendix 4, BLM 2020). Comments received are responded to in Appendix 5 of the 2020 RMPA/EA (BLM 2020);
- The BLM has considered substantive and relevant comments received, revised the alternatives and/or impacts analysis as needed, and on July 9, 2020 published this RMPA/Final EA along with an approved FONSI;
- On July 9, 2020 a 30-day protest period and concurrent 60-day Governor's Consistency Review was initiated following the release of the RMPA/Final EA and approved FONSI; and after resolution of any protests and conclusion of the Governor's Consistency Review, the BLM will issue a Decision Record and RMP Amendment.

- On October 19, 2023 the BLM was ordered to comply with the settlement agreement in *Western Watersheds Project et al v. United States Bureau of Land Management* (21cv01126-PHX-SRB, Dkt. 51). Specifically, the court agreed the BLM’s assertion that cattle impacts are minimal beyond 2 miles in the grazing compatibility analysis and land health evaluation was not sufficiently justified.
- On May 6, 2024, the BLM opened the comment period on the proposed revisions to the Environmental Assessment. Changes were made to the Land Health Evaluation, Grazing Compatibility Analysis, and Appendices F and H of the Land Health Evaluation. An additional alternative has been added and analyzed in the Proposed RMPA EA. Citations and peer reviewed literature was updated in these documents as well, to incorporate recent publications to consider the best available science.

1.8 Relationships to Statutes, Regulations, Manuals and Other Plans

Actions considered under this Draft RMPA/EA are consistent with all federal, State, and local laws, regulations, and policies deemed relevant to the Draft RMPA/EA. The following statutes, regulations, or plans apply to BLM-managed lands within the Planning Area:

- Arizona Wilderness Act of 1990.
- Maricopa County 2020, Eye to the Future Comprehensive Plan (2008).
- Pinal County Comprehensive Plan (2009).
- Presidential Proclamation 7397.
- Taylor Grazing Act of 1934.
- Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.).
- Public Rangelands Improvement Act of 1978.
- 43 CFR 4100 Grazing Administration - Exclusive of Alaska.
- Section 106 of the National Historic Preservation Act of 1966, as amended.
- National Environmental Policy Act of 1969.
- Migratory Bird Treaty Act of 1917, and Executive Order 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds.
- Secretarial Order 3362: Improving Quality in Western Big-Game Winter Range and Migration Corridors.
- SDNM RMP/ROD (2012).
- Wilderness Act of 1964.

1.9 Decision to be Made

The Arizona State Director is the Authorized Officer responsible for planning-level decisions within the SDNM. This Draft RMPA/EA will provide information for the Authorized Officer to make an informed decision whether livestock grazing is compatible with the SDNM objects in the SDNM north of I-8.

Decisions to be made include:

- Allotments available/unavailable for livestock grazing; and
- Range of AUM’s available for livestock grazing across all SDNM allotments north of I-8.

The determination of each individual allotment’s classification and/or perennial AUMs will be made at the implementation-level and not in this planning effort.

2.0 ALTERNATIVES

2.1 Description of Alternatives

2.1.1 Summary

The Proposed RMPA EA analyzes five alternatives the: No Action, Maximum Acreage, No Grazing, Reduced Grazing, and Ephemeral Only Alternatives. The number of AUMs in the alternatives range from 0 AUMs to as much as 4232 AUMs divided among the six allotments. Alternative E was not analyzed previously.

2.1.2 Alternative A: No Action Alternative

Alternative A, the No Action Alternative, “provides a benchmark, enabling decision makers to compare the magnitude of environmental effects of the action alternatives” (CEQ 1981: question 3). This alternative provides the baseline environmental condition against which the other alternatives are compared. For RMP actions, the No Action Alternative is to continue to implement the management direction in the 2012 RMP. Under this alternative, the BLM would continue the livestock management on portions of five allotments (Arnold, Beloat, Big Horn, Hazen, and Lower Vekol), north of I-8 in the SDNM (Figure 2). This alternative allows 3,318 AUMs across the Planning Area (ROD decision GR-2.1.4) (Table 3). The current management actions, best management practices (BMPs), and mitigation as approved in the 2012 ROD would continue to apply to the No Action Alternative.

Under the No Action Alternative, range improvements, such as allotment fencing and water developments, would continue to be maintained by permittees in allotments available for livestock grazing.

Alternative A was analyzed in the Lower Sonoran/SDNM Final Environmental Impact Statement (FEIS) as Alternative E (BLM 2012b).

2.1.3 Alternative B: Maximum Acreage Alternative

Under Alternative B, the Maximum Acreage Alternative, grazing would be available on all six allotments in the SDNM north of I-8 (Table 3) (Figure 3). Livestock grazing use would range from ephemeral use only to a maximum of 4,232² perennially authorized AUMs across the Planning Area (Table 3). Ephemeral grazing in Arizona is guided by regulations in 43 CFR 4100 and, where designated Sonoran desert tortoise habitat is present, the 2015 Sonoran desert tortoise Candidate Conservation Agreement (USFWS 2015). When compared to the No Action Alternative, there would be a maximum increase of 914 AUMs across all six allotments within the SDNM.

The Maximum Acreage Alternative would be a reduction in the potential maximum perennial AUMs, from historically authorized 8,703 AUMs under the 1985 Lower Gila South RMP to 4,232 AUMs, across the Analysis Area.

² Based on the average perennially authorized or documented actual use AUMs, prorated by acres, between 2007 and 2018 excluding AUMs authorized for ephemeral use and AUMs previously authorized on allotments and portions of allotments closed under the Proclamation within the SDNM south of I-8.

The results of the new LHE (Appendix 3) and GCA (Appendix 4) suggest that livestock grazing, within this range of potential use, could remain available on the SDNM north of I-8. However, implementation-level adjustments in livestock grazing management, including the number of authorized perennial-AUMs by allotment, would be required to maintain and achieve Standards for Rangeland Health (Standards) and be compatible with monument objects.

This alternative would allow grazing on 77,710 acres of the Conley Allotment, a portion of the Big Horn Allotment (16,970 acres), and a portion of the Lower Vekol Allotment (610 acres), that were previously unavailable for grazing (Table 5). The current management actions, BMPs, and mitigation as approved in the 2012 ROD would continue to apply to the Maximum Acreage Alternative.

However, no livestock grazing will be permitted on the six allotments that make up the SDNM until the BLM first completes implementation-level NEPA analysis, on an allotment-by-allotment, or group of allotments, basis.

Table 3. Comparison of Potential AUMs Between the Alternatives. Allotments would be classified as perennial, ephemeral, or perennial-ephemeral at the implementation-level.

Planning Area	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
All SDNM allotments north of I-8	3,318 AUMs*	Ephemeral only to 4,232 AUMs**	0 AUMs	Ephemeral only to 3,293***	Ephemeral Only

* Across five allotments (excluding the Conley and portions of the Big Horn and Lower Vekol Allotments).

** Maximum perennially authorized AUMs across all six allotments (including the Conley Allotment).

*** Maximum perennially authorized AUMs across all six allotments (excluding portions of the Big Horn and Conley allotments).

Table 4. Comparison of Grazing Availability Between the Alternatives.

Allotment Name	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Arnold	Available	Available	Unavailable	Available	Available
Beloat	Available	Available	Unavailable	Available	Available
Big Horn	Available	Available	Unavailable	Available ³	Available
Conley	Unavailable	Available	Unavailable	Available	Available
Hazen	Available	Available	Unavailable	Available	Available
Lower Vekol	Available	Available	Unavailable	Available	Available

³ Although the Big Horn and Conley allotments under this alternative would be allocated as available, portions of these allotments would be unavailable for livestock grazing.

Table 5. Comparison of Acres Available for Grazing Between Alternatives.

Allotment Name	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Arnold	1,610	1,610	0	1,610	1,610
Beloat	33,600	33,600	0	33,600	33,600
Big Horn	75,230 ⁴	92,200	0	61,590	92,200
Conley	0	77,710	0	36,230	77,710
Hazen	31,930	31,930	0	31,930	31,930
Lower Vekol	14,800	15,410	0	15,410	15,410
Total	157,170	252,460	0	180,370	252,460

Under the Maximum Acreage Alternative, range improvements, such as allotment fencing and water developments, would be maintained by permittees in allotments available for livestock grazing.

In Arizona, allotments are classified as perennial, ephemeral, or perennial-ephemeral. These classifications are described below:

- Perennial – rangelands that produce perennial forage every year;
- Ephemeral – rangelands that do not consistently produce enough forage to sustain a year-round livestock operation but may briefly produce sufficient ephemeral (annual) forage to accommodate livestock grazing. Ephemeral rangelands are defined by the special ephemeral rule as defined in the *Federal Register* Vol. 33, No. 238, Page 18245, Saturday, December 7, 1968 and authorized in accordance with 43 CFR 4100; and
- Perennial-Ephemeral – rangelands that produce perennial forage every year and periodically provide additional ephemeral vegetation. In a year of abundant moisture and favorable climatic conditions, annual forbs and grasses add materially to the total grazing capacity.

Consistent with the Taylor Grazing Act and FLPMA, the BLM has the discretion to adjust grazing use based on range conditions, including cancelling a permit, and to regulate the occupancy and use of the range. The determination of each individual allotment’s classification and/or perennial AUMs would be made at the implementation-level and not in this planning effort.

2.1.4 Alternative C: No Grazing Alternative

Under Alternative C, the No Grazing Alternative, livestock grazing would be unavailable on all six allotments in the SDNM north of I-8 (Table 3) (Figure 4). AUMs would be 0 (zero) across all six allotments within the SDNM. The management actions in the 2012 SDNM ROD that

⁴ Although the Big Horn Allotment was allocated as ‘available,’ portions of the allotment, including where livestock waters occur, were made ‘unavailable’ in the 2012 ROD, thus making the majority of the acres unusable (Figure 2).

specifically address grazing management would no longer apply if this alternative were approved. All other decisions in the 2012 SDNM ROD would continue to be implemented in the management of the SDNM.

Under the No Grazing Alternative permittees would be reimbursed in accordance with 43 CFR 4120, for their interest in the fair market value of the documented range improvements within the unavailable allotments. These range improvements would then be removed, maintained, or modified in order to achieve resource goals, such as wildlife and recreation, on a case-by-case basis. Range improvements on allotments outside the SDNM would be maintained for livestock and wildlife use by permittees in accordance with 43 CFR 4120.

Alternative C was analyzed in the Lower Sonoran/SDNM FEIS as Alternative D (BLM 2012b).

2.1.5 Alternative D: Reduced Grazing Alternative

Under Alternative D, the Reduced Grazing Alternative, grazing would be allocated available on portions of all six allotments in the SDNM north of I-8. Portions of the Big Horn and Conley allotments north of State Route 238 (SR-238) (Table 3) (Figure 5) would be unavailable to livestock grazing. Livestock grazing use would range from ephemeral use only to a maximum of 3,293⁵ perennially authorized AUMs across the Analysis Area (Table 3). When compared to the No Action Alternative, there would be a decrease of 25 AUMs across all six allotments within the SDNM.

The Reduced Grazing Alternative would be a reduction in the potential maximum perennial AUMs, from historically authorized 8,703 AUMs under the 1985 Lower Gila South RMP to 3,293 AUMs, across the Analysis Area and the unavailability of grazing on portions of the Big Horn and Conley allotments north of SR-238.

The results of the new LHE (Appendix 2) and new GCA (Appendix 4) suggest that livestock grazing within this range of potential use, could remain available on portions of the SDNM north of I-8. However, implementation-level adjustments in livestock grazing management, including the number of authorized AUMs by allotment, would be required to maintain and achieve Standards and be compatible with monument objects.

This alternative would allow grazing on all allotments except for 30,610 acres of the Big Horn Allotment and 41,480 acres of the Conley Allotment north of SR-238. The proposed unavailable areas on the Big Horn and Conley allotments contain areas of recreational use and cultural significance, such as the Juan Bautista de Anza Recreational Management Zone (RMZ) and the Anza National Historic Trail Corridor and Management Area. The current management actions, BMPs, and mitigation as approved in the 2012 ROD would continue to apply to the Reduced Grazing Alternative.

⁵ Based on the average perennially authorized or documented actual use AUMs, prorated by available acres (excluding proposed unavailable acres), between 2007 and 2018 excluding AUMs authorized for ephemeral use and AUMs previously authorized on allotments and portions of allotments closed under the Proclamation within the SDNM south of I-8.

However, no livestock grazing will be permitted on the six allotments that make up the SDNM until the BLM first completes implementation-level NEPA analysis, on an allotment-by-allotment, or group of allotments, basis.

See the Maximum Acreage Alternative for a discussion on the differences between perennial, ephemeral, or perennial-ephemeral classifications.

2.1.6 Alternative E: Ephemeral Use Only (Preferred Alternative)

Under Alternative E, the Ephemeral Use Only Alternative, grazing would be available on all six allotments in the SDNM north of I-8 (Table 3, Figure 6). Livestock grazing use would range from zero AUMs annually to ephemeral use only. Ephemeral grazing in Arizona is guided by regulations in 43 CFR 4100, 2023 Arizona Permanent Instruction Memorandum Processing Ephemeral Applications and Estimating Ephemeral Production, and, where designated Sonoran desert tortoise habitat is present, the 2015 Sonoran desert tortoise Candidate Conservation Agreement (USFWS 2015). When compared to the No Action Alternative, there would be a decrease of up 3,318 AUMs per year across all six allotments within the SDNM.

The Ephemeral Use Only Alternative would be a reduction in the potential maximum perennial AUMs, from historically authorized 8,703 AUMs under the 1985 Lower Gila South RMP to zero perennially authorized AUMs.

The results of the new LHE (Appendix 2) and new GCA (Appendix 4) suggest that livestock grazing, within this range of potential use, could remain available on the SDNM north of I-8. However, implementation-level adjustments in livestock grazing management, including site specific criteria for approving ephemeral use, would be required to maintain and achieve Standards for Rangeland Health (Standards) and be compatible with monument objects.

This alternative would allow grazing on 77,710 acres of the Conley Allotment, a portion of the Big Horn Allotment (16,970 acres), and a portion of the Lower Vekol Allotment (610 acres), that were previously unavailable for grazing (Table 5). The current management actions, BMPs, and mitigation as approved in the 2012 ROD would continue to apply to this alternative.

However, no livestock grazing will be permitted on the six allotments that make up the SDNM until the BLM first completes implementation-level NEPA analysis, on an allotment-by-allotment, or group of allotments, basis.

2.2 Alternatives Considered but Eliminated from Detailed Analysis

This section describes alternatives considered but not further analyzed in this Draft RMPA/EA. These alternatives were recommended by resource specialists or members of the public during scoping. The alternatives along with the rationale for excluding them from further consideration are described below.

Make Portions of Allotments not Meeting Standards for Rangeland Health due to Grazing, Unavailable to Grazing

Allocating portions of allotments not meeting Standards due to livestock grazing unavailable to grazing would be impractical to implement in lieu of other management options. The selected alternative in the 2012 SDNM RMP/EIS made areas not achieving Standards in three allotments unavailable for grazing. These areas were primarily surrounding livestock waters which effectively prevented grazing in areas available for grazing within those allotments. The implementation of

this alternative would segregate pastures and require ground-disturbing and intensive management of livestock to prevent cattle from drifting into areas not currently meeting Standards, primarily around livestock waters. Potential management actions that would be required include fencing around dirt reservoirs, the removal of livestock troughs fed by pipelines and wells, and additional pasture fencing. These measures are dismissed from further consideration because the additional ground disturbance involved in subdividing allotments is ineffective to meet the purpose and need of the RMPA/EA in regard to the compatibility of grazing with monument objects and the effects of such subdivision are speculative. The RMPA/EA instead analyzes more technically feasible options such as reduction in AUMs, seasonal use (ephemeral grazing only), or making grazing unavailable, which are consistent with current policies and can improve progress towards achieving Standards and require less additional infrastructure and labor-intensive grazing management practices.

Create a Forage Reserve on the Lower Vekol Grazing Allotment.

A forage reserve is an area or allotment without a current permittee where temporary grazing may be authorized for permittees requiring forage for cattle due to extenuating circumstances such as fire, drought, public land sales/exchanges, or other variables causing temporary or permanent loss of forage within their grazing allotments. The Lower Vekol Allotment would be impractical to manage as a forage reserve due to its limited livestock carrying capacity, remoteness from other parts of the SDNM, and the mixed land status consisting of private and State lands.

Allowing Other Classes of Livestock to Graze (i.e. Sheep, Goats, and Horses).

The 2012 RMP/ROD does not allow sheep or goat grazing on the SDNM (ROD decision GR-2.1.2). Allowing other classes of livestock to graze would have adverse impacts to wildlife. Sheep, goat, and horse grazing/browsing preferences can have more overlap than cattle with wildlife forage preferences. Domesticated sheep and goats can also transmit diseases to native bighorn sheep that occupy the SDNM.

Making Sensitive Areas such as Cultural Sites and Saguaro Forests Unavailable to Livestock Grazing.

The known cultural sites and the majority of the saguaro forest sites are shielded by natural barriers such as slope and rough terrain and are unlikely to receive substantial livestock grazing due to being far (often greater than two miles, see Appendix 4) from livestock waters. The new GCA shows that livestock grazing is unlikely to adversely impact cultural monument objects. The BLM also has the discretion at the implementation-level to adjust grazing use based on range conditions, including cancelling a permit, and to regulate the occupancy or use of the range. The sensitive areas that are not protected by natural barriers can be protected through implementation-level adjustments in livestock management such as short duration grazing and/or limiting the number of authorized AUMs. Excluding these areas through fencing would require extensive amounts of fencing materials and ground disturbing activities, which would conflict with other uses and resources within the SDNM such as recreation, visual resources, wilderness characteristics, and wildlife movement.

Authorize AUMs at Historical Use

Under this alternative, all allotments would have been allocated as available for livestock grazing and the maximum AUMs would be 8,703. This number is based on the 1985 Lower Gila South Resource Management Plan (BLM 1985), prorated by acres, and deduction of AUMs for

unavailable allotments under the Proclamation within the SDNM south of I-8 (BLM 2012b). According to the GCA (Table 4 in Appendix 4), livestock grazing at 8,703 AUMs is incompatible with monument objects. There would be no practical means at the implementation-level for livestock grazing at this level to be authorized and be compatible with monument objects. This alternative which authorized 8,703 AUMs was previously analyzed in detail as the No Action Alternative in the 2012 FEIS (see Table 2-24) and is dismissed from further consideration because it does not serve the purpose and need of this RMPA/EA.

3.0 AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

This chapter identifies and describes the current condition and trend of elements or resources in the human environment which may be affected by the Maximum Acreage Alternative or alternatives. The Affected Environment is the same for all alternatives.

3.1 General Setting

The Planning Area is the Analysis Area, encompassing the entire SDNM north of I-8 which includes portions of six grazing allotments (Arnold, Beloat, Big Horn, Conley, Hazen, and Lower Vekol allotments) and is south of the City of Goodyear, northeast of Gila Bend, and north of Mobile, Arizona (Figure 1). The Analysis Area is approximately 252,460 acres of public land. Both the North Maricopa Mountains and South Maricopa Mountains wilderness areas are within the Analysis Area (Figure 1). The predominant vegetation communities in the Analysis Area include creosote-bursage scrub, palo verde mixed cactus, and ephemeral washes. The Analysis Area for socioeconomics is Maricopa County, Arizona covering approximately 9,199 square miles (not shown). Maricopa County is the fourth most populous county in the U.S.

Resources Considered for Analysis

The BLM's interdisciplinary team met on March 19, 2024 to discuss the RMPA/EA, and were tasked with reviewing and updating the 2020 RMPA/EA Resource and Issues Identification form within the Planning Area. Based on those discussions, and in consideration of relevant comments received during public scoping in 2020, the BLM determined which resource or issues are present and warrant detailed analysis in this RMPA/Final EA (BLM 2020). See Appendix 1 for a list and description of those resources or issues not present in the Planning Area, and those resources or issues that are present in the Planning Area that do not warrant detailed analysis.

3.2 Types of Effects

In this document, the terms “effect” and “impact” are used synonymously. Effects fall into two categories:

- **Direct:** caused by the action and occur at the same time and place.
- **Indirect:** caused by the action, but occur later in time or further in distance, but are still reasonably foreseeable.

For the purpose of this analysis, direct or indirect impacts are referred to as “impacts.”

For the purpose of this analysis, the duration of the impacts are defined as follows:

- **Long-term:** impacts that would occur over the life of this RMPA/EA. Typically, land use plans remain in effect at least 10-years.
- **Short-term:** impacts of limited duration from implementation-level actions such as modifications to range improvements.

For the purpose of this analysis, intensity of the impact is defined as follows:

- **Negligible:** effects are undetectable and immeasurable.
- **Minor:** effects are apparent, measurable, small, localized, and contained within the footprint of the action.

- **Moderate:** effects are readily apparent and measurable over a larger area but are still mainly within the footprint of the action.

For the purpose of this analysis, the type of impact is defined as follows:

- **Adverse:** impacts that would have a detrimental effect to a resource.
- **Beneficial:** impacts that would have a positive effect to a resource.

The Proclamation identified monument “objects.” Table 6 lists the object and applicable section(s) in this Draft RMPA/EA that considered the potential effects from the alternatives.

Table 6. Monument Objects Analyzed in this Draft RMPA/EA.

Object Name	Applicable Resources	RMPA/EA Section(s)
Functioning desert ecosystems	Vegetation, General Wildlife, BLM Sensitive Species (Animals), Migratory Birds, Soil Resources	3.6, 3.7, 3.8
Diversity of plant and animal species	Vegetation, General Wildlife, BLM Sensitive Species (Animals), Migratory Birds	3.6, 3.7
Saguaro cactus forest	Vegetation	3.6
Scientific analysis of plant species and climates in past eras	Vegetation	3.6
Vegetation communities	Vegetation	3.6
Wildlife	General Wildlife, BLM Sensitive Species (Animals), Migratory Birds	3.7
Archeological and historic sites	Cultural and Heritage Resources	3.9

Within all or portions of the Analysis Area, there are also the following additional Special Designations:

- Sonoran Desert National Monument – portions of the six allotments fall within the SDNM, a unit of the National Conservation System;
- Juan Bautista de Anza National Historic Trail Corridor, Butterfield Overland National Historic Trail, and Sonoran Desert Trails Special Cultural Resource Management Area – for a discussion, see Section 3.9; and
- North and South Maricopa Mountains wilderness areas – for a discussion, see Section 3.12.

3.3 Livestock Grazing

3.3.1 Affected Environment

The Analysis Area includes the SDNM north of I-8 where “...grazing on federal lands north of Interstate 8 shall be allowed to continue only to the extent that the BLM determines that grazing is compatible with the paramount purpose of protecting the objects identified in this proclamation.” This Analysis Area consists of only those portions of six grazing allotments that are within the SDNM (Arnold, Beloit, Big Horn, Conley, Hazen, and Lower Vekol) (Figure 1). Grazing on these allotments outside the SDNM are not considered in this Draft RMPA/EA.

The six allotments currently within the SDNM contain a variety of range improvements including wells, pipelines, earthen reservoirs, fence lines, and corrals. See the LHE maps for locations of range improvements by allotment. As of 2015, four of the six grazing allotment permits (Big Horn, Conley, Hazen, and Lower Vekol) within the Analysis Area are expired and have not been renewed due to pending litigation of the livestock grazing decisions in the 2012 SDNM ROD. Livestock last grazed the Conley Allotment portion of the SDNM up until the permit expired in 2015. The Arnold and Beloit allotments have current permits which both expire in February 2025. Livestock grazing has not occurred on the SDNM portions of these allotments since 2015. On the Arnold Allotment (ephemeral) no grazing has occurred due to lack of available ephemeral forage in recent years and/or permittees voluntarily choosing to use other non-SDNM portions of the grazing allotments. Ephemeral grazing has not been authorized on any perennial/ephemeral allotments since 2005 when all SDNM allotments, excluding Hazen and Lower Vekol, were authorized for ephemeral increases. The only ephemeral grazing that has occurred on or near the SDNM was on the Arnold, an ephemeral only allotment, in 2014 and 2015 where a total of 852 AUMs were authorized between the two years. Under the 2012 ROD, up to 3,318 perennial AUMs are allowed across the five livestock grazing allotments available for use.

Compatibility of livestock grazing with monument objects was assessed through the new LHE (Appendix 3) and new GCA (Appendix 4). In the LHE, each allotment was evaluated to determine if Standards are being achieved and whether livestock grazing is the causal factor for any non-achievement. Many Standards are tied to monument objects which were assessed in the GCA (Table 1 in the Appendix 4). The results of these studies showed some areas with and without expected historical livestock use are meeting Standards and are therefore compatible with monument objects. This indicates that livestock grazing could continue on the SDNM north of Interstate 8 with adjustments in grazing management.

Livestock grazing will continue to be excluded from four of the six allotments (Big Horn, Conley, Hazen, and Lower Vekol) and, after 2025, the remaining two allotments (Arnold and Beloit), will be closed to grazing until the BLM first completes implementation-level NEPA analysis, on an allotment-by-allotment, or group of allotments, basis. Upon conclusion of implementation-level analysis, the BLM would proceed to authorize potential new range improvements and issue grazing permit(s) with terms and conditions ensuring compatibility with monument objects.

At the implementation-level, adjustments to grazing management could include the following:

- Exclusion of sensitive areas and/or areas failing to achieve Standards in proximity to livestock waters by restricting livestock access to waters (fencing⁶) and/or redistributing livestock around additional (new) livestock water sources in less sensitive areas;
- Adjustments in number of authorized AUMs;
- Adjustments to ephemeral use requirements; and/or
- Adjustments in season of use.

In addition to implementation-level adjustments, all regulations, and guidelines as described in the Arizona Standards for Rangeland Health and Guidelines for Grazing Administration, the 2013

⁶ At the implementation-level, new proposed fencing would be wildlife-friendly and would meet the Arizona Game and Fish Department standards contained in the *Guidelines for Wildlife Compatible Fencing* (AGFD 2011).

Instruction Memorandum for Resource Management During Drought, 2023 Arizona Permanent Instruction Memorandum Processing Ephemeral Applications and Estimating Ephemeral Production, and the 2015 Candidate Conservation Agreement for the Sonoran desert tortoise in Arizona applicable to livestock grazing on BLM lands will continue to apply. For more information on livestock grazing within the Analysis Area, see Section 3.3.2 of the Lower Sonoran/SDNM PRMP/FEIS (BLM 2012b). Permanent Instruction Memorandum AZ-PIM-2023-008 will also be followed, if applicable. The PIM directs constraints on the number of months ephemeral grazing can occur and under what conditions.

3.3.2 Environmental Consequences

No Action Alternative (Current Management)

Under the No Action Alternative, the current livestock management would continue on portions of five of the six allotments available for grazing on the SDNM north of I-8. Livestock grazing would be unavailable within the SDNM on 16,970 acres of the Big Horn Allotment, 610 acres of the Lower Vekol, and the entire 77,710 acres of the Conley Allotment. Three thousand three hundred and eighteen AUMs would remain available across the five allotments available for grazing.

Livestock grazing on the Big Horn Allotment would be moderately impacted due to the areas surrounding livestock waters being unavailable for grazing. By making these areas unavailable for grazing, livestock would not have access to waters that could potentially service other available portions of the Big Horn Allotment. Livestock grazing on the Conley Allotment would be moderately impacted by decreasing the preference inside the SDNM portion of the allotment to zero AUMs and proportionally decreasing the remaining AUMs allocated for portions outside the SDNM boundary. Livestock grazing on the Lower Vekol Allotment would be minorly impacted due to the area around one livestock water being made unavailable for grazing.

Impacts to livestock grazing would be beneficial, minor, and long-term for the Arnold, Beloit, and Hazen allotments and would be adverse, moderate, and long-term for the Big Horn, Conley, and Lower Vekol allotments. Impacts could be mitigated through implementation-level management actions, such as the addition of range improvements to increase the service areas of livestock waters and fencing to prevent livestock from drifting into unavailable areas yet allowing available areas to be grazed.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, all six allotments (252,460 acres) within the SDNM would be available for livestock grazing, including 77,710 acres of the Conley Allotment, 16,970 acres of the Big Horn Allotment and 610 acres of the Lower Vekol Allotment which were made unavailable to grazing in the 2012 ROD. The level of use would change from 3,318 AUMs across five allotments (Conley Allotment excluded), to a range from ephemeral use only to a maximum of 4,232 perennial AUMs across all six allotments. Fencing would no longer be required to prevent livestock from accessing areas formerly unavailable for grazing which would lower operational costs of maintenance and labor hours. However, the overall impacts to livestock grazing would largely depend on the level and management of grazing authorized under implementation-level decisions.

The level of authorized grazing use within each allotment will be subject to separate environmental review and authorized under implementation-level decisions. This level could range from ephemeral use only to a maximum of 4,232 perennial AUMs and require adjustments in grazing management such as the modification of range improvements, adjustments in number of authorized AUMs by allotment, adjustments in season of use, and the exclusion of sensitive areas.

Impacts would vary depending on the classification of each allotment as follows: there would be a minor beneficial impact to permittees if a low number of perennial AUMs are allocated without the option of ephemeral increases; there would be a negligible beneficial impact to permittees if ephemeral grazing only is authorized; and there would be a moderate beneficial impact to permittees if the maximum number of perennial AUMs are allocated with the option of ephemeral increases. Overall, impacts to livestock grazing would be beneficial, negligible to moderate, and long-term.

No Grazing Alternative

Under the No Grazing Alternative, livestock grazing would be unavailable on all six allotments in the SDNM north of I-8. Livestock grazing would be eliminated as permits expire on the Arnold and Beloit allotments. The impacts to livestock grazing would be adverse, moderate, and long-term. There would be moderate impacts to grazing permittees as permits expire requiring the permittees to find other means to sustain their herds or leave the livestock industry entirely. Livestock grazing could continue on those portions of the existing allotments outside the SDNM. These authorizations would be subject to separate environmental review. The permittees would be reimbursed in accordance with 43 CFR 4120 for their interest in the fair market value of the documented range improvements within the unavailable allotments. These range improvements could then be removed, maintained, or modified in order to achieve resource goals, such as wildlife and recreation, on a case-by-case basis. The towns and communities that are dependent on the ranching industry could see minor economic impacts. Implementation-level decisions could include additional boundary fencing and/or range improvements, and adjustments in the level of use for the portions of allotments outside the SDNM.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, all six allotments within the SDNM would be allocated available for livestock grazing, except for 30,610 acres of the Big Horn Allotment and 41,480 acres of the Conley Allotment north of SR-238. The level of use would change from 3,318 AUMs across five allotments (Conley Allotment excluded), to a range from ephemeral use only to a maximum of 3,293 perennial AUMs across portions of six allotments. The permittees would be reimbursed, in accordance with 43 CFR 4120, for their interest in the fair market value of the documented range improvements within the unavailable portions of the Big Horn and Conley allotments. These range improvements could then be removed, maintained, or modified in order to achieve resource goals, such as wildlife and recreation, on a case-by-case basis. The towns and communities that are dependent on the ranching industry could see minor economic impacts. Implementation-level decisions could include additional boundary fencing and/or range improvements, and adjustments in the level of use for the portions of allotments outside the SDNM. Additional fencing would be required to prevent livestock from entering the unavailable portions of the Big Horn and Conley allotments from other portions of the allotments allocated available for grazing. However, the overall impacts to livestock grazing would largely depend on the level and management of grazing authorized under implementation-level decisions.

The level of authorized grazing use within each allotment will be subject to separate environmental review and authorized under implementation-level decisions. This level could range from ephemeral use only to a maximum of 3,293 perennial AUMs and require adjustments in grazing management such as the addition or removal of range improvements, adjustments in number of authorized AUMs by allotment, adjustments in season of use, and the exclusion of sensitive areas.

Under the range of potential use; there would be a negligible beneficial impact to permittees if a low number of perennial AUMs are allocated without the option of ephemeral increases; there would be a negligible beneficial impact to permittees if ephemeral grazing only is authorized; and there would be a minor beneficial impact to permittees if the maximum number of perennial AUMs are allocated with the option of ephemeral increases. Overall, impacts to livestock grazing would be beneficial, negligible to minor, and long-term.

Ephemeral Use Only Alternative

Under the Ephemeral Use Only Alternative, all six allotments (252,460 acres) within the SDNM would be available for livestock grazing, including 77,710 acres of the Conley Allotment, 16,970 acres of the Big Horn Allotment and 610 acres of the Lower Vekol Allotment which were formerly unavailable to grazing. The level of use would change from 3,318 AUMs across five allotments (Conley Allotment excluded), to zero AUMs or ephemeral use only. Fencing would no longer be required to prevent livestock from accessing areas formerly unavailable for grazing which would lower operational costs of maintenance and labor hours. Impacts to livestock grazing would include the loss of ability to graze perennially.

The level of grazing use, as approved under ephemeral grazing authorizations, within each allotment will be subject to separate environmental review and authorized under implementation-level decisions. This level would be limited to ephemeral use only with potential adjustments in grazing management such as the modification of range improvements, adjustments in number of AUMs approved under ephemeral authorizations, adjustments in season of use, and the exclusion of sensitive areas.

There would be a negligible beneficial impact to permittees if ephemeral grazing only is authorized. Overall, impacts to livestock grazing would be beneficial, negligible, and long-term.

3.4 Recreation Management

3.4.1 Affected Environment – Recreation Management

The Analysis Area includes two recreation management areas: a portion (approximately 199,660 acres) of the Sonoran Desert Extensive Recreation Management Area (ERMA), and (approximately 52,800 acres) of the Juan Bautista de Anza Recreation Management Zone (RMZ). The ERMA was allocated to provide facilities, educational opportunities, and visitor information on the SDNM. The RMZ was allocated to provide recreation and educational opportunities directed at visitors seeking to discover, tour, and learn about the Juan Bautista de Anza National Historic Trail (NHT), Arizona history, and natural history of the Sonoran Desert. There are no developed recreation facilities such as campgrounds or picnic areas within the Analysis Area. Two Special Recreation Permits have been issued for activities in the Analysis Area. Recreational uses within the Analysis Area consist of dispersed recreational activities such as birdwatching, motorized-use, horseback riding, hiking, backcountry camping, hunting, and recreational target shooting. In Fiscal Year 2019 the number of visits to the Analysis Area based on available traffic

counts was 20,503. Approximately 71 percent of the Analysis Area is closed to motorized vehicles (wilderness areas and temporary closure of the RMZ).

3.4.2 Environmental Consequences – Recreation Management

No Action Alternative (Current Management)

Under the No Action Alternative, five of six allotments would be available for livestock grazing (approximately 60 percent of the Analysis Area). In the portions of the Analysis Area where livestock grazing would be available, recreational activities including motor vehicle use, recreational shooting sports, noise, and backcountry camping could adversely impact grazing operations by increasing the likelihood of harassment, injury, or displacement of livestock. Concentrated livestock use areas around water developments and trailing along fencing would result in loss of vegetative cover, affecting the aesthetics of the recreation experience. Overall, under the No Action Alternative, impacts to recreation management would be adverse, negligible, and long-term.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, all six allotments within the Analysis Area would be available for livestock grazing. Impacts would be similar to the No Action Alternative, except that a larger area (40 percent more) would be available for livestock grazing, increasing the potential for recreation-related conflicts with livestock grazing. Overall, under the Maximum Acreage Alternative, impacts to recreation management would be adverse, negligible to minor, and long-term.

No Grazing Alternative

Under the No Grazing Alternative, all six allotments within the Analysis Area would be unavailable for livestock grazing. There would be no potential conflict from and on recreational activities because no livestock grazing would occur in the Analysis Area. There would be no impacts to the aesthetics of recreation from loss of vegetative cover around water developments and trailing along fencing. Overall, under the No Grazing Alternative, impacts to recreation management would be beneficial, moderate, and long-term.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, all six allotments would be available for livestock grazing except for portions of the Conley and Big Horn allotments. This represents approximately 71 percent of the Analysis Area. Impacts would be similar to the Maximum Acreage Alternative, except that a smaller area (30 percent less) would be available for livestock grazing, decreasing the potential for recreation-related conflicts with livestock grazing. Overall, under the Reduced Grazing Alternative, impacts to recreation management would be adverse, negligible, and long-term.

Ephemeral Use Only Alternative

Under the Ephemeral Use Only Alternative, all six allotments within the Analysis Area would be available for livestock grazing. The level of use would range from zero AUMs (no use) or ephemeral use only. Impacts would be similar to the No Action Alternative, except that a larger area (40 percent more) would be available for livestock grazing, increasing the potential for recreation-related conflicts with livestock grazing, when ephemeral grazing is approved. However,

generally grazing is only approved for short periods of time where livestock/recreation-related conflicts would be absent for the majority of the year. Overall, under the Ephemeral Use Only Alternative, impacts to recreation management would be adverse, negligible, and long-term.

3.5 Socioeconomics and Environmental Justice

3.5.1 Affected Environment - Socioeconomics

Grazing land makes up approximately 75 percent of Arizona's total land area. According to a 2014 University of Arizona study, many Arizona ranches rely on a combination of private, Arizona State Land Department, and BLM-administered lands for their operations (UofA 2014).

The Analysis Area for socioeconomics is Maricopa County, Arizona which includes the six allotments. Maricopa County covers approximately 9,199 square miles and had an estimated population of 4,410,824 people in 2018 (the fourth most populous county in the U.S.). Maricopa County covers approximately eight percent of Arizona, and BLM-administered lands make up approximately 2,688 square miles (29 percent) of the county of Maricopa. According to the 2010 U.S. Census, the median income for a household was \$55,054 and median income for a family was \$65,438. In 2018 agriculture, including farming and ranching, represented approximately 0.2 percent of all employment in Maricopa County (Headwaters 2020). There are portions of 75 BLM-administered grazing allotments within Maricopa County, six of which are partially within the SDNM.

The BLM collects annual grazing fees from permittees based on the number of permitted AUMs. An AUM represents the amount of forage required to sustain one cow and one calf for one month. The 2012 ROD provided for 3,318 AUMs on five allotments within the SDNM. At the current rate of \$1.35 per AUM, the allotments can generate as much as \$4,479 per year from active use AUMs. The BLM distributes 50 percent of the grazing revenues to range betterment projects, 37.5 percent to the U.S. Treasury, and 12.5 percent is returned to the State the allotment is located within (43 U.S.C. Chapter 8A 1934).

Permittees also add money to the local economy. Supplies, materials, and services are often purchased for the following activities on public lands: fence/corral construction and maintenance; salt and supplements; shoeing, wages for hired herder/rider(s); veterinary expenses; vehicle purchases; repair and fuel. Open space associated with grazing promotes other activities such as recreation, hunting, and wildlife watching. For more information on Social and Economic Conditions within the Analysis Area, see Section 3.5.3 of the Lower Sonoran/SDNM FEIS (BLM 2012b).

3.5.2 Environmental Consequences - Socioeconomics

No Action Alternative (Current Management)

Under the No Action Alternative, five allotments would continue to be available for livestock grazing in the SDNM, in addition to 70 other allotments in the Analysis Area. Authorized grazing would continue at existing levels (3,318 AUMs). Livestock grazing in the Analysis Area would result in corresponding benefits to the regional economic activity from the permittee's spending in the local economy. Livestock grazing would benefit the permittee, any employees, the businesses where the permittee purchases supplies, and the communities that are supported by livestock operations. Grazing would benefit tax revenues for the local economy. One allotment would continue to be unavailable, and the portions of two other allotments would not be available for

livestock grazing. These impacts could be partially mitigated if grazing is allowed on the non-SDNM portion of the one unavailable allotment. Overall, impacts to socioeconomics under the No Action Alternative would be beneficial, negligible to minor, and long-term.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, six allotments would be available for grazing within the Analysis Area in the SDNM, in addition to 69 other allotments in the Analysis Area. The level of authorized use would range from ephemeral use only to a maximum of 4,232 AUMs. Based on the current rate of \$1.35 per AUM, the allotments would generate as much as \$5,701 per year from active use AUMs. Compared to the No Action Alternative, this would potentially represent an increase of 914 AUMs (\$1,134). Overall availability of BLM-administered lands for livestock grazing would decrease or increase depending on the level of grazing authorized under implementation-level decisions. Regardless of the level of livestock grazing authorized, the availability of a larger area for livestock grazing compared to the No Action Alternative would result in increased benefits to the regional economic activity from the permittee's spending in the local economy. Livestock grazing would benefit the permittee, any employees, the businesses where the permittee purchases supplies, and the communities that are supported by livestock operations. Grazing would benefit tax revenues for the local economy. Permittees would be reimbursed, in accordance with 43 CFR 4120, for their interest in the fair market value of the documented range improvements within allotments made unavailable.

Under the range of potential use, there would be a negligible beneficial impact to socioeconomics if a low number of perennial AUMs are allocated without the option of ephemeral increases; there would be a negligible beneficial impact to socioeconomics if ephemeral grazing only is authorized; and there would be a minor beneficial impact to socioeconomics if the maximum number of perennial AUMs are allocated with the option of ephemeral increases. Overall, impacts to socioeconomics under the Maximum Acreage Alternative would be beneficial, negligible to minor, and long-term.

No Grazing Alternative

Under the No Grazing Alternative, no allotments would be available for livestock grazing in the SDNM, however 69 other allotments in the Analysis Area would continue to be available for livestock grazing. The social and economic benefits associated with grazing operations would be lost in the SDNM. The elimination of AUMs could have a multiplier effect on aspects of the local economy that are associated with the ranching community. Elimination of grazing could result in corresponding reduction in regional economic activity and would adversely impact the permittees, any employees, the businesses where the permittees purchase supplies, and the communities that are supported by livestock operations. The permittees may have to relocate their livestock to private land or a different public land allotment available for grazing. If the permittee's use of BLM-administered land is critical to their operation, the permittee could be forced to sell livestock and/or close their grazing operation entirely. This could result in decreased tax revenues for the local economy. These impacts could be partially mitigated if grazing is authorized on the non-SDNM portions of the six unavailable allotments. Permittees would be reimbursed, in accordance with 43 CFR 4120, for their interest in the fair market value of the documented range improvements within the unavailable allotments. Overall, impacts to socioeconomics under the No Grazing Alternative would be adverse, negligible to minor, and long-term.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, five allotments would continue to be allocated available for livestock grazing in the SDNM, in addition to 70 other allotments in the Analysis Area. The Conley Allotment would be changed to allocated available, however, portions of the Big Horn and Conley allotments north of SR-238 would be unavailable to livestock grazing. Grazing could be authorized up to 3,293 AUMs within the available portions of the SDNM. Livestock grazing in the Analysis Area would result in corresponding benefits to the regional economic activity from the permittee's spending in the local economy. Livestock grazing would benefit the permittee, any employees, the businesses where the permittee purchases supplies, and the communities that are supported by livestock operations. Grazing would benefit tax revenues for the local economy.

Under the range of potential use, there would be a negligible beneficial impact to socioeconomics if a low number of perennial AUMs are allocated without the option of ephemeral increases; there would be a negligible beneficial impact to socioeconomics if ephemeral grazing only is authorized; and there would be a negligible beneficial impact to socioeconomics if the maximum number of perennial AUMs are allocated with the option of ephemeral increases. Overall, impacts to socioeconomics under the Maximum Acreage Alternative would be beneficial, negligible, and long-term.

Ephemeral Use Only Alternative

Under the Ephemeral Use Only Alternative, six allotments would be available for grazing within the Analysis Area in the SDNM, in addition to 69 other allotments in the Analysis Area. The level of use would range from zero AUMs (no use) or ephemeral use only. The allotments are not expected to generate funds through grazing fees every year. The amount of use approved under an ephemeral authorization is dependent on the annual production of ephemeral plants which is largely dependent on the amount and timing of precipitation. Compared to the No Action Alternative, this would potentially represent a decrease of 914 AUMs (\$1,134). The allowable level of livestock grazing would decrease or increase depending on how grazing is authorized under implementation-level decisions. Regardless of the level of livestock grazing authorized, the availability of a larger area for livestock grazing compared to the No Action Alternative would result in increased benefits to the regional economic activity from the permittee's spending in the local economy. Livestock grazing would benefit the permittee, any employees, the businesses where the permittee purchases supplies, and the communities that are supported by livestock operations. Grazing would benefit tax revenues for the local economy. Permittees would be reimbursed, in accordance with 43 CFR 4120, for their interest in the fair market value of the documented range improvements within allotments made unavailable.

There would be a negligible beneficial impact to socioeconomics if ephemeral grazing only is authorized. Overall, impacts to socioeconomics under the Ephemeral Use Only Alternative would be beneficial, negligible, and long-term.

3.5.3 Environmental Justice

The Executive Order 12898 (1994) entitled Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994) requires that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its

programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Mariana Islands.”

In September 2022, the BLM published an Instruction Memorandum on Environmental Justice Implementation (<https://www.blm.gov/policy/im2022-059>) which reflects the following five criteria for determining whether a community is an environmental justice community:

- EJ community criterion 1: minority population higher than 50%
- EJ community criterion 2: minority population higher than 110% of reference area
- EJ community criterion 3: low-income population higher than 50%
- EJ community criterion 4: low-income population higher than 100% of reference area
- EJ community criterion 5: tribal communities

If at least one answer to the above 5 criteria is yes, then overall the community is an EJ community.

The following four communities in the State of Arizona in the five grazing allotments are identified.

- (1) Buckeye city, Maricopa County
- (2) Goodyear city, Maricopa County
- (3) Avondale city, Maricopa County
- (4) Gila Bend town, Maricopa County

The data compiled, analyzed and presented in Maps 1 and 2, Tables 1 to 5, and Figures 1 and 2 (Appendix 6) indicate that, for the recent year 2022, three of the four communities within or overlapping the five grazing allotments in the State of Arizona should be considered as an environmental justice community of concern (Table 2 in Appendix 6).

- (1) Buckeye city based on EJ community criteria 1 and 2
- (3) Avondale city and (4) Gila Bend town based on EJ community criteria 1, 2 and 4

Key socioeconomic characteristics of the analysis area include the following.

- In terms of the size of community, (1) Buckeye city, (2) Goodyear city, and (3) Avondale city had populations more than 50,000 people in 2022.
- In terms of education limitation (that is percentage of individuals aged 25 and over with less than high school degree), and language limitation (that is percentage of households in which no member 14 years old and over (a) speaks only English or (b) speaks a non-English language and speaks English “very well”), (4) Gila Bend town had remarkably high rates in 2022 (more than 200% of county and state levels).
- In terms of employed labor forces by sectors, the four communities overall had major employment in two sectors in 2022: (A) educational services, health care and social assistance, and (B) wholesale trade and retail trade.
- In terms of changes from 2016 to 2022, (1) Buckeye city had a noticeable increased population (more than 50%).
- There are no disproportionately high and adverse human, environmental, and economic impacts on the identified EJ communities.

These combinations of socioeconomic characteristics suggest that the following communities could be identified with priority concerns for benefiting from such programs that have the potential to enhance specific aspects of socioeconomic well-being.

- The community in (4) Gila Bend town could be identified as having priority concerns that would benefit from programs that have the potential to improve education attainment level and language proficiency.

3.6 Vegetation, Noxious and Invasive Weed Species⁷

3.6.1 Affected Environment

The vegetation of the Analysis Area is considered Sonoran desertscrub and includes three predominant vegetation communities (Figure 7). The creosote bush-bursage community is the most prevalent and most arid consisting primarily of creosote bush (*Larrea tridentata*) and white (*Ambrosia dumosa*) or triangle leaf bursage (*Ambrosia deltoidea*). This community exists primarily on broad alluvial valleys and terraces. The palo verde-mixed cacti is the second most prevalent community and is found in areas with different soil types, higher rainfall, and higher elevation gradients and contains a greater diversity of plant and wildlife species. This community consists of extensive stands of saguaro cactus interspersed with cholla (*Cylindropuntia* spp.), barrel cacti (*Ferocactus* spp.), palo verde (*Parkinsonia* spp.), brittlebush (*Encelia farinosa*), creosote bush, ocotillo (*Fouquieria splendens*), mesquite (*Prosopis* spp.), cat claw acacia (*Senegalia greggii*), and ironwood (*Olneya tesota*). The desert wash community occurs as small inclusions in large areas of upland sites and is considered to be valuable habitat for a variety of wildlife species. The vegetation of desert washes is quite variable, ranging from sparse to patchy to moderately dense, and usually occurs along the banks but may occur within the channel. The woody layer typically is intermittent to open and may be dominated by shrubs and small trees. Common species of the desert wash community include mesquite, catclaw acacia, blue palo verde (*Parkinsonia florida*), and desert ironwood. No BLM sensitive plant species exist within the Analysis Area. All these vegetation communities have the potential to produce up to 1,000 pounds of dry matter per acre of annual vegetation which can be an important source of forage for livestock and wildlife, including the Sonoran desert tortoise. Annual (ephemeral) vegetation production is highly variable and dependent on the amount and timing of precipitation, soil type, and seedbank load and diversity.

Natural fire frequency in the Sonoran Desert is a rare event and all vegetation communities present within the Analysis Area are fire-intolerant. However, some fire-tolerant noxious and invasive weed species have the potential to exist in the Analysis Area including buffelgrass (*Cenchrus ciliaris*), Sahara mustard (*Brassica tournefortii*), and Mediterranean grass (*Schismus barbatus*). Long-distance dispersal of those species may be assisted by livestock and/or vehicular travel through the area. Large infestations of Mediterranean grass and small infestations of buffelgrass and Sahara mustard have been documented within the Analysis Area. The small infestations of buffelgrass and Sahara mustard pose insignificant threat of widespread wildfire. Though buffelgrass and Mediterranean grass have been shown to increase the likelihood of wildfires the desert southwest, wildfires fueled by those species tend to be smaller than in the similar, uninvaded

⁷ See Appendix 1 for a discussion on threatened or endangered species.

habitat (Fusco et al. 2019). For more information on vegetation communities within the Analysis Area, see Section 3.2.7 of the Lower Sonoran/SDNM FEIS (BLM 2012b).

3.6.2 Environmental Consequences - Biological Resources

No Action Alternative (Current Management)

Under the No Action Alternative, the current livestock management would continue on portions of five of the six allotments available for grazing on the SDNM north of I-8. Portions of the Big Horn Allotment, the Lower Vekol Allotment, and the entire Conley Allotment would remain unavailable inside the SDNM and 3,318 AUMs would remain available across the five allotments available for grazing. Sustained heavy livestock use can result in reduced plant vigor, alteration of vegetation community composition or structure, reduction of vegetation cover, reduction of individual plants, and introduction or spread of invasive weeds in many arid systems (Waser and Price 1981, Enright & Miller 2007, Brooks et al. 2006, Mata-González et al. 2007, Gamoun 2014, Pol et al. 2014 Pelliza et al. 2021). However, light to moderate use of most forage species may have little to no impact on cover and plant community composition (Navarro et al. 2002, Martin and Severson 2007, Molinar et al. 2011, Gamoun 2014) and can improve range conditions (Holechek et al. 1999, Holechek et al. 2006). Areas of livestock concentration such as around permanent water sources could experience prolonged use by livestock and wildlife. These impacts from livestock on vegetation in the immediate vicinity of water sources (1/4 mile) would continue to be adverse but would decrease with distance from the water source and be sparse beyond two miles (Fusco et al. 1995, Brook et al. 2006, Blanco et al. 2009, for an expanded discussion see Appendix 5).

Livestock grazing has the potential to reduce fire frequency through the thinning of dense annual forbs and grasses (fine fuels), but also has the potential to increase the fire frequency through the introduction of less palatable fire adapted non-native annual species. These consequences would be expected in areas available for grazing. However, vegetation resources would be beneficially impacted in the areas unavailable for grazing where there would be an expected increase in vegetative cover, vigor, diversity, and reproductive capability of native plants and a reduction in the potential spread of noxious and invasive species. Overall, the impacts to vegetation and noxious and invasive weed species would be beneficial, negligible, and long-term on the Big Horn, Conley, and Lower Vekol allotments and would be adverse, moderate, and long-term on the Arnold, Beloit, and Hazen allotments. Impacts can be mitigated through implementation-level adjustments in livestock grazing management such as alteration of authorized AUMs, changes in season of use, and modifications to range improvements.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, all six allotments within the SDNM would be available for livestock grazing; 77,710 acres of the Conley Allotment, 16,970 acres of the Big Horn Allotment, and 610 acres of the Lower Vekol Allotment which were formerly unavailable for grazing would become available for grazing. The level of use would range from ephemeral use only to a maximum of 4,232 perennial AUMs. Impacts to vegetation, including annuals, would be similar to areas available for grazing under the No Action Alternative, but expanded across the entirety of the six allotments available for grazing. The likelihood of vegetation disturbance and spread of noxious and invasive weed species around watering facilities and congregation areas, as described in the No Action Alternative, would increase on the Big Horn, Conley, and Lower Vekol

allotments. However, the overall impacts to vegetative resources would largely depend on the level and management of grazing authorized under implementation-level decisions.

The GCA (Table 4, Appendix 4) shows livestock grazing at historic levels to be incompatible with vegetation communities and diversity of plant and animal species on the Beloat, Big Horn, Conley, and Lower Vekol allotments. The GCA also shows livestock grazing at historic levels to be incompatible with saguaro cactus forests on the Beloat, and portions of the Big Horn and Conley allotments (Appendix 4). At the implementation-level, compatibility of livestock grazing with vegetation communities would be achieved through adjustments to grazing management through the modification of range improvements, adjustments in number of authorized AUMs, adjustments in season of use, and/or exclusion of sensitive areas.

Adjustments to grazing management, as described above, have been shown to maintain and improve the monument objects tied to vegetation. Conservative grazing may improve vegetation diversity, and productivity (Holechek et al. 1999, Holechek et al. 2006). The Maximum Acreage Alternative includes a reduction in the potential maximum perennial AUMs, from historically authorized 8,703 AUMs under the 1985 Lower Gila South RMP to 4,232 AUMs, across the Analysis Area. Adjustments in season of use, such as authorizing ephemeral grazing only, can allow forage plants to withstand grazing during certain times of the year as compared to others (Caldwell 1984). Ephemeral grazing allows for flexible stocking rates, based on annual forage availability, and the ability to remove livestock quickly in response to changing conditions (Hall 2005). The flexibility and criteria required to authorize ephemeral grazing would prevent potential impacts to both perennial and ephemeral vegetation.

The maximum potential of 4,232 perennial AUMs would be compatible with monument objects tied to vegetation following the modification of range improvements, such as restricting use of water sources. Compatibility of saguaro cactus forests can be achieved through restricting access by fencing of livestock waters within two miles of saguaro forest areas. The restriction of access by fencing of livestock waters would also be implemented in areas failing to achieve Standards due to livestock grazing. Fencing would not be required around livestock waters greater than two miles from saguaro forest area because cattle generally do not travel more than two miles from water on flat terrain and no more than one mile in rough terrain (Appendix 5). These actions together would result in the overall compatibility of grazing with monument objects tied to vegetation.

The installation of new fencing around livestock waters to restrict livestock use can cause short-term localized adverse impacts to soils and vegetation. New fencing would be required to be constructed in a wildlife-friendly manner and is unlikely to cause adverse impacts to wildlife. The addition of new livestock water infrastructure may be needed to redistribute livestock to less sensitive areas which can cause adverse impacts to vegetation, wildlife, and soils. The degree of impacts from these implementation-level actions would depend on the extent of the developments and would be evaluated under separate environmental review.

Impacts would vary depending on the classification of each allotment as follows: there would be a minor adverse impact to vegetation if a low number of perennial AUMs are allocated without the option of ephemeral increases; there would be a negligible adverse impact to vegetation if ephemeral grazing only is authorized. There would be a moderate adverse impact to vegetation if the maximum number of perennial AUMs are allocated with the option of ephemeral increases. Overall, under the Maximum Acreage Alternative, impacts to vegetation resources would be

adverse, negligible to moderate, and long-term. These adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, reducing AUMs, and/or authorizing grazing seasonally/ephemerally.

No Grazing Alternative

Under the No Grazing Alternative, livestock grazing would be unavailable on all six allotments in the SDNM north of I-8. Livestock grazing would be eliminated as permits expire (in the case of the Arnold and Beloat allotments). There would likely be an increase in vegetative cover, vigor, diversity, and reproductive capability as well as a reduction in the potential spread of noxious and invasive weed species. Overall impacts to vegetative resources would be beneficial, negligible, and long-term.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, all six allotments within the SDNM would be allocated available for livestock grazing, except for 30,610 acres of the Big Horn Allotment and 41,480 acres of the Conley Allotment north of SR-238. The level of use would change from 3,318 AUMs across five allotments (Conley Allotment excluded), to a range from ephemeral use only to a maximum of 3,293 perennial AUMs across portions of six allotments. Impacts to vegetation would be similar to the areas available for grazing under the No Action Alternative but expanded across the entirety of the four allotments and portions of two allotments available for grazing. The likelihood of vegetation disturbance and spread of noxious and invasive weed species around watering facilities and congregation areas, as described in the No Action Alternative, would increase on some portions of the Big Horn, Conley, and Lower Vekol allotments. However, the overall impacts to vegetative resources would largely depend on the level and management of grazing authorized under implementation-level decisions.

The GCA (Table 4, Appendix 4) shows livestock grazing at historic levels to be incompatible with vegetation communities and diversity of plant and animal species on the Beloat, Big Horn, Conley, and Lower Vekol allotments. The GCA also shows livestock grazing at historic levels to be incompatible with saguaro cactus forests on the Beloat, and portions of the Big Horn and Conley allotments (Appendix 4). At the implementation-level, compatibility of livestock grazing with vegetation communities would be achieved through adjustments to grazing management through the modification of range improvements, adjustments in number of authorized AUMs, adjustments in season of use, and/or exclusion of sensitive areas.

Adjustments to grazing management, as described above, have been shown to maintain and improve the monument objects tied to vegetation. Conservative grazing may improve vegetation diversity, and productivity (Holechek et al. 1999, Holechek et al. 2006). The Reduced Grazing Alternative includes a reduction in the potential maximum perennial AUMs, from historically authorized 8,703 AUMs under the 1985 Lower Gila South RMP to 3,293 AUMs, across the Analysis Area and the unavailability of grazing on portions of the Big Horn and Conley allotments north of SR-238. Adjustments in season of use, such as authorizing ephemeral grazing only, can allow forage plants to withstand grazing during certain times of the year as compared to others (Caldwell 1984). Ephemeral grazing allows for flexible stocking rates, based on annual forage availability, and the ability to remove livestock quickly in response to changing conditions (Hall 2005). The flexibility and criteria required to authorize ephemeral grazing would prevent potential impacts to vegetation.

The maximum potential of 3,293 perennial AUMs would be compatible with monument objects tied to vegetation following the modification of range improvements, such as restricting use of water sources. Compatibility of saguaro cactus forests can be achieved through restricting access by fencing of livestock waters within two miles of saguaro forest areas. The restriction of access by fencing of livestock waters would also be implemented in areas failing to achieve Standards due to livestock grazing. Fencing would not be required around livestock waters greater than two miles from saguaro forest area because cattle generally do not travel more than two miles from water on flat terrain and no more than one mile in rough terrain (Appendix 5). These actions together would result in the overall compatibility of grazing with monument objects tied to vegetation.

The installation of new fencing around livestock waters to restrict livestock use can cause short-term localized adverse impacts to soils and vegetation. New fencing would be constructed in a wildlife-friendly manner and is unlikely to cause adverse impacts to wildlife. The addition of new livestock water infrastructure may be needed to redistribute livestock to less sensitive areas which can cause adverse impacts to vegetation, wildlife, and soils. The degree of impacts from these implementation-level actions would depend on the extent of the developments and would be evaluated under separate environmental review.

Under the range of potential use on allotments and portions of allotments available for grazing; there would be a minor adverse impact to vegetation if a low number of perennial AUMs are allocated without the option of ephemeral increases; there would be a negligible adverse impact to vegetation if ephemeral grazing only is authorized; and there would be a moderate adverse impact to vegetation if the maximum number of perennial AUMs are allocated with the option of ephemeral increases.

Overall, under the Reduced Grazing Alternative, impacts to vegetation resources would be adverse, negligible to moderate, and long-term on the Arnold, Beloit, Hazen, and Lower Vekol allotments. On 36,231 acres of the Conley and 61,586 acres of the Big Horn allotments north of SR-238 there would be beneficial, minor, and long-term impacts to vegetation resources. Adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, reducing AUMs, and/or authorizing grazing seasonally/ephemerally.

Ephemeral Grazing Only

Under the Ephemeral Grazing Only Alternative, all six allotments within the SDNM would be available for livestock grazing; 77,710 acres of the Conley Allotment, 16,970 acres of the Big Horn Allotment, and 610 acres of the Lower Vekol Allotment which were formerly unavailable for grazing would become available for grazing. The level of use would range from zero AUMs (no use) or ephemeral use only. Impacts to vegetation, including annuals, would be similar but less, shorter duration, to areas available for grazing under the No Action Alternative, but expanded across the entirety of the six allotments available for grazing. The likelihood of vegetation disturbance and spread of noxious and invasive weed species around watering facilities and congregation areas, as described in the No Action Alternative, would increase on the Big Horn, Conley, and Lower Vekol allotments. However, the overall impacts to vegetative resources would largely depend on the management of ephemeral grazing authorized under implementation-level decisions.

The GCA (Table 4, Appendix 4) shows livestock grazing at historic levels to be incompatible with vegetation communities and diversity of plant and animal species on the Beloat, Big Horn, Conley, and Lower Vekol allotments. The GCA also shows livestock grazing at historic levels to be incompatible with saguaro cactus forests on the Beloat, and portions of the Big Horn and Conley allotments (Appendix 4). At the implementation-level, compatibility of livestock grazing with vegetation communities would be achieved through adjustments to grazing management through the modification of range improvements, modifications to how ephemeral grazing is approved, adjustments in season of use, and/or exclusion of sensitive areas.

Adjustments to grazing management, as described above, have been shown to maintain and improve the monument objects tied to vegetation. Conservative grazing may improve vegetation diversity, and productivity (Holechek et al. 1999, Holechek et al. 2006). The Ephemeral Grazing Only Alternative allows for zero AUMs to ephemeral grazing only, from historically authorized 8,703 AUMs under the 1985 Lower Gila South RMP to 4,232 AUMs, across the Analysis Area. Approving use through an ephemeral grazing only authorization, can allow forage plants to withstand grazing during certain times of the year as compared to others (Caldwell 1984). Ephemeral grazing allows for flexible stocking rates, based on annual forage availability, and the ability to remove livestock quickly in response to changing conditions (Hall 2005). The flexibility and criteria required to authorize ephemeral grazing would prevent potential impacts to both perennial and ephemeral vegetation.

Ephemeral only grazing would be compatible with monument objects tied to vegetation due to the smaller portion of vegetation being consumed by livestock and the majority of forage consumed, when ephemeral grazing is approved, is comprised of annual/ephemeral species. Compatibility of saguaro cactus forests can be achieved through restricting access by fencing of livestock waters within two miles of saguaro forest areas. The shorter duration of ephemeral grazing, if approved, would result in fewer impacts to saguaro and nurse plants. The restriction of access by fencing of livestock waters would also be implemented in areas failing to achieve Standards due to livestock grazing. Fencing would not be required around livestock waters greater than two miles from saguaro forest area because cattle generally do not travel more than two miles from water on flat terrain and no more than one mile in rough terrain (Appendix 5). These actions together would result in the overall compatibility of grazing with monument objects tied to vegetation.

The installation of new fencing around livestock waters to restrict livestock use can cause short-term localized adverse impacts to soils and vegetation. New fencing would be required to be constructed in a wildlife-friendly manner and is unlikely to cause adverse impacts to wildlife. The addition of new livestock water infrastructure may be needed to redistribute livestock to less sensitive areas which can cause adverse impacts to vegetation, wildlife, and soils. The degree of impacts from these implementation-level actions would depend on the extent of the developments and would be evaluated under separate environmental review.

There would be a negligible adverse impact to vegetation if ephemeral grazing only is authorized. Overall, under the Ephemeral Grazing Only Alternative, impacts to vegetation resources would be adverse, negligible, and long-term. These adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, and/or modifying how ephemeral grazing is approved.

3.7 General Wildlife, Special Status Species (Animals), Migratory Birds

3.7.1 Affected Environment

The Analysis Area contains many species of animals that are commonly associated with a Sonoran desert scrub community. Typical general wildlife species include the following: desert mule deer (*Odocoileus hemionus*), javelina (*Pecari tajacu*), mountain lion (*Puma concolor*), and bighorn sheep (*Ovis canadensis*). Small mammal species present include the black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus auduboni*), skunks (*Mephitis spp.*), coyote (*Canis latrans*), American Badger (*Taxidea taxus*), and raccoons (*Procyon lotor*). Wildlife species present within the monument include bats, small mammals, reptiles, amphibians, and various migratory birds such as , Western Diamondback rattlesnake (*Crotalus atrox*), Sonoran gopher snake (*Pituophis catenifer affinis*), whiptail lizard (*Aspidoscelis spp.*), horned lizard (*Phrynosoma spp.*), zebra-tailed lizard (*Callisaurus draconoides*), side blotched lizard (*Uta stansburiana*), Bald Eagle (*Haliaeetus leucocephalus*), and Peregrine Falcon (*Falco peregrinus anatum*). Source material used in this assessment includes information from the FWS, AZGFD and information on file with the Lower Sonoran Field Office and site visits conducted by staff biologists. The BLM Phoenix District sensitive species list (USDI 2017) was reviewed and cross-referenced by county with the AZGFD Heritage Data Management System to narrow the list to potential sensitive species that occur within the monument. For more information on General Wildlife within the Analysis Area, see Section 3.2.13 of the Lower Sonoran/SDNM FEIS (BLM 2012b).

There are several BLM sensitive species that potentially occur within the Analysis Area including the Sonoran desert tortoise (*Gopherus morafkai*) and the lesser long-nosed bat (*Leptonycteris curasoae yerbabuena*). The Analysis Area contains habitat that the BLM characterizes as tortoise habitat. There are approximately 154,200 acres of Category I tortoise habitat, 22,340 acres of Category II tortoise habitat and 3,450 acres of Category III tortoise habitat within the Analysis Area (Figure 8). For more information on BLM Sensitive Species within the Analysis Area, see Section 3.2.13 of the Lower Sonoran/SDNM FEIS (BLM 2012b).

The Candidate Conservation Agreement for Sonoran desert tortoise states: “The primary threats to SDT in Arizona are habitat destruction, fragmentation, and degradation. Causes of these threats include but are not limited to: invasive nonnative plant establishment; an altered fire regime; urbanization and development; human-constructed barriers to movement; off-road vehicle use; and livestock grazing. Because there is little overlap in the habitat shared by livestock and SDT in most areas in Arizona, and because livestock grazing in Arizona is actively managed by land management agencies, livestock grazing is not currently thought to affect populations in Arizona (USFWS 2015).”

There are several federally listed endangered, threatened, or candidate species that may occur within the Analysis Area or within 5-miles. Sonoran pronghorn (*Antilocapra americana sonoriensis*), Cactus Ferruginous Pygmy Owl (*Glaucidium brasilianum cactorum*), Yellow-billed Cuckoo (*Coccyzus americanus*), Yuma Ridgway’s Rail (*Rallus obsoletus yumanensis*), Southwestern Willow Flycatcher (*Empidonax traillii extimus*), California Least Tern (*Sternula antillarum browni*), Desert Pupfish (*Cyprinodon macularius*), Gila Topminnow (*Poeciliopsis occidentalis*), Monarch Butterfly (*Danus plexippus*), and Acuna Catus (*Echinomastus erectocentrus acunensis*) have potential to occur within the Analysis Area. No designated critical habitat falls within Analysis Area.

Of these species with the potential to occur within the Analysis Area, none have been observed within a 5-mile buffer of the Analysis Area with the exception of Sonoran Pronghorn and Monarch Butterfly. Appropriate habitat exists within the Analysis Area for Cactus Ferruginous Pygmy Owl, however, the species has not been observed within 50-miles of the Analysis Area in the last 30 years. There is no mapped habitat for Yellow-billed Cuckoo within the Analysis Area. The closest observation in the last 10 years is approximately 8-miles north of Analysis Area. There are approximately 196-acres of predicted suitable habitat for Yuma Ridgway's Rail within the Analysis Area, located on the northeastern edge. The closest observation in the last 10 years is approximately 8.5-miles northwest of the Analysis Area. There is no mapped suitable habitat for the Southwestern Willow Flycatcher within the Analysis Area. The closest observation from the last 10 years is approximately 8-miles northwest of Analysis Area. There is no mapped suitable habitat for the California Least Tern within the Analysis Area. The closest observation is approximately 25-miles northeast of Analysis Area. There is no mapped suitable habitat for the Acuna Cactus within the Analysis area. The closest observation from the last 5 years is approximately 8.5-miles south of the Analysis Area. There is no mapped suitable habitat for the Desert pupfish within the Analysis Area and information on any recorded observations within 5-miles of the Analysis Area could not be found. There is no mapped suitable habitat for the Gila topminnow within the Analysis Area and information on any recorded observations within 5-miles of the Analysis Area could not be found. The proposed changes will not affect these species to the extent that warrants analysis.

Sonoran pronghorn have been observed within the far southern edge of the Analysis Area, but are not known to occupy it. The entire Analysis Area has been designated as a 'Non-Essential Experimental Population' under section 10(j) of the Endangered Species Act for Sonoran pronghorn (Vol. 76, No. 87, 25593) (see Figure 3-15 of the Lower Sonoran/SDNM FEIS, BLM 2012b). Appropriate habitat exists within the Analysis Area for Monarch Butterfly within the Analysis Area. There has been one recorded observation within the Analysis Area in the last 5 years. Informal consultation was initiated with USFWS on April 8, 2024 and is ongoing.

The Analysis Area contains suitable habitat for many migratory birds. Typical migratory bird species including the following: mourning dove (*Zenaida macroura*), Gambel's quail (*Callipepla gambelii*), phainopepla (*Phainopepla nitens*), and cactus wren (*Campylorhynchus brunneicapillus*). Migratory birds are protected under the 1918 Migratory Bird Treaty Act (16 USC 703), which prohibits the taking of any migratory birds, their parts, nests, or eggs unless specifically permitted by regulation. Additional protections are provided for migratory birds by the Neotropical Migratory Bird Conservation Act of 2000 (16 USC Chapter 80), and Executive Order 13186, which requires the BLM and other federal agencies to work with FWS to provide protection for migratory birds, primarily in the form of habitat protection to avoid migratory pattern disruption. Birds found within the monument are typical of desert scrub habitat. For more information on migratory birds within the Analysis Area see Section 3.2.13 of the Lower Sonoran/SDNM FEIS (BLM 2012b).

3.7.2 Environmental Consequences

No Action Alternative (current management)

Both livestock and wildlife utilize vegetation. Various wildlife species (e.g., bighorn sheep, mule deer, some migratory birds) depend on forbs and shrubs for forage and concealment. Insectivore species such as bats or some migratory birds are indirectly dependent on herbaceous vegetation to

support their insect population diet or to provide a substrate for nesting, roosting, or concealment. Some bird species are further dependent on herbaceous vegetation for nesting materials and habitat and roosting. Larger predator species are also indirectly dependent on herbaceous vegetation to provide forage and cover for prey species such as small mammals and birds. The presence and movement of livestock between areas can result in the direct disturbance or displacement of individual wildlife species from areas providing cover and forage. Competition between livestock and a variety of wildlife species can occur in areas with low perennial grass composition where livestock and wildlife are more likely to utilize the same browse forage species. According to the 2020 LHE, there are areas that are not achieving Standards as a result of historical livestock grazing. One of the three ecological sites on the Arnold Allotment, two of the seven ecological sites on the Beloit Allotment, one of the four ecological sites on the Big Horn Allotment, two of the six ecological sites on the Conley Allotment, and two of the five ecological sites on the Lower Vekol Allotment are not achieving Standards as a result of livestock grazing.

Under the No Action Alternative, range improvements such as water developments, would continue to be maintained by permittees in allotments available for livestock grazing.

Under the No Action Alternative, impacts to general wildlife, special status species and migratory birds would be adverse, moderate, and long-term on the Arnold, Beloit, Big Horn, Hazen, and Lower Vekol allotments and would be adverse, minor, and long-term on the Conley Allotment.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, livestock grazing would be available on all allotments including an additional 77,170 acres of the Conley Allotment, 16,970 acres of the Big Horn Allotment, and 610 acres of the Lower Vekol Allotment. The level of grazing authorized across the SDNM would range from ephemeral use only to a maximum of 4,232 perennial AUMs. Depending on the number of perennially, if any, authorized AUMs under implementation-level decisions, the Maximum Acreage Alternative could have similar or fewer impacts than the No Action Alternative.

The GCA (Table 4, Appendix 4) shows livestock grazing at historic levels to be incompatible with wildlife and diversity of plant and animal species on the Beloit, Big Horn, Conley, and Lower Vekol allotments. At the implementation-level, compatibility of livestock grazing with wildlife and species diversity would be achieved through adjustments to grazing management through the modification of range improvements, adjustments in number of perennially authorized AUMs, adjustments in season of use, and/or exclusion of sensitive areas.

Adjustments to grazing management as described above have been shown to maintain and improve the monument objects tied to wildlife, including wildlife habitat. The Maximum Acreage Alternative includes a reduction in the potential maximum perennial AUMs, from historically authorized 8,703 AUMs under the 1985 Lower Gila South RMP to 4,232 AUMs, across the Analysis Area. Adjustments in season of use, such as authorizing ephemeral grazing only, can allow forage plants to withstand grazing during certain times of the year as compared to others (Caldwell 1984). Ephemeral grazing limits the frequency of livestock/wildlife interactions, especially in wash communities that serve as forage areas and movement corridors, and competition for perennial browse. The flexibility and criteria required, including the 2015 Sonoran desert tortoise Candidate Conservation Agreement, to authorize ephemeral grazing would reserve forage for wildlife, prevent potential impacts to wildlife, and prevent potential impacts wildlife habitat.

The maximum potential of 4,232 perennial AUMs would be compatible with monument objects tied to wildlife following the modification of range improvements, such as restricting livestock use of water sources. Restricting livestock access by fencing livestock waters within two miles of saguaro forest areas would allow additional recruitment of saguaro and increase foraging opportunities for saguaro dependent wildlife species. The restriction of access by fencing livestock waters would also be implemented in areas failing to achieve Standards due to livestock grazing which would improve wildlife habitat in these areas. These actions together would result in the overall compatibility of grazing with monument objects tied to wildlife.

Under the Maximum Acreage Alternative, water developments, would be maintained by permittees on allotments available for livestock grazing.

The installation of new fencing around livestock waters to restrict livestock use can cause short-term localized adverse impacts to soils and vegetation. New fencing would be constructed in a wildlife-friendly manner and is unlikely to cause adverse impacts to wildlife. The addition of new livestock water infrastructure may be needed to redistribute livestock to less sensitive areas which can cause adverse impacts to vegetation, wildlife, and soils. The degree of impacts from these implementation-level actions would depend on the extent of the developments and would be evaluated under separate environmental review.

Impacts would vary depending on the classification of each allotment as follows: there would be minor adverse impact to wildlife if a low number of perennial AUMs are allocated without the option of ephemeral increases; there would be a negligible adverse impact to wildlife if ephemeral grazing only is authorized; and there would be a moderate adverse impact to wildlife if the maximum number of perennial AUMs are allocated with the option of ephemeral increases. These conclusions are based on the idea that fewer livestock interactions would be beneficial to wildlife and there would be more forage resources available for wildlife. These adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, reducing AUMs, and/or authorizing grazing seasonally/ephemerally.

Overall, under the Maximum Acreage Alternative, impacts to general wildlife, special status species, and migratory birds would be adverse, negligible to moderate, and long-term.

No Grazing Alternative

In the absence of livestock grazing, competition for wildlife forage vegetation would be reduced, providing more forage for wildlife and insect populations. The absence of livestock grazing could result in cover canopy increasing over time, benefiting cover-dependent species. Livestock disturbance/displacement effects would not occur, benefiting nesting migratory birds and other wildlife. With the absence of grazing, improvements in vegetative cover conditions would be expected to occur more rapidly. This would result in a potential benefit for wildlife. An increase of herbaceous species frequency, cover, and composition would be expected to be greater under this alternative.

Under the No Grazing Alternative permittees would be reimbursed in accordance with 43 CFR 4120 for their interest in the fair market value of the documented range improvements within the unavailable allotments. These range improvements could then be removed, maintained, or modified to achieve resource goals, such as wildlife, on a case by case basis. Allotment fencing and water developments outside the SDNM would continue to be maintained by permittees.

However, the number of maintained water sources within the SDNM is likely to decrease due to the removal of permittee maintenance contributions. Fencing hinders the movement of some wildlife species and it is possible for wildlife to be injured on fencing. Unmaintained fencing is potentially a greater hazard to wildlife. When fence materials break and are on the ground, there is a greater potential for wildlife to become entangled in it. Unmaintained range improvements could result in adverse impacts to wildlife.

Under the No Grazing Alternative, impacts to general wildlife, special status species, and migratory birds would be beneficial, minor to moderate, and long-term.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, livestock grazing would be available on all allotments. Under this alternative the northern portions of the Big Horn and Conley allotments would be unavailable for grazing. When compared to the No Action Alternative there would be an additional 46,556 acres of the Conley Allotment, 5,645 acres of the Big Horn Allotment south of SR-238, and 610 acres of the Lower Vekol Allotment that would become available to grazing. There are 30,614 acres of the Big Horn Allotment north of SR-238 that would become unavailable for grazing. The level of grazing authorized across the SDNM would range from ephemeral use only to a maximum of 3,293 perennial AUMs. Depending on the number of authorized AUMs under implementation-level decisions, the Reduced Grazing Alternative could have similar or fewer impacts than the No Action Alternative.

The GCA (Table 4, Appendix 4) shows livestock grazing at historic levels to be incompatible with wildlife and diversity of plant and animal species on the Beloit, Big Horn, Conley, and Lower Vekol allotments. At the implementation-level, compatibility of livestock grazing with wildlife and species diversity would be achieved through adjustments to grazing management through the modification of range improvements, adjustments in number of authorized AUMs, adjustments in season of use, and/or exclusion of sensitive areas.

Adjustments to grazing management, as described above, have been shown to maintain and improve the monument objects tied to wildlife, including wildlife habitat. The Maximum Acreage Alternative includes a reduction in the potential maximum perennial AUMs, from historically authorized 8,703 AUMs under the 1985 Lower Gila South RMP to 3,293 AUMs, across the Analysis Area. Adjustments in season of use, such as authorizing ephemeral grazing only, can allow forage plants to withstand grazing during certain times of the year as compared to others (Caldwell 1984). Ephemeral grazing limits the frequency of livestock/wildlife interactions, especially in wash communities that serve as forage areas and movement corridors, and competition for perennial browse. The flexibility and criteria required to authorize ephemeral grazing would prevent potential impacts to wildlife and wildlife habitat.

The maximum potential of 3,293 perennial AUMs would be compatible with monument objects tied to wildlife following the modification of range improvements, such as restricting livestock use of water sources. Restricting livestock access by fencing livestock waters within two miles of saguaro forest areas would allow additional recruitment of saguaro and increase foraging opportunities for saguaro dependent wildlife species. The restriction of access by fencing livestock waters would also be implemented in areas failing to achieve Standards due to livestock grazing which would improve wildlife habitat in these areas. These actions together would result in the overall compatibility of grazing with monument objects tied to wildlife.

Under the Reduced Grazing Alternative, range improvements such as water developments, would continue to be maintained by permittees in areas available for livestock grazing. The range improvements north of SR-238 would be unmaintained by permittees including two livestock waters on the Big Horn Allotment.

The installation of new fencing around livestock waters to restrict livestock use can cause short-term localized adverse impacts to soils and vegetation. New fencing would be constructed in a wildlife-friendly manner and is unlikely to cause adverse impacts to wildlife. The addition of new livestock water infrastructure may be needed to redistribute livestock to less sensitive areas which can cause adverse impacts to vegetation, wildlife, and soils. The degree of impacts from these implementation-level actions would depend on the extent of the developments and would be evaluated under separate environmental review.

Under the range of potential use on allotments and portions of allotments available for grazing; there would be minor adverse impact to wildlife if a low number of perennial AUMs are allocated without the option of ephemeral increases; there would be a negligible adverse impact to wildlife if ephemeral grazing only is authorized; and there would be a moderate adverse impact to wildlife if the maximum number of perennial AUMs are allocated with the option of ephemeral increases. These conclusions are based on the idea that fewer livestock interactions would be beneficial to wildlife and there would be more forage resources available for wildlife.

Overall, under the Reduced Grazing Alternative impacts to general wildlife, special status species, and migratory birds would be adverse, negligible to moderate, and long-term on the Arnold, Beloit, Hazen, and Lower Vekol allotments. On 36,231 acres of the Conley and 61,586 acres of the Big Horn allotments north of SR-238 there would be beneficial, minor, and long-term impacts to general wildlife, special status species and migratory birds.

Ephemeral Grazing Only

Under the Ephemeral Grazing Only Alternative, all six allotments within the SDNM would be available for livestock grazing; 77,710 acres of the Conley Allotment, 16,970 acres of the Big Horn Allotment, and 610 acres of the Lower Vekol Allotment which were formerly unavailable for grazing would become available for grazing. The level of use would range from zero AUMs (no use) or ephemeral use only. The Ephemeral Grazing Only Alternative would have fewer impacts than the No Action Alternative.

The GCA (Table 4, Appendix 4) shows livestock grazing at historic levels to be incompatible with wildlife and diversity of plant and animal species on the Beloit, Big Horn, Conley, and Lower Vekol allotments. At the implementation-level, compatibility of livestock grazing with wildlife and species diversity would be achieved through adjustments to grazing management through the modification of range improvements, authorizing ephemeral use only, adjustments in season of use, and/or exclusion of sensitive areas.

Adjustments to grazing management as described above have been shown to maintain and improve the monument objects tied to wildlife, including wildlife habitat. The Ephemeral Grazing Only Alternative includes a reduction in the potential maximum perennial AUMs, from historically authorized 8,703 AUMs under the 1985 Lower Gila South RMP to ephemeral use only, across the Analysis Area. Adjustments in season of use and authorizing ephemeral grazing only can allow forage plants to withstand grazing during certain times of the year as compared to others (Caldwell 1984). Ephemeral grazing limits the frequency of livestock/wildlife interactions, especially in

wash communities that serve as forage areas and movement corridors, and competition for perennial browse. The flexibility and criteria required, including the 2015 Sonoran desert tortoise Candidate Conservation Agreement, to authorize ephemeral grazing would reserve forage for wildlife, prevent potential impacts to wildlife, and prevent potential impacts wildlife habitat.

Ephemeral use only would be compatible with monument objects tied to wildlife. Restricting livestock access by fencing livestock waters within two miles of saguaro forest areas would allow additional recruitment of saguaro and increase foraging opportunities for saguaro dependent wildlife species. The restriction of access by fencing livestock waters would also be implemented in areas failing to achieve Standards due to livestock grazing which would improve wildlife habitat in these areas. These actions together would result in the overall compatibility of grazing with monument objects tied to wildlife.

Under the Ephemeral Grazing Only Alternative, water developments, would be maintained by permittees on allotments available for livestock grazing.

The installation of new fencing around livestock waters to restrict livestock use can cause short-term localized adverse impacts to soils and vegetation. New fencing would be constructed in a wildlife-friendly manner and is unlikely to cause adverse impacts to wildlife. The addition of new livestock water infrastructure may be needed to redistribute livestock to less sensitive areas which can cause adverse impacts to vegetation, wildlife, and soils. The degree of impacts from these implementation-level actions would depend on the extent of the developments and would be evaluated under separate environmental review.

There would be a beneficial impact to wildlife if ephemeral grazing only is authorized. These conclusions are based on the idea that fewer livestock interactions would be beneficial to wildlife and there would be more forage resources available for wildlife. Potential adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, and/or authorizing grazing for ephemeral use only.

Overall, under the Ephemeral Grazing Only Alternative, impacts to general wildlife, special status species, and migratory birds would be beneficial, minor to moderate, and long-term.

3.8 Soil Resources

3.8.1 Affected Environment

Landforms in the Analysis Area consist of broad, alluvial basin floors separated by basaltic or granitic mountains, hills, and rock outcrops, dissected by several major drainages and numerous ephemeral ones. The soils range from shallow to deep, usually calcareous, sandy loams. Upland parts of the basins are carved by desert washes with soils that are coarse- to medium-textured and cobbly to gravelly on the surface. Soils located higher on broad alluvial fans often derive directly from upslope bedrock and are underlain by a caliche layer. Farther down, alluvial fans often occur with loamier texture in the upper horizons and often contain a less distinct carbonate layer. Biotic crusts and desert pavement are common in the Analysis Area and provide increase soil stability, water infiltration (Belnap 1995) and protection against wind and surface-sheet erosion (BLM 2001). Qualitative and quantitative soil-resource data is available from the National Resource

Conservation Service soils surveys (NRCS 1997). For additional information on Soils Resources in the Analysis Area, see Section 3.2.6 of the Lower Sonoran/SDNM FEIS (BLM 2012b).

Though overgrazing can lead to increased bare ground and risk of soil erosion, other human activities in the analysis area make it difficult to understand the impact of cattle grazing in the Sonoran Desert. Wildfires, building construction, and linear rights of way such as pipelines and roads contribute to sedimentation rates at 3-4 times greater rates than grazing (Jeong & Dorn 2019). The increased use of public lands since Covid-19 has resulted in more damage from off-road vehicles. Clearing and construction for solar developments and expanding suburban development in the project area is expected to have a greater impact than grazing (Jeong & Dorn 2019).

3.5.4 Environmental Consequences - Soil Resources

No Action Alternative (Current Management)

Under the No Action Alternative, the current livestock management would continue on portions of five of the six allotments available for grazing on the SDNM north of I-8. Portions of the Big Horn and Lower Vekol allotments, and the entire Conley Allotment would remain unavailable inside the SDNM. This alternative decreases the AUMs from historically authorized 8,703 AUMs under the 1985 Lower Gila South RMP to 3,318 AUMs across the five allotments available for grazing. The impacts to soil resources would include soil compaction around water sources and fence-lines, a potential reduction in protective vegetation cover, litter, and damage to biological crusts leading to a potential increase of soil loss through erosion.

Adjustments to grazing management have been shown to maintain and improve soil resources. Conservatively managed grazing can improve vegetation diversity, productivity, and reduce mortality (Holechek et al. 2006). Adjustments in season of use, such as authorizing ephemeral grazing only, can allow forage plants to withstand grazing during certain times of the year as compared to others (Caldwell 1984). Ephemeral grazing allows for flexible stocking rates, based on annual forage availability, and the ability to remove livestock quickly in response to changing conditions (Hall 2005). Ephemeral grazing may only occur during wet seasons when biological crusts are less vulnerable to damage by livestock grazing activities (BLM 2001). The flexibility and criteria required to authorize ephemeral grazing would improve vegetative and biological crust cover and prevent potential impacts to soils.

There would be a greater risk of impact under current management compared to the No Grazing Alternative and Ephemeral Grazing Alternatives. The impacts to soil resources would be adverse, minor, and long-term.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, all six allotments within the SDNM would be available for livestock grazing; 77,710 acres of the Conley Allotment, 16,970 acres of the Big Horn Allotment and 610 acres of the Lower Vekol Allotment which were formerly unavailable to grazing, would become available for grazing. The level of use across all six allotments would range from ephemeral use only to a maximum of 4,232 perennial AUMs. Soil compaction in areas of heavier use and the potential for increased erosion would be similar to the No Action Alternative and would be expected to occur on the additional areas available for grazing under this alternative. The likelihood of disturbance around watering facilities and congregation areas on the Big Horn,

Conley, and Lower Vekol allotments would increase. However, the impacts to soil resources would largely depend on the level of grazing authorized under implementation-level decisions.

At the implementation-level, achievement of Standards related to soils would be made through adjustments to grazing management through the modification of range improvements, adjustments in number of authorized AUMs, adjustments in season of use, and/or exclusion of sensitive areas.

Adjustments to grazing management, as described above, have been shown to maintain and improve soil resources. Conservatively managed grazing can improve vegetation diversity, productivity, and reduce mortality (Holechek et al. 2006). The Maximum Acreage Alternative includes a reduction in the potential maximum perennial AUMs, from historically authorized 8,703 AUMs under the 1985 Lower Gila South RMP to 4,232 AUMs, across the Analysis Area. Adjustments in season of use, such as authorizing ephemeral grazing only, can allow forage plants to withstand grazing during certain times of the year as compared to others (Caldwell 1984). Ephemeral grazing allows for flexible stocking rates, based on annual forage availability, and the ability to remove livestock quickly in response to changing conditions (Hall 2005). Ephemeral grazing may only occur during wet seasons when biological crusts are less vulnerable to damage by livestock grazing activities (BLM 2001). The flexibility and criteria required to authorize ephemeral grazing would improve vegetative and biological crust cover and prevent potential impacts to soils.

The maximum potential of 4,232 perennial AUMs would achieve Standards related to soils following the modification of range improvements, such as restricting use of water sources. The restriction of access by fencing of livestock waters would also be implemented in areas failing to achieve Standards due to livestock grazing. These actions would result in the achievement of Standards tied to soils.

The installation of new fencing around livestock waters to restrict livestock use can cause short-term localized adverse impacts to soils and vegetation. New fencing would be constructed in a wildlife-friendly manner and is unlikely to cause adverse impacts to wildlife. The addition of new livestock water infrastructure may be needed to redistribute livestock to less sensitive areas which can cause adverse impacts to vegetation, wildlife, and soils. The degree of impacts from these implementation-level actions would depend on the extent of the developments and would be evaluated under separate environmental review.

Under the range of potential use, there would be a minor adverse impact to soils if a low number of perennial AUMs are allocated without the option of ephemeral increases; there would be a negligible adverse impact to soils if ephemeral grazing only is authorized; and there would be a moderate adverse impact to soils if the maximum number of perennial AUMs are allocated with the option of ephemeral increases.

Overall, under the Maximum Acreage Alternative, impacts to soil resources would be adverse, negligible to moderate, and long-term. These adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, reducing AUMs, and/or authorizing grazing seasonally/ephemerally.

No Grazing Alternative

Under the No Grazing Alternative, livestock grazing would be unavailable on all six allotments in the SDNM north of I-8. Livestock grazing would be eliminated in the SDNM as permits expire (in

the case of the Arnold and Beloit allotments). Eliminating grazing would reduce impacts on soil resources by decreasing ground disturbance and allowing additional vegetation and biological crust cover to develop over time. The impacts to soil resources would be beneficial, minor, and long-term.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, all six allotments within the SDNM would be allocated available for livestock grazing, except for 30,610 acres of the Big Horn Allotment and 41,480 acres of the Conley Allotment north of SR-238. The level of use would change from 3,318 AUMs across five allotments (Conley Allotment excluded), to a range from ephemeral use only to a maximum of 3,293 perennial AUMs across portions of six allotments. Impacts to vegetation would be similar to the areas available for grazing under the No Action Alternative but expanded across the entirety of the four allotments and portions of two allotments available for grazing. The likelihood of soil disturbance around watering facilities and congregation areas, as described in the No Action Alternative, would increase on some portions of the Big Horn, Conley, and Lower Vekol allotments. However, the overall impacts to soil resources would largely depend on the level and management of grazing authorized under implementation-level decisions.

At the implementation-level, achievement of Standards related to soils would be made through adjustments to grazing management through the modification of range improvements, adjustments in number of authorized AUMs, adjustments in season of use, and/or exclusion of sensitive areas.

Adjustments to grazing management, as described above, have been shown to maintain and improve soil resources. Conservative grazing may improve vegetation diversity, and productivity (Holechek et al. 2006). The Maximum Acreage Alternative includes a reduction in the potential maximum perennial AUMs, from historically authorized 8,703 AUMs under the 1985 Lower Gila South RMP to 3,293 AUMs, across the Analysis Area. Adjustments in season of use, such as authorizing ephemeral grazing only, can allow forage plants to withstand grazing during certain times of the year as compared to others (Caldwell 1984). Ephemeral grazing allows for flexible stocking rates, based on annual forage availability, and the ability to remove livestock quickly in response to changing conditions (Hall 2005). Ephemeral grazing may only occur during wet seasons when biological crusts are less vulnerable to damage by livestock grazing activities (BLM 2001). The flexibility and criteria required to authorize ephemeral grazing would improve vegetative and biological crust cover and prevent potential impacts to soils.

The maximum potential of 3,293 perennial AUMs would achieve Standards related to soils following the modification of range improvements, such as restricting use of water sources. The restriction of access by fencing of livestock waters would also be implemented in areas failing to achieve Standards due to livestock grazing. These actions would result in the achievement of Standards tied to soils.

The installation of new fencing around livestock waters to restrict livestock use can cause short-term localized adverse impacts to soils and vegetation. New fencing would be constructed in a wildlife-friendly manner and is unlikely to cause adverse impacts to wildlife. The addition of new livestock water infrastructure may be needed to redistribute livestock to less sensitive areas which can cause adverse impacts to vegetation, wildlife, and soils. The degree of impacts from these implementation-level actions would depend on the extent of the developments and would be evaluated under separate environmental review.

Under the range of potential use, there would be a minor adverse impact to soils if a low number of perennial AUMs are allocated without the option of ephemeral increases; there would be a negligible adverse impact to soils if ephemeral grazing only is authorized; and there would be a minor adverse impact to soils if the maximum number of perennial AUMs are allocated with the option of ephemeral increases.

Overall, under the Maximum Acreage Alternative, impacts to soil resources would be adverse, negligible to minor, and long-term.

Ephemeral Use Only Alternative

Under the Ephemeral Use Only Alternative, all six allotments within the SDNM would be available for livestock grazing; 77,710 acres of the Conley Allotment, 16,970 acres of the Big Horn Allotment and 610 acres of the Lower Vekol Allotment which were formerly unavailable to grazing, would become available for grazing. The level of use would range from zero AUMs (no use) or ephemeral use only. Soil compaction in areas of heavier use and the potential for increased erosion would be less than the No Action Alternative but would be expected to occur on the additional areas available for grazing under this alternative. The likelihood of disturbance around watering facilities and congregation areas on the Big Horn, Conley, and Lower Vekol allotments would increase. However, the impacts to soil resources would largely depend on the level of grazing authorized under implementation-level decisions, zero AUMs or ephemeral use only.

At the implementation-level, achievement of Standards related to soils would be made through adjustments to grazing management through the modification of range improvements, the authorization of ephemeral use only, adjustments in season of use, and/or exclusion of sensitive areas.

Adjustments to grazing management, as described above, have been shown to maintain and improve soil resources. Conservatively managed grazing can improve vegetation diversity, productivity, and reduce mortality (Holechek et al. 2006). The Ephemeral Use Only Alternative includes a reduction in the potential maximum perennial AUMs, from historically authorized 8,703 AUMs under the 1985 Lower Gila South RMP to zero perennial AUMs and ephemeral use only. Adjustments in season of use and authorizing ephemeral grazing only, can allow forage plants to withstand grazing during certain times of the year as compared to others (Caldwell 1984). Ephemeral grazing allows for flexible stocking rates, based on annual forage availability, and the ability to remove livestock quickly in response to changing conditions (Hall 2005). Ephemeral grazing may only occur during wet seasons when biological crusts are less vulnerable to damage by livestock grazing activities (BLM 2001). The flexibility and criteria required to authorize ephemeral grazing would improve vegetative and biological crust cover and prevent potential impacts to soils.

Ephemeral use only would achieve Standards related to soils. The restriction of access by fencing of livestock waters would also be implemented in areas failing to achieve Standards due to livestock grazing. These actions would result in the achievement of Standards tied to soils.

The installation of new fencing around livestock waters to restrict livestock use can cause short-term localized adverse impacts to soils and vegetation. The addition of new livestock water infrastructure may be needed to redistribute livestock to less sensitive areas which can cause adverse impacts to vegetation, wildlife, and soils. The degree of impacts from these

implementation-level actions would depend on the extent of the developments and would be evaluated under separate environmental review.

Overall, under the Ephemeral Use Only Alternative, impacts to soil resources would be adverse, negligible, and long-term. These adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, and authorizing grazing ephemerally.

3.9 Cultural and Heritage Resources

3.9.1 Affected Environment – Cultural and Heritage Resources

Cultural and heritage resources are the physical and traditional remnants of thousands of years of human occupation and use of the land and its resources. Cultural resource sites date to both prehistoric and historic time periods up to the mid-20th century. Cultural resources also include places of traditional importance to Native Americans and are recognized as fragile and irreplaceable resources.

The types of sites present on the SDNM include: prehistoric sites with artifact scatters; prehistoric trails; petroglyphs; and rock alignments. In the Analysis Area, the sites most often found there tend to be associated with short-term resource procurement and various levels of occupation. This translates to light-density, temporary use cultural sites, probably related to hunting and gathering camps, trails, and some processing of resources.

Roughly 80 percent of the cultural sites found on the SDNM reflect aboriginal occupation. About 13 percent of the total number can be attributed to Euro-American occupation, leaving some sites of unknown age and/or cultural affiliation. Within the Analysis Area, roughly half of the cultural resource sites can be associated with indigenous use and half are Euro-American in origin. It is important to note that intensive archaeological survey information is limited, so an unknown number of sites have not been identified.

Historic Euro-American sites found in the Analysis Area include ranching sites with corrals and water troughs, railroad sites with foundations and graves, homesteading attempts with historic artifact scatters, extant historic structures, mining sites, historic trail sites, and sites associated with automobile travel. Most of these historic era sites are associated with the settling of the west by Euro-American people beginning in the mid to late 19th century. Structures and longer-term settlements typically date to the mid-20th century.

The objects of the SDNM include not only prehistoric and historic cultural sites, but also the natural historic landscape settings, including a segment of the Juan Bautista de Anza National Historic Trail (Anza NHT) corridor (Figure 9)⁸, a segment of the Butterfield Overland National Historic Trail (Figure 9), and the 19th century era trails that have been documented along the same corridor. The Juan Bautista de Anza NHT, designated by Congress in 1990, is a 1,200-mile historic trail corridor extending from what was to become Mexico to northern California. The Anza NHT commemorates the 1775–1776 land route that Spanish commander Juan Bautista de Anza took in

⁸ The SDNM ROD also allocated the Anza NHT Management Area (Figure 8).

an effort to establish a self-sustaining settlement and presidio near San Francisco Bay. It has been documented only through diaries and journal entries made by the people who followed the trail for the first time, making it a historic corridor. A segment of this historic trail corridor is located north of State Route 238 and runs east-west for approximately 17 miles through the width of both the Big Horn and Conley allotments. Although the Anza NHT has no known surviving trail signature on the ground, certain segments of the trail that traverse the SDNM are considered to be among the best-preserved corridor segments and most representative of the historic trail corridor landscape and conditions.

In addition to the Anza Trail corridor, remnants of 19th century historic trails can be seen. The Mormon Battalion and a segment of the Butterfield Overland National Historic Trail are two of the later trails that were constructed for the use of wheeled vehicles. These 19th century trails are an example of the types of routes that crossed through this part of the Sonoran Desert from east to west in this period. Archaeological evidence is associated with these travel corridors.

For the purposes of this Draft RMPA/EA, the Analysis Area is also known as the *area of potential effect* for purposes of complying with Section 106 of the National Historic Preservation Act. A thorough review of project records and cultural resources information has been performed for this action. This review has revealed that a total of 94 cultural inventory projects have been documented within the Analysis Area. These projects total approximately 14,473 acres. As a result of these efforts, 89 cultural resource sites have been documented within the Analysis Area.

Tribal Interests

Ongoing consultation with the Gila River Indian Community and the other O'odham-speaking indigenous groups, has resulted in some new understanding about a historic, traditional trail route called the Oyadaibuic-Komadk Trail. This trail is a route connecting the historical Piman villages of Oxibahibuiss and Comac/Komadk (Darling and Eiselt 2009). The Gila River Indian Community has been performing in-depth research and field investigation to document any physical traces of this trail. The route is described in the Oriole Song, a traditional Akimel O'odham song series known by many in the Gila River Indian Community (Darling 2009). The Oriole song creates a song-scape by describing the traveler's movement along this route from east to west as the sun moves in the daytime and then back from west to east as it moves through the underworld at night or through fire (Darling 2009). This type of song has geographical information in it as well as traditional knowledge that the traveler must learn to follow (Darling and Lewis 2007). There are more than 100 songs that chart a journey over at least 280 miles from their villages along the upper Gila River all the way to particular salt flats in Sonora (Darling and Lewis 2007).

Probable physical traces of the Komadk traditional trail corridor have been observed within the SDNM. Recent archaeological inventory has identified likely trail segments that appear to cut through the northern end of the SDNM. Physical traces have been documented on the western slope of the Sierra Estrella Mountains and in some areas near State Route 85.

On March 21, 2020 the BLM initiated government-to-government consultation with the following tribes: Ak-Chin Indian Community, Tohono O'odham Nation, Pascua Yaqui Tribe, Salt River Pima-Maricopa Indian Community, The Hopi Tribe, and the Gila River Indian Community. Additional information was provided to the tribes on: April 21, 2020; May 5, 2020; and May 8, 2020. On June 4, 2020 the BLM held a conference call with government representatives of the Ak-Chin Indian Community, Pascua Yaqui Tribe, and Gila River Indian Community tribes. On June 10, 2020 the BLM held a conference call with a government representative of the Tohono O'odham

Nation. Tribal concerns on the RMPA/EA included the potential impacts on cultural sites from livestock grazing by soil compaction and erosion, and potential direct impacts to sites. The Tohono O’odham Nation considers the SDNM a traditional cultural property.

On June 19, 2020 the BLM received a response from the Gila River Indian Community with concerns about the potential occurrence of the Komadk Trail and the need for additional cultural surveys. Recent inventories have yielded information about probable segments of the Komadk Trail (Wright 2022), and consultation is ongoing regarding this important corridor. On June 19, 2020 the BLM received a response from the Tohono O’odham Nation, expressing opposition to livestock grazing in the SDNM due to the potential damage to fragile-pattern archeological sites. The SDNM is also a portion of the traditional-use areas by the tribe and contains evidence of use by Tohono O’odham Nation ancestors.

3.9.2 Environmental Consequences – Cultural and Heritage Resources

No Action Alternative (Current Management)

Under the No Action Alternative, five of the six allotments would be available for livestock grazing. The impacts would be similar the Maximum Acreage Alternative, except that the Conley Allotment and portions of the Big Horn and Lower Vekol allotments would be unavailable for livestock grazing. The No Action Alternative would benefit the Butterfield Overland NHT segment in the vicinity of the North Tank (in the Conley Allotment) by eliminating the potential for livestock to congregate there. According to the GCA (Appendix 4), concentrated livestock use at watering facilities and trailing along fencing can be incompatible with cultural monument objects. At the implementation-level, any new range improvements would be subject to separate review under Section 106 of the National Historic Preservation Act (NHPA). The BLM will follow the procedures identified in the executed Arizona Vegetation and Range Management Programmatic Agreement (2020) in order to comply with Section 106 of the NHPA.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, livestock grazing would be available on all six allotments. The cultural sites documented in the Analysis Area are scattered lightly across the landscape. Soils and slope play a strong role in how precipitation affects the area, which influences the distribution of cultural sites. Lower precipitation, a lack of permanent water sources, and limited areas having thick stands of vegetation results in very light density of cultural sites. Areas of scattered and light density vegetation patterns offer few areas where livestock would congregate. Other areas with soft soils and dense vegetation providing shade occur along major washes and in proximity to livestock waters provide areas where livestock are most likely to concentrate. Roughly nine of the documented cultural sites within the six allotments show some level of impact from livestock grazing.

Both indigenous and Euro-American trails cross east to west through the Conley and Big Horn allotments. Gap Tank, Gap Well, Conley Tank, and North Tank Well are all livestock water developments that provide water, shade and soft soils where livestock tend to congregate. Livestock use of these water developments in proximity to these trails and their associated sites, have resulted in some level of impacts. Livestock trailing has resulted in vegetation loss and compaction of soils, leading to erosion of some sites. According to the GCA (Appendix 4) concentrated livestock use at watering facilities and trailing along fencing can be incompatible with cultural monument objects.

At the implementation-level, any new range improvements would be subject to the requirements of the Arizona Vegetation and Range Management Programmatic Agreement (2020) in order to comply with Section 106 of the NHPA. The most common mitigation is site avoidance in order to ensure no adverse impacts would occur from concentrated livestock use. If eligible-cultural sites are present, the range improvement(s) such as livestock waters would be excluded from livestock by fencing to avoid impacts to the site(s) and maintain compatibility with monument objects. Allowing livestock grazing in these areas would result in negative, negligible to minor, and long-term impacts to cultural and heritage resources.

No Grazing Alternative

Under the No Grazing Alternative, livestock grazing would be unavailable for all six allotments. With the elimination of livestock grazing in the SDNM, there would be no potential impacts from livestock grazing on cultural sites. Vegetative cover around existing livestock water developments may increase over time and have a beneficial impact on nearby cultural sites by reducing the potential for erosion. The No Grazing Alternative would eliminate livestock grazing within the Anza NHT Corridor and Management Area. Excluding livestock grazing from Conley and Big Horn allotments north of SR-238 would result in beneficial, negligible to minor, and long-term impacts to historic/indigenous trails, and overall negative, negligible to minor, and long-term impacts to cultural and heritage resources in the SDNM north of I-8.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, all six allotments would be available for livestock grazing, except portions of the Conley and Big Horn allotments would be unavailable. The Reduced Grazing Alternative would benefit the Butterfield Overland NHT segment in the vicinity of the North Tank (in the Conley Allotment) by eliminating the potential for livestock to congregate there (Map 2 in the GCA, Appendix 4). The Reduced Grazing Alternative would eliminate livestock grazing within the Anza NHT Corridor and Management Area. According to the GCA (Appendix 4) concentrated livestock use at watering facilities and trailing along fencing can be incompatible with cultural monument objects.

At the implementation-level, any new range improvements would be subject to the requirements of the Arizona Vegetation and Range Management Programmatic Agreement (2020) in order to comply with Section 106 of the NHPA. Allowing livestock grazing in the six allotments, except for portions of the Conley and Big Horn allotments north of SR-238 would result in beneficial, negligible to minor, and long-term impacts to historic/indigenous trails, and overall negative, negligible to minor, and long-term impacts to cultural and heritage resources in the SDNM north of I-8.

Ephemeral Use Only Alternative

Under the Ephemeral Use Only Alternative, livestock grazing would be available on all six allotments. The impacts would be similar to the Maximum Acreage Alternative except with more restrictions on any authorized use, which would be required to maintain and achieve Standards for Rangeland Health. Grazing would occur only part of the year on a limited basis. This alternative would reduce the impacts to cultural and heritage resources within the Analysis Area due to the more stringent guidelines.

Major Euro-American and indigenous trails cross east to west through the Conley and Big Horn allotments. Gap Tank, Gap Well, Conley Tank, and North Tank Well are all livestock water

developments that provide not only water, but shade and soft soils, making it ideal for cattle congregation. Livestock use of these water developments in proximity to the aforementioned trails and their associated sites, have resulted in some level of impacts over the years. Livestock trailing has resulted in vegetation loss and compaction of soils, leading to erosion of some sites. According to the GCA (Appendix 4) concentrated livestock use at watering facilities and trailing along fencing can be incompatible with cultural monument objects. Restricting grazing use to certain times of the year and on a basis that there is suitable forage would reduce these impacts considerably.

At the implementation-level, any new range improvements would be subject to the requirements of the Arizona Vegetation and Range Management Programmatic Agreement (2020) in order to comply with Section 106 of the NHPA. The most common mitigation is site avoidance in order to ensure no adverse impacts would occur from concentrated livestock use. If eligible cultural sites are present, the range improvement(s) such as livestock waters would be excluded from livestock by fencing to avoid impacts to the site(s) and maintain compatibility with monument objects. Allowing any livestock grazing in areas where sensitive cultural resources are present, would likely result in negative, negligible to minor, and long-term impacts to cultural and heritage resources.

3.10 Air Resources

3.10.1 Affected Environment

The Environmental Protection Agency sets National Ambient Air Quality Standards for six principal or “criteria” pollutants. The pollutants are carbon monoxide (CO), lead, nitrogen dioxide (NO₂), ozone (O₃), sulfur dioxide (SO₂), and two categories of particulate matter (particulate matter with an aerodynamic diameter of 10 microns or less [PM₁₀] and particulate matter with an aerodynamic diameter of 2.5 microns or less [PM_{2.5}]).

Non-attainment areas overlapping the Analysis Area are associated within the Phoenix metropolitan area, an area with a population of more than four million people. The Phoenix metropolitan area is within Maricopa County, and is the fourth most populous county in the U.S.

Portions of the Arnold, Hazen, and Beloit allotments are within non-attainment for large particulates (PM₁₀) (1.3 percent of the Analysis Area). Primary pollution sources of PM₁₀ contributing to this non-attainment are windblown dust from construction sites, agricultural fields, unpaved roads and parking lots, and disturbed vacant lots. Portions of the Arnold, Beloit, Big Horn, Conley, and Hazen allotments are within non-attainment for 8-hour Ozone (O₃) (49 percent of the Analysis Area). Ozone is produced by chemical reactions involving naturally occurring gases and gases from pollution sources. Primary pollution sources of O₃ contributing to this non-attainment are industrial solvents and coating use, residential/industrial fuel combustion, open burning/wildfires, and cars and trucks.

Greenhouse gases include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), water vapor, and several trace gases. Methane is a greenhouse gas emitted from ruminants including livestock from the consumption of vegetation. From 1990 to 2000, Arizona’s greenhouse gas emissions rose 51 percent compared with a national GHG emissions increase of 23 percent (BLM 2018). The average temperature in the Southwest has increased approximately 1.5°F (0.83°C)

above a baseline period of 1960-1990 and is projected to rise 4.0-10.0°F (2.2°C-5.6°C) by the end of the century (BLM 2012b).

3.10.2 Environmental Consequences

No Action Alternative (Current Management)

Under the No Action Alternative, five of six allotments in the Analysis Area would continue to be available for livestock grazing. Although there are existing permits for two allotments, no livestock grazing has occurred in the Analysis Area since 2015. Should grazing resume under the No Action Alternative, use of motor vehicles and equipment to maintain livestock infrastructure such as fencing and water developments, would cause localized and short-term increases in fugitive dust. Livestock grazing on two allotments with existing permits would result in increased emissions of methane, which contributes to climate change. Overall, impacts to air resources would be adverse, negligible, and long-term.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, all allotments within the Analysis Area would be available for livestock grazing. Use of motor vehicles and equipment to maintain livestock infrastructure such as fencing and water developments, would cause localized and short-term increases in fugitive dust. Compared to the No Action Alternative, there would be a 914 AUM increase (21 percent) in authorized livestock use. The area available for grazing would increase by 40 percent. Livestock grazing on two allotments with existing permits would result in increased emissions of methane, which contributes to climate change. Overall, impacts to air resources would be adverse, negligible, and long-term.

No Grazing Alternative

Under the No Grazing Alternative, all allotments within the Analysis Area would be unavailable for livestock grazing. There would be no contributions to fugitive dust from the use of motor vehicles and equipment to maintain livestock infrastructure such as fencing and water developments, because those activities would not occur. There would be no contributions of methane emissions from livestock, because no authorized livestock grazing would occur. Overall, impacts to air resources would be adverse, negligible, and long-term.

Reduced Grazing Alternative

Under the Maximum Acreage Alternative, all allotments within the Analysis Area would be available for livestock grazing. Use of motor vehicles and equipment to maintain livestock infrastructure such as fencing and water developments, would cause localized and short-term increases in fugitive dust. Compared to the No Action Alternative, there would be a 25 AUM decrease in authorized livestock use. The area available for grazing would increase by 12 percent. Livestock grazing on two allotments with existing permits would result in increased emissions of methane, which contributes to climate change. Overall, impacts to air resources would be adverse, negligible, and long-term.

Ephemeral Use Only Alternative

Under the Ephemeral Use Only Alternative, all allotments within the Analysis Area would be available for livestock grazing. Use of motor vehicles and equipment to maintain livestock

infrastructure such as fencing and water developments, would cause localized and short-term increases in fugitive dust. Compared to the No Action Alternative, there would be no perennially authorized AUMs. Livestock would be on the allotment(s) only when forage conditions warrant. The area available for grazing would increase by 40 percent. Livestock grazing on two allotments with existing permits would result in increased emissions of methane, which contributes to climate change. Overall, impacts to air resources would be adverse, negligible, and long-term.

3.11 Visual Resources Management

3.11.1 Affected Environment – Visual Resources Management

The BLM uses the Visual Resource Management (VRM) System to classify and manage visual resources on lands under its jurisdiction. The VRM System involves inventorying scenic values, establishing management objectives for those values through the resource management planning process, and then evaluating proposed activities to determine whether they conform to the management objectives (BLM 1984). The BLM’s VRM System incorporates scenic quality, viewer sensitivity, and distance zones to identify visual resource inventory (VRI) classes. These classes represent the relative value of the existing visual landscape, as well as the visual resource baseline from which to measure impacts that a proposed project may have on these values. In its planning process, the BLM weighs visual and competing resource values and designates the VRM classes, with associated management class objectives for a given area’s visual setting.

VRM Classes I, II, and III. Management objectives for the VRM classifications are described below:

Class I Objective: “To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.”

Class II Objective: “To retain the existing character of the landscape. The level of change to the characteristic landscape should be low.”

Class III Objective: “To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.”

Table 7 lists the VRM classes in the Analysis Area that were allocated in the 2012 ROD (Table 2-3). VRM classes do not apply to non-BLM lands.

Table 7. VRM Classes and Acres in the Analysis Area.

I	123,804
II	76,564
III	52,082

3.11.2 Environmental Consequences – Visual Resources Management

No Action Alternative (Current Management)

Under the No Action Alternative, no livestock grazing has occurred in the SDNM since 2015 although there are existing permits on two allotments. Areas of concentrated past livestock use around infrastructure and water developments has shown loss of vegetative cover through

trampling and soil compaction. Any infrastructure such as water troughs or tanks, fencing, and access roads, has caused localized changes to the visual character of the site, but would not impact on the overall scenic condition of the Analysis Area. Overall, the degree of changes to the visual character of the Analysis Area is weak, long-term, adverse and negligible.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, livestock grazing would be available on all six allotments. Areas of concentrated livestock use around infrastructure and water developments has shown loss of vegetative cover through trampling and soil compaction. Any infrastructure such as water troughs or tanks, fencing, and access roads, would cause localized changes to the visual character of the site, but would not impact on the overall scenic condition of the Analysis Area. New infrastructure at the implementation-level would have the potential to introduce additional localized change to the site. New infrastructure would be required to meet VRM standards and could include use of appropriate color (shades of brown, gray, green) to lessen visual contrast, or site placement to lessen visual intrusion. Overall, the degree of changes to the visual character of the Analysis Area would be weak, long-term, adverse and negligible to minor.

No Grazing Alternative

Under the No Grazing Alternative, livestock grazing would not be available in the Analysis Area. Existing livestock infrastructure not needed for other purposes could be removed. Overall impacts to the visual character of the Analysis Area would be weak, long-term, beneficial, and negligible.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, livestock grazing would be available on portions of all six allotments. Areas of concentrated livestock use around infrastructure and water developments has shown loss of vegetative cover through trampling and soil compaction. Any infrastructure such as water troughs or tanks, fencing, and access roads, would cause localized changes to the visual character of the site, but would not impact on the overall scenic condition of the Analysis Area. New infrastructure at the implementation-level would have the potential to introduce additional localized change to the site. New infrastructure would be required to meet VRM standards and could include use of appropriate color (shades of brown, gray, green) to lessen visual contrast, or site placement to lessen visual intrusion. Overall, the degree of changes to the visual character of the Analysis Area would be weak, long-term, adverse and negligible.

Ephemeral Use Only Alternative

Under the Ephemeral Use Only Alternative, livestock grazing would be available on all six allotments. Areas of concentrated livestock use around infrastructure and water developments has shown loss of vegetative cover through trampling and soil compaction. Any infrastructure such as water troughs or tanks, fencing, and access roads, would cause localized changes to the visual character of the site, but would not impact on the overall scenic condition of the Analysis Area. New infrastructure at the implementation-level would have the potential to introduce additional localized change to the site. New infrastructure would be required to meet VRM standards and could include use of appropriate color (shades of brown, gray, green) to lessen visual contrast, or site placement to lessen visual intrusion. Overall, the degree of changes to the visual character of the Analysis Area would be weak, long-term, adverse and negligible to minor.

3.12 Special Designations– Wilderness

3.12.1 Affected Environment

The Analysis Area includes the North Maricopa Mountains Wilderness (63,600 acres) and South Maricopa Mountains Wilderness (60,800 acres) areas totaling 124,400 acres (Figure 1). These two wilderness areas were designated by the Arizona Wilderness Act of 1990 and are managed according to the Maricopa Complex Wilderness Management Plan (1995). This plan outlines four management goals:

- To provide for the long-term protection and preservation of the area’s wilderness character under a principle of non-degradation;
- To manage the wilderness area for the use and enjoyment of visitors in a manner that will leave the area unimpaired for future use and enjoyment as wilderness;
- To manage the area using the minimum tool, equipment or structure necessary to successfully, safely and economically accomplish the objective; and
- To manage nonconforming but accepted uses permitted by the Wilderness Act and subsequent laws in a manner that will prevent unnecessary or undue degradation of the area’s wilderness character.

These wilderness areas are also subject to the Wilderness Act of 1964 where Section 4(d)(4)(2) states that grazing, “...where established prior to the effective date of the Act, shall be permitted to continue subject to such reasonable regulations as are deemed necessary by the [administering agency].”

Portions of the Beloat, Big Horn, Hazen, and Conley allotments are within the North Maricopa Mountains Wilderness area and portions of the Big Horn, Conley and Lower Vekol allotments are within the South Maricopa Mountains Wilderness area (Figure 1). Approximately 11 miles of allotment boundary and pasture fencing installed prior to wilderness designation occur within the wilderness areas. There is one well and three dirt reservoirs cherry-stemmed into these wilderness areas but there are no water developments (i.e. wells, troughs, dirt tanks etc.) within the wilderness boundaries. Areas adjacent to water developments typically experience concentrated livestock use (trampling of vegetation etc.). However, steep topography often restricts livestock movement in most areas and with few exceptions, no permanent livestock water exists within several miles of wilderness boundaries. Livestock permittees operating within the allotments containing wilderness have maintenance responsibility for the range improvements both in and outside of wilderness areas. There are three wildlife water catchments cherry-stemmed and four wildlife water catchments within the wilderness areas which serve wildlife. These catchments are managed and maintained by Arizona Game and Fish Department (AGFD). Maintenance of range improvements and wildlife water catchments within these wilderness areas must abide by the Wilderness Act of 1964, the Arizona Wilderness Act of 1990, and the 2012 SDNM RMP/ROD.

Certain motorized/mechanized uses are authorized within these wilderness areas. Emergency response, some law enforcement activities, motorized retrieval of sick or injured livestock, and other accepted uses are provided for in the Arizona Desert Wilderness Act of 1990.

Within the Analysis Area there are two existing Special Recreation Permits for recreation events. Otherwise, use within the wilderness areas consists of dispersed recreational activities such as birdwatching, horseback riding, hiking, backcountry camping, and hunting.

3.6.2 Environmental Consequences - Wilderness

No Action Alternative (Current Management)

Under the No Action Alternative, livestock grazing would continue to be available in the North Maricopa Mountains Wilderness on the Beloat and Hazen allotments and a portion of the Big Horn Allotment. Livestock grazing would also continue to be available in the South Maricopa Mountains wilderness on a portion of the Big Horn and Lower Vekol allotments. Livestock grazing would be unavailable on the North and South Maricopa Mountains wilderness areas on the Conley Allotment.

Areas of concentrated past livestock use around infrastructure and water developments has shown loss of vegetative cover through trampling and soil compaction. Any infrastructure such as water troughs or tanks, fencing, and access roads, in or within close proximity to wilderness areas has caused localized changes to the wilderness character of the site, but would not impact on the overall character of the Analysis Area. Dispersed livestock grazing in wilderness areas has a low potential to affect the areas naturalness and outstanding opportunities for solitude and primitive, unconfined recreation.

Fencing and cherry-stemmed livestock waters would continue to be maintained by permittees in the areas available for grazing. However, wilderness fencing within the closed portions of allotments would no longer be maintained by permittees. The continuation of dispersed grazing use in available allotments with wilderness areas would be long-term, adverse, and negligible given the large-scale (acres) of the wilderness areas and lack of water developments.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, livestock grazing would continue to be available on all allotments within the North and South Maricopa Mountains wilderness areas. Areas of concentrated past livestock use around infrastructure and water developments has shown loss of vegetative cover through trampling and soil compaction. Any infrastructure such as water troughs or tanks, fencing, and access roads, in or within close proximity to wilderness areas has caused localized changes to the wilderness character of the site, but would not impact on the overall character of the Analysis Area. Dispersed livestock grazing in wilderness areas has a low potential to affect the areas naturalness and outstanding opportunities for solitude and primitive, unconfined recreation.

Fencing and cherry-stemmed livestock waters would continue to be maintained by permittees. The continuation of dispersed grazing use throughout wilderness areas would be long-term, adverse, and negligible given the large-scale (acres) of the wilderness areas and lack of water developments. Any adverse impacts could be avoided or reduced at the implementation-level by consideration of adjustments to livestock grazing management and range improvements consistent with BLM policies regarding the management of grazing in wilderness area.

No Grazing Alternative

Under the No Grazing Alternative, livestock grazing would not be available in both the North and South Maricopa Mountains wilderness areas. Existing livestock infrastructure not needed for other purposes could be removed. Overall impacts to wilderness areas would be long-term, beneficial, and negligible.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, livestock grazing would continue to be available in the North Maricopa Mountains Wilderness on the Beloat and Hazen allotments and unavailable within the Big Horn and Conley allotments. Livestock grazing would continue to be available on all allotments within the South Maricopa Mountains Wilderness.

Areas of concentrated past livestock use around infrastructure and water developments has shown loss of vegetative cover through trampling and soil compaction. Any infrastructure such as water troughs or tanks, fencing, and access roads, in or within close proximity to wilderness areas has caused localized changes to the wilderness character of the site, but would not impact on the overall character of the Analysis Area. Dispersed livestock grazing in wilderness areas has a low potential to affect the areas naturalness and outstanding opportunities for solitude and primitive, unconfined recreation.

Fencing and cherry-stemmed livestock waters would continue to be maintained by permittees in the areas available for grazing. However, wilderness fencing within the closed portions of allotments would no longer be maintained by permittees. The continuation of dispersed grazing use throughout wilderness areas would be long-term, adverse, and negligible given the large-scale (acres) of the wilderness areas and lack of water developments. Any adverse impacts could be avoided or reduced at the implementation-level by consideration of adjustments to livestock grazing management and range improvements consistent with BLM policies regarding the management of grazing in wilderness area.

Ephemeral Use Only Alternative

Under the Ephemeral Use Only Alternative, livestock grazing would continue to be available on all allotments within the North and South Maricopa Mountains wilderness areas. Areas of concentrated past livestock use around infrastructure and water developments has shown loss of vegetative cover through trampling and soil compaction. Any infrastructure such as water troughs or tanks, fencing, and access roads, in or within close proximity to wilderness areas has caused localized changes to the wilderness character of the site, but would not impact on the overall character of the Analysis Area. Dispersed livestock grazing in wilderness areas has a low potential to affect the areas naturalness and outstanding opportunities for solitude and primitive, unconfined recreation.

Fencing and cherry-stemmed livestock waters would continue to be maintained by permittees. The continuation of dispersed grazing use throughout wilderness areas would be long-term, adverse, and negligible given the large-scale (acres) of the wilderness areas and lack of water developments. Any adverse impacts could be avoided or reduced at the implementation-level by consideration of adjustments to livestock grazing management and range improvements consistent with BLM policies regarding the management of grazing in wilderness area.

3.13 Residual Effects

Residual effects are those effects that remain after mitigation measures have been applied to the Ephemeral Alternative or other alternatives, and had not been previously incorporated into the Ephemeral Alternative or other alternatives (BLM 2008). No mitigation has been identified for the alternatives; therefore no residual impacts are discussed.

4.0 CUMULATIVE EFFECTS

A cumulative effect is defined under NEPA as “the change in the environment which results from the incremental impact of the action, decision, or project when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other action.” “Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR Part 1508.7). Past, present, and reasonably foreseeable future actions are analyzed to the extent that they are relevant and useful in analyzing whether the reasonably foreseeable effects of the Maximum Acreage Alternative and/or alternatives may have an additive and significant relationship to those effects. Only those resources or issues indirectly affected by the alternatives in Chapter 3 and analyzed in detail are considered for cumulative effects.

4.1 Geographic Scope

The Cumulative Effects Study Area (CESA) for all resources, except socioeconomics, is approximately 733,973 acres of BLM-administered, Arizona State Land Department, and privately-owned lands (Figures 10, 11, 12). This CESA consists of the six livestock grazing allotments including those portions outside the SDNM, plus the Kirian, Palo Verde Mountains, and Powers Butte allotments. The Gila River serves as the northern and western boundary of this CESA. Rainbow Valley and the Sierra-Estrella Mountains are located in the northeastern portion of this CESA. Interstate 8 serves as the southern boundary of this CESA. The CESA for socioeconomics is Maricopa County, Arizona (not shown).

4.2 Timeframe of Effects

Individual grazing permits are valid for 10-years, but grazing may continue beyond that with decadal reviews through Environmental Assessments or by using FLMPA 402(C)(2) authority to renew with the existing terms and conditions. In recent years, the Lower Sonoran Field Office has received numerous applications for solar energy development on land adjacent to the Sonoran Desert National Monument. Those Right of Ways are 30 year permits with the option to renew. Impacts to biotic crusts from overgrazing by sheep during a drought persist even 50 years after the end of grazing (Duniway et al. 2018). Due to the potential for long-term impacts resulting from cattle and the Right of Way applications, the timeframe for effects analyze here is 50 years.

4.3 Past and Present Actions

The CESA includes BLM, Arizona State Land Department, other federal agencies including tribal lands, and privately-owned lands. BLM-administered lands make up approximately 407,937 acres (56 percent) of the CESA.

On non-BLM administered lands within the CESA, past and present actions include agriculture; low-density residential development; and small communities on private lands such as Gila Bend (population 1,922), Bosque, Shawmut, Estrella, Enid, and Heaton along Maricopa Road/SR-238 which runs west to east through the SDNM. I-8 crosses west to east through the SDNM and serves as the southern boundary of this CESA with Gila Bend on the west, and the small communities of Big Horn and Freeman along the I-8 corridor on private lands within the SDNM. Interstate, state highways (State Route 85), county roads, overhead transmission lines, and underground natural gas pipelines are examples of transportation and energy infrastructures within the CESA. A portion of the Gila River Indian Reservation and Ak-Chin Indian Community are located within the northeastern portion of this CESA. Maricopa County Department of Parks and Recreation operates

the Estrella Mountains Regional Park in the northern portion of this CESA and the Buckeye Hills Recreation Area in the northwestern corner of this CESA.

On BLM-administered lands outside the SDNM and north of I-8, past and present actions include: rights-of-ways for overhead transmission lines and underground natural gas pipelines; exploration and mining on unpatented mining claims; county maintained roads; BLM travel routes ranging from single-track trails to bladed dirt and gravel roads; and permitted livestock grazing on three allotments. There are approximately 270 miles of allotment fencing for BLM-administered allotments outside the SDNM. Uses outside of the SDNM and north of I-8 on BLM-administered lands include non-motorized trails for hiking and equestrian use, travel routes for motorcycles and motor vehicles, dispersed camping, hunting, and recreational target shooting. In 2018 the BLM approved a 250-foot right-of-way for the Sonoran Valley Parkway. This corridor resides outside and along the northeastern corner of the SDNM, connecting the communities of Goodyear and Maricopa with a 15- to 18-mile long, two- to six-lane parkway. Construction of the Sonoran Valley Parkway would impact approximately 472 acres of BLM and non-BLM lands. Construction of the initial two-lane highway by the City of Maricopa is not anticipated to start until 2021 or later. Outside of the SDNM, there are five wildlife water catchments maintained by the AGFD.

On BLM-administered lands within the SDNM and north of I-8, past and present actions include: rights-of-ways for I-8 and overhead transmission lines along the I-8 corridor; and rights-of-ways on Maricopa Road/SR-238 through the SDNM. In 2012 the BLM completed a travel management plan for the SDNM which designated travel routes as open, limited or closed within the SDNM. Uses inside the SDNM and north of I-8 include non-motorized trails for hiking and equestrian use, travel routes for motorcycles and motor vehicles, trespass livestock, dispersed camping, hunting, and recreational target shooting. Five grazing allotments are available for livestock grazing. There are approximately 115 miles of allotment fencing for BLM-administered allotments within the SDNM.

There are three special recreation permits for recreational activities within the CESA. In June 2008 the BLM temporarily closed approximately 88 miles of routes within the Juan Bautista de Anza RMZ. In January 2017 the BLM approved the Juan Bautista de Anza RMZ Project (Anza RMZ), which authorized the construction of three recreation developments within the SDNM: Butterfield Recreation Area, Sierra-Estrella Wayside Recreation Area, and Christmas Group Camp Recreation Area. Construction of these recreation areas would impact approximately 20 acres of BLM-administered lands and is not anticipated to start until 2020 or later. Approximately 57 miles of routes closed in 2008 would also be re-opened as a part of these developments. In 2018 the BLM approved the SDNM Target Shooting RMPA/ROD, which closed approximately 52,000 acres of the Anza RMZ area to dispersed recreational target shooting. A complaint on the ROD was filed in U.S. District Court in 2020. In fiscal year 2019 the BLM recorded 20,508 recreation visits to the northern portion of the SDNM based on traffic counts where they exist. Within the SDNM, there are 14 wildlife water catchments maintained by the AGFD.

There is one active solar rights-of-ways in operation within the LSFO and one currently in NEPA within proximity of the SDNM. The Sonoran Solar project is a 260MW solar photovoltaic facility with a 260 MW battery storage facility on approximately 3,281 acres of BLM managed land in northwest Maricopa County, Arizona (Figure 12). The project is in the west end of the little Rainbow Valley located 1 mile north of the SDNM and 4 miles east of SR-85. Additional project features include access roads, solar trackers, junction boxes, a step-up transformer/on-site

substation, battery energy storage system, drainage and discharge facilities, a 500kV gen-tie line, perimeter fence, and groundwater wells.

Pinyon solar project is proposed be a 300MW alternating current photovoltaic facility on approximately 1,788 acres of BLM-administered land in unincorporated Maricopa County, Arizona about 10 miles west of the city of Maricopa and is currently in the NEPA process. The project would interconnect to the Tucson Electric power at the Pinal West Substation. The project is located south of SR-238 near 83rd Ave and Schumacher Ln. Pinyon is directly adjacent to the eastern boundary of the SDNM just north of the Booth Hills.

4.4 Reasonably Foreseeable Future Actions

Reasonably foreseeable future actions (RFFAs) are actions that are known or could reasonably be anticipated to occur within the CESA (Figures 10-12). They include actions that have existing decisions, funding, formal proposals, or that are highly probable.

On non-BLM administered lands within the CESA, RFFAs include continued population growth, housing and commercial development, and agricultural use. Additional energy and transportation infrastructure, especially along the urban fringe adjacent to BLM-administered lands, is anticipated to continue into the foreseeable future. Areas of growth within the CESA include Rainbow Valley in the northeast, and Gila Bend in the southwest. Livestock grazing and maintenance of range improvements would be expected to occur in the future.

On BLM-administered lands outside the SDNM and north of I-8, RFFAs include renewal of existing authorizations for utility rights-of-ways, livestock grazing (including maintenance of range improvements), exploration on unpatented mining claims, dispersed recreational activities, and construction of the Sonoran Valley Parkway.

The I-11 corridor study area stretches 280 miles from Nogales to Wickenburg, Arizona and may affect BLM and non-BLM lands in the Rainbow Valley area, northeast of the SDNM in the CESA. The study area varies in width from approximately 10 to 25 miles. The Arizona Department of Transportation/Federal Highway Administration prepared a Draft Environmental Impact Statement that was made available for public input in mid-2019. The timeframe for the selected corridor and implementation is unknown. Construction of I-11 and the Sonoran Valley Parkway are reasonably certain to occur although the timeframes are unknown. There is also potential these two highway projects may be combined.

On BLM-administered lands within the SDNM and north of I-8, RFFAs include renewal of existing authorizations for utility rights-of-ways, dispersed camping, hunting, hiking, and recreational target shooting. Construction of recreation developments in the Anza RMZ is anticipated to start in 2020 or later and be completed in multiple phases.

There are four solar rights-of-ways projects currently in variance and proposed to be within close proximity to the SDNM. The Mariposa Solar project is a proposed 350 MW alternating current solar photovoltaic facility and energy storage project on approximately 2,350 acres of BLM-administered land in unincorporated Maricopa County, AZ. The project is located within the Little Rainbow Valley between the Sierra Estrella Mountains and the SDNM's northeastern boundary. The project is currently in the pre-NEPA planning phase and estimated to start NEPA late 2024.

Caballero is a proposed 200MW alternating current photovoltaic facility on approximately 1,231 acres of BLM-administered land in Maricopa County, AZ. The project is located south of SR-238

directly adjacent to the western boundary of the Pinyon Solar project and the eastern boundary of the SDNM. This project has been approved in the variance process. .

Pinal West is a 300-400 MW proposed photovoltaic facility on approximately 1,488 acres of BLM-administered land in Pinal County, AZ. The project is located south of SR-238 directly adjacent to the western side of the Palo Verde Mountains just east of the Pinyon Solar project. Pinal West is currently in prevariance. BLM held variance agency, tribal, and public meetings on April 17, 2024 and a comment period remained open until 5/17/2024. The variance application is expected to be submitted in late 2024.

Southwest Crossroads is a proposed 250MW photovoltaic facility on approximately 1,400 acres of BLM-administered land (project total is ~2,600 acres) in Maricopa County, AZ. The project is located along SR-85 approximately 10 miles north of Gila Bend, AZ adjacent to the western border of the SDNM. This is project is currently in prevariance.

Sevenmile is a proposed 625MW photovoltaic solar energy facility with an up to 625MW lithium-ion battery storage system. The project would be located Rainbow Valley on land administered by BLM LSFO. The project is approximately 14 miles southeast of Buckeye in Maricopa County, AZ within the Little Rainbow Valley just southeast of the currently operated Sonoran Solar project. The proposed project would interconnect with the existing Salt River Project Pinal West to Jojoba 500kV transmission line using a 230-500kV gentie line. The application area includes 3,105 acres for the solar facility and 29.4-32.5 acres for the gentie right-of-way. This project is currently in the pre-application/adjudication process.

Fragrant Sage is a proposed 600MW alternating current single axis tracking photovoltaic solar generation plant with up to 300MW of four-hour duration lithium-ion battery storage. The proposed project would include a substation, gentie line, access roads, and an operations building. The project would interconnect to the Pinal West to Jojoba 500kV transmission line or the Pinal West to Westwing 345kV transmission line. The project would be constructed in 4,869 acres of BLM designated land within the Little Rainbow Valley between the Sierra Estrella Mountains and the SDNM's northeastern boundary directly adjacent to the proposed Mariposa solar project. This project is currently in variance.

Rainbow Valley Gentie is a proposed 345-500kV dual-circuit alternating current overhead electric transmission line from the Pinal West Substation to a future planned grid-scale solar voltaic generation site. This project would be needed to connect the Pinal West solar fields to the electrical grid. The project would require a 150ft wide right-of-way with temporary workspace and permanent access road. The project is located in Pinal County, AZ just south of SR-238 between the proposed Pinyon and Pinal West solar projects.

4.5 Livestock Grazing

Cumulative Impacts Common to All Alternatives

Livestock grazing in the CESA is currently impacted by activities such as urban sprawl, recreational activities, trespass livestock, climate change and drought, utility and road rights-of-way, and mining operations. Urban sprawl, primarily in the northeast and southeast portions of the CESA is likely to increase in the foreseeable future. This may lead to increased recreational activity, human/livestock interactions, and damage to livestock grazing infrastructure in the form of cut fences, damage and tampering with water facilities, and gates left open. Trespass livestock have the potential to enter BLM land from adjacent State and private lands due to the lack of, cut,

and/or damaged fences. Trespass livestock may lead to additional utilization of vegetation which otherwise would sustain the authorized livestock for a longer period. Climate change and drought are likely to reduce the productivity of rangelands and therefore reduce the potential for livestock production. Utility and road rights-of-way and mining operations can fragment allotments and create challenges with moving livestock between pastures. Developed recreational facilities will be constructed within the Anza RMZ which would increase recreational opportunities in or near areas where livestock would be present if the Big Horn and Conley allotments are available for livestock grazing. The Sonoran Valley Parkway is also planned for construction in Rainbow Valley in the foreseeable future and would fragment the Beloat Allotment and portions of the Conley Allotment outside the SDNM. The Sonoran Solar project has been constructed on the boundary of the Arnold and Beloat allotments reducing the overall acres available for livestock grazing. Additional solar rights-of-ways are under consideration on the Beloat and Conley Allotments. The Pinyon Solar project is currently being analyzed thorough NEPA and Mariposa Solar is likely to begin the NEPA process in FY 2025. Those projects and other projects within the CESA would reduce the available acreage used to calculate AUMs and would result in a reduction in the number of cattle potential able to graze within the Beloat and Conley Allotments. The final number of AUMs would be determined by an implementation level Environmental Analysis prior to cattle being released into these allotments.

No Action Alternative (Current Management)

Under the No Action Alternative, five of the six allotments associated with the SDNM would be available for livestock grazing, in addition to three other allotments outside the SDNM. Portions of the Big Horn Allotment (16,960 acres), the Lower Vekol Allotment (610 acres), and the entire Conley Allotment (77,170 acres) within the SDNM would be unavailable to grazing within the SDNM. The permittees of the Big Horn, Conley, and Lower Vekol allotments would have less flexibility in their management of livestock. The level and management of grazing on allotments within the CESA would be determined at the implementation-level and could vary in order to meet Standards and adapt to other uses within the CESA. Existing allotment fencing and water developments for livestock would be maintained by permittees in those allotments available for livestock grazing. Urban sprawl and the development of recreational facilities would likely have a minor impact to livestock grazing on these allotments more so than the Maximum Acreage Alternative. The cumulative effects of the No Action Alternative, in combination with other past, present, and RFFAs, would result in long-term, moderate, and beneficial to livestock grazing.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, all six allotments associated with the SDNM would be available for livestock grazing, in addition to three other allotments outside the SDNM. Existing allotment fencing and water developments for livestock would continue to be maintained by permittees in those allotments available for livestock grazing. The level and management of grazing on allotments within the CESA would be determined at the implementation-level and could vary in order to meet Standards and adapt to other uses within the CESA. The availability of livestock grazing on all six allotments associated with the SDNM would benefit livestock producers as they would have a larger area to manage their herds, allowing flexibility in grazing management. The cumulative effects of the Maximum Acreage Alternative, in combination with other past, present, and RFFAs, would result in negligible to minor, beneficial, and long-term impacts to livestock grazing.

No Grazing Alternative

Under the No Grazing Alternative, the SDNM portions of six allotments would be unavailable for livestock grazing. However, the non-SDNM portions of these allotments and three other allotments outside the SDNM would be available for livestock grazing. These allotments are in the urban/rural interface and could be impacted by other uses or activities in the CESA. There would be fewer human/livestock interactions on the SDNM where recreational facilities will be developed in the Big Horn and Conley allotments. Under the No Grazing Alternative, allotment fencing within the SDNM would likely not be maintained by permittees, in addition to water developments solely for the purpose of livestock. The cumulative effects of the No Grazing Alternative, in combination with other past, present, and RFFAs, would result in minor to moderate, adverse, and long-term impacts to livestock grazing.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, all six allotments associated with the SDNM would be allocated available for livestock grazing, except for 30,610 acres of the Big Horn Allotment and 41,480 acres of the Conley Allotment north of SR-238, in addition to three other allotments outside the SDNM. Existing allotment fencing and water developments for livestock would be maintained by permittees in the allotments and portions of allotments available for grazing. The level and management of grazing on allotments within the CESA would be determined at the implementation-level and could vary in order to meet Standards and adapt to other uses within the CESA. The availability of livestock grazing on the entirety of four and portions of two allotments associated with the SDNM would benefit livestock producers as they would have a larger area to manage their herds allowing flexibility in grazing management. Permittees would be reimbursed, in accordance with 43 CFR 4120, for their interest in the fair market value of the documented range improvements within the unavailable portions of two allotments. The cumulative effects of the Reduced Grazing Alternative, in combination with other past, present, and RFFAs, would result in negligible to minor, beneficial, and long-term impacts to livestock grazing.

Ephemeral Use Only Alternative

Under the Ephemeral Use Only Alternative, all six allotments associated with the SDNM would be available for livestock grazing, in addition to three other allotments outside the SDNM. Existing allotment fencing and water developments for livestock would continue to be maintained by permittees in those allotments available for livestock grazing. The level and management of grazing on allotments within the CESA would be determined at the implementation-level and could vary in order to meet Standards and adapt to other uses within the CESA. The availability of livestock grazing on all six allotments associated with the SDNM would benefit livestock producers as they would have a larger area to manage their herds, allowing flexibility in grazing management. The cumulative effects of the Ephemeral Use Only Alternative, in combination with other past, present, and RFFAs, would result in minor, beneficial, and long-term impacts to livestock grazing.

4.6 Recreation Management

Cumulative Impacts Common to All Alternatives

The CESA is adjacent to the fourth most populous county in the U.S.As. Population rises and the public seeks more outdoor recreation experiences, visitation to the CESA would be anticipated to grow. BLM-managed lands are used for a variety of recreation activities including hiking, equestrian use, back country camping, and dispersed recreational target shooting. In 2017 the BLM approved the development of three new recreation areas within this Anza RMZ. These developments would increase visitation to the CESA, and potentially increase recreation-related impacts on livestock operations.

No Action Alternative (Current Management)

Under the No Action Alternative, five allotments associated with the SDNM and three other allotments outside the SDNM would be available for livestock grazing. Recreation activities such as off-road motor vehicle use and dispersed recreational target shooting have the potential to result in loss of vegetative cover and displacement of wildlife and livestock. Concentrated livestock use around water developments and trailing along fence lines would be expected to result in loss of vegetative cover, which would reduce the aesthetic quality of the area. The cumulative effects of the No Action Alternative, in combination with other past, present, and RFFAs, would result in negligible, adverse, and long-term impacts to recreation management.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, all six allotments associated with the SDNM and three allotments outside the SDNM would be available for livestock grazing. The impacts from the Maximum Acreage Alternative would be expected to be similar to the No Action Alternative, except that livestock grazing would be allowed over a larger area (40 percent more). The cumulative effects of the Maximum Acreage Alternative, in combination with other past, present, and RFFAs, would result in negligible to minor, adverse, and long-term impacts to recreation management. These adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, reducing AUMs, and/or authorizing grazing seasonally/ephemerally.

No Grazing Alternative

Under the No Grazing Alternative, the SDNM portions of six allotments would be unavailable for livestock grazing. However, the non-SDNM portions of these allotments would be available for grazing, in addition to three other allotments. There would be no recreation-livestock conflicts in the CESA. Recreational activities such as off-road motor vehicle use, and dispersed recreational target shooting have the potential to result in loss of vegetative cover and displacement of wildlife, which would reduce the aesthetic quality of the area. The cumulative effects of the No Grazing Alternative, in combination with other past, present, and RFFAs, would result in negligible, beneficial, and long-term impacts to recreation management.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, six allotments associated with the SDNM and three other allotments outside the SDNM would be allocated available for livestock grazing. Portions of the Big Horn and Conley allotments north of SR-238 would be unavailable to livestock grazing. The elimination of livestock grazing in the Anza RMZ would prevent recreation-livestock conflicts

from occurring when three new recreation areas are constructed. The cumulative effects of the Reduced Grazing Alternative, in combination with other past, present, and RFFAs, would result in negligible, adverse, and long-term impacts to recreation management.

Ephemeral Use Only Alternative

Under the Ephemeral Use Only Alternative, all six allotments associated with the SDNM and three allotments outside the SDNM would be available for livestock grazing. The impacts from the Maximum Acreage Alternative would be expected to be similar to the No Action Alternative, except that livestock grazing would be allowed over a larger area (40 percent more). The cumulative effects of the Ephemeral Use Only Alternative, in combination with other past, present, and RFFAs, would result in negligible, adverse, and long-term impacts to recreation management. These adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, and authorizing grazing for ephemeral use only.

4.7 Socioeconomics and Environmental Justice

Cumulative Impacts Common to All Alternatives

The CESA for socioeconomics is Maricopa County (not shown). BLM-administered lands make up approximately 29 percent of Maricopa County. There are portions of 75 BLM-administered grazing allotments within Maricopa County. The Phoenix metropolitan area currently has more than four million people and is projected to increase to more than seven million people by 2050 (MAG 2017). On non-BLM lands, population growth will continue to result in the conversion of Arizona State Land Department and privately-owned lands currently available for grazing into residential and commercial developments. This trend would result in increased pressure on BLM-lands to maintain availability for livestock grazing. Overall agriculture employment in Maricopa County would be expected to decline as lands are converted from agricultural into residential and commercial uses. Open space associated with grazing would also be expected to decline in Maricopa County.

No Action Alternative (Current Management)

Under the No Action Alternative, five allotments associated with the SDNM and portions of 69 other allotments outside the SDNM would be available for livestock grazing. Portions of the Big Horn and Lower Vekol allotments, and the entire Conley Allotment within the SDNM would be unavailable for grazing within the SDNM. The No Action Alternative would provide for less economic contributions from livestock grazing than the Maximum Acreage Alternative, and more than the No Grazing Alternative. Permittees would be reimbursed in accordance with 43 CFR 4120 for their interest in the fair market value of the documented range improvements within the unavailable allotments. The cumulative effects of the No Action Alternative, in combination with other past, present, and RFFAs, would result in negligible to minor, beneficial, and long-term impacts to socioeconomics.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, all six allotments associated with the SDNM and portions of 69 allotments outside the SDNM would be available for livestock grazing. Compared to the other alternatives, the Maximum Acreage Alternative would provide for the greatest economic contributions from livestock grazing. The cumulative effects of the Maximum Acreage

Alternative, in combination with other past, present, and RFFAs, would result in minor, beneficial, and long-term impacts to socioeconomics.

No Grazing Alternative

Under the No Grazing Alternative, the SDNM portions of six allotments would be unavailable for livestock grazing. However, the non-SDNM portions of these allotments would be available for grazing which includes the areas with urban/rural interface and other uses, in addition to portions of 69 other allotments outside the SDNM. The No Grazing Alternative would provide no economic contributions from livestock grazing on six allotments in the SDNM. Permittees would be reimbursed in accordance with 43 CFR 4120 for their interest in the fair market value of the documented range improvements within the unavailable allotments. The cumulative effects of the No Grazing Alternative, in combination with other past, present, and RFFAs, would result in negligible to minor, adverse, and long-term impacts to socioeconomics.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, six allotments associated with the SDNM and portions of 69 other allotments outside the SDNM would be allocated available for livestock grazing. Portions of the Big Horn and Conley allotments north of SR-238 would be unavailable to livestock grazing. The Reduced Grazing Alternative would provide for less economic contributions from livestock grazing than the Maximum Acreage Alternative, and more than the No Grazing Alternative. Permittees would be reimbursed in accordance with 43 CFR 4120 for their interest in the fair market value of the documented range improvements within the unavailable allotments. The cumulative effects of the Reduced Grazing Alternative, in combination with other past, present, and RFFAs, would result in negligible, beneficial, and long-term impacts to socioeconomics.

Ephemeral Use Only

Under the Ephemeral Use Only Alternative, all six allotments associated with the SDNM and portions of 69 allotments outside the SDNM would be available for livestock grazing. Compared to the No Action alternative, the Ephemeral Use Only Alternative would cause a decrease in economic contributions from livestock grazing. The cumulative effects of the Ephemeral Use Only Alternative, in combination with other past, present, and RFFAs, would result in minor, beneficial, and long-term impacts to socioeconomics.

4.8 Vegetation, Noxious and Invasive Weed Species

Cumulative Impacts Common to All Alternatives

The vegetation in the CESA (Figure 10) is currently impacted by activities such as urban sprawl, recreational activities, livestock grazing and trespass livestock, climate change and drought, agricultural developments, utility and road rights-of-way, and mining operations. Urban sprawl, primarily in the northern and eastern portions of the CESA is likely to increase in the foreseeable future. In addition, the potential solar development in the east and northeast increases the amount of potential disturbance area. Since 2020, public lands have seen increased visitation as people rediscovered recreation on public lands since the Covid pandemic. The increased disturbance from construction, recreation, as well as changes in climate (e.g. temperature and changes in precipitation timing) that may favor invasive species will increase the risk of invasive plant species establishment while cattle grazing and people recreating provide a potential vector for the spread of weedy species. Trespass livestock have the potential to enter BLM-managed land from adjacent

State and private lands within the CESA due to the lack of, cut, and/or damaged fences. Trespass livestock may lead to additional utilization of vegetation which would be additive to authorized livestock use, if any.

Climate change and drought may alter the composition of vegetation communities and make them more susceptible to disturbance. Utility and road right-of-ways and mining operations damage and remove vegetation through clearing and maintenance of rights-of-way. The Sonoran Valley Parkway is an approved right-of-way and is planned for construction in Rainbow Valley in the foreseeable future and would impact approximately 472 acres. Developed recreational facilities will be constructed within the Anza RMZ, which would increase recreational opportunities and would increase the potential for damage to vegetation and spread of invasive species from motor vehicle use and camping.

No Action Alternative (Current Management)

Under the No Action Alternative, five of the six allotments associated with the SDNM would be available for livestock grazing. Portions of the Big Horn Allotment, the Lower Vekol Allotment, and the entire Conley Allotment within the SDNM would be unavailable to grazing within the SDNM. The level and management of grazing on allotments within the CESA (Figure 10) would be determined at the implementation-level and could vary in order to meet Standards and adapt to other uses within the CESA. The areas unavailable to grazing within the Big Horn, Lower Vekol, and Conley allotments would benefit vegetation and reduce the likelihood of the spread of noxious and invasive species. Urban sprawl and the development of recreational facilities within the SDNM would impact vegetation less in the No Action Alternative, than under the Maximum Acreage Alternative. The cumulative effects of the No Action Alternative, in combination with other past, present, and RFFAs, would result in minor to moderate, adverse, and long-term impacts to vegetation.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, all six allotments associated with the SDNM would be available for livestock grazing. The level and management of grazing on allotments within the CESA (Figure 10) would be determined at the implementation-level and could vary in order to meet Standards and adapt to other uses within the CESA. The impacts to vegetation would depend on the level of grazing authorized under implementation-level decisions. However, under the Maximum Acreage Alternative vegetation is more likely to be utilized and damaged by livestock and invasive species are more likely to be spread by livestock when compared to other alternatives. Vegetation on the non-SDNM portion of the CESA has the potential to be grazed by livestock on the other allotments available for grazing. The cumulative effects of the Maximum Acreage Alternative, in combination with other past, present, and RFFAs, would result in minor to moderate, adverse, and long-term impacts to vegetation. These adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, reducing AUMs, and/or authorizing grazing seasonally/ephemerally.

No Grazing Alternative

Under the No Grazing Alternative, the SDNM portions of six allotments would be unavailable for livestock grazing. However, the non-SDNM portions of these allotments could potentially be remain available for grazing. These allotments include areas with urban/rural interface and could

potentially be impacted by other uses listed in the RFFAs. The cumulative effects of the No Grazing Alternative, in combination with other past, present, and RFFAs, would result in negligible to minor, beneficial, and long-term impacts to vegetation.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, all six allotments associated with the SDNM would be allocated available for livestock grazing, except for portions of the Big Horn and Conley allotments north of SR-238, in addition to three other allotments outside the SDNM. The level and management of grazing on allotments within the CESA would be determined at the implementation-level and could vary in order to meet Standards and adapt to other uses within the CESA. The impacts to vegetation would depend on the level of grazing authorized under implementation-level decisions. However, under the Reduced Grazing Alternative vegetation is less likely to be utilized and damaged by livestock and invasive species are less likely to be spread by livestock when compared to the Maximum Acreage Alternative. Vegetation on the non-SDNM portion of the CESA has the potential to be grazed by livestock on the other allotments available for grazing. The cumulative effects of the Reduced Grazing Alternative, in combination with other past, present, and RFFAs, would result in minor to moderate, adverse, and long-term impacts to vegetation.

Ephemeral Use Only Alternative

Under the Ephemeral Use Only Alternative, all six allotments associated with the SDNM would be available for livestock grazing. The level and management of grazing on allotments within the CESA (Figure 9), either zero AUMs or ephemeral use only, would be determined at the implementation-level and could vary in order to meet Standards and adapt to other uses within the CESA. The impacts to vegetation would depend on the level of grazing authorized under implementation-level decisions. Under the Ephemeral Use Only Alternative vegetation is less likely to be utilized and damaged by livestock and invasive species are less likely to be spread by livestock when compared to the No Action Alternative. Vegetation on the non-SDNM portion of the CESA has the potential to be grazed by livestock on the other allotments available for grazing. The cumulative effects of the Ephemeral Grazing Only Alternative, in combination with other past, present, and RFFAs, would result in minor to minor, adverse, and long-term impacts to vegetation. These adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, and authorizing grazing for ephemeral use only.

4.9 General Wildlife, Special Status Species, Migratory Birds

Cumulative Impacts Common to All Alternatives

Other activities such as recreation and continued population growth in and around the CESA (Figure 11) could result in a variety of impacts to wildlife and wildlife habitat. Roads and other infrastructure projects in the CESA could displace wildlife, fragment and remove habitat, and could contribute to direct mortality. The Sonoran Valley Parkway is an approved right-of-way and is planned for construction in Rainbow Valley in the foreseeable future and would impact approximately 472 acres. Trespass livestock have the potential to enter BLM land from adjacent State and private lands within the CESA due to the lack of, cut, and/or damaged fences. Trespass livestock may lead to additional utilization of vegetation which would be additive to authorized

livestock use, if any. Climate change and drought have the potential to alter vegetation communities that makeup wildlife habitat and reduce water availability in these arid environments.

No Action Alternative (Current Management)

Livestock grazing would continue within the CESA outside of the SDNM on BLM-administered, State and private lands. Under the No Action Alternative, five allotments within the SDNM would continue to be available for livestock grazing. Competition for forage between wildlife and livestock would continue. Range improvements such as water developments for livestock would be maintained by permittees. Grazing, infrastructure projects including highways, and conversion of open space into residential and commercial developments outside of the SDNM and within the CESA would add additional impacts to wildlife. The cumulative effects of the No Action Alternative, in combination with other past, present, and RFFAs, would result in long-term, minor to moderate, adverse impacts to general wildlife, special status species, and migratory birds.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, livestock grazing would be available on all allotments within the SDNM, in addition to three other allotments outside the SDNM. There would be competition for forage and space between wildlife and livestock. Range improvements such as water developments for livestock would be maintained by permittees. Grazing, infrastructure projects including highways, and conversion of open space into residential and commercial developments outside of the SDNM and within the CESA (Figure 11) would add additional impacts to wildlife. The cumulative effects of the Maximum Acreage Alternative, in combination with other past, present, and RFFAs, would result in long-term, negligible to moderate, adverse impacts to general wildlife, special status species and migratory birds. These adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, reducing AUMs, and/or authorizing grazing seasonally/ephemerally.

No Grazing Alternative

Livestock grazing would continue within the CESA (Figure 11) outside of the SDNM on BLM-administered, State and private lands. Under the No Grazing Alternative, livestock grazing would not be authorized within the SDNM. In the absence of livestock grazing, competition for forage between wildlife and livestock would be eliminated, which would result in more forage for wildlife and insect populations. The absence of livestock grazing could result in cover canopy increasing over time, a benefit for cover-dependent species. Livestock disturbance/displacement effects would not occur, benefiting nesting migratory birds and other wildlife individuals. The absence of grazing within the SDNM would result in a benefit to wildlife within the SDNM, although as population growth continues in the CESA it is highly likely that recreation on the SDNM would increase, which would contribute to many new stressors on wildlife. Grazing, infrastructure projects including highways, and conversion of open space into residential and commercial developments outside of the SDNM and within the CESA would add additional impacts to wildlife. Range improvements such as water developments within the SDNM would no longer be maintained by permittees. The cumulative effects of the No Grazing Alternative, in combination with other past, present, and RFFAs, would result in long-term impacts that could range from negligible and beneficial to minor and adverse, to general wildlife, special status species and migratory birds.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, livestock grazing would be available on all allotments within the SDNM with portions of the Big Horn and Conley allotments unavailable, in addition to three other allotments outside the SDNM. There would be competition for forage and space between wildlife and livestock. Except on the Big Horn and Conley allotments north of SR-238, range improvements such as water developments for livestock would be maintained by permittees. Grazing, infrastructure projects including highways, and conversion of open space into residential and commercial developments outside of the SDNM and within the CESA (Figure 11) would add additional impacts to wildlife. The cumulative effects of the Reduced Grazing Alternative, in combination with other past, present, and RFFAs, would result in long-term, negligible to moderate, adverse impacts to general wildlife, special status species and migratory birds.

Ephemeral Use Only Alternative

Under the Ephemeral Use Only Alternative, livestock grazing would be available on all allotments within the SDNM, in addition to three other allotments outside the SDNM. There would be seasonal competition for forage and space between wildlife and livestock. Range improvements such as water developments for livestock would be maintained by permittees. Grazing, infrastructure projects including highways, and conversion of open space into residential and commercial developments outside of the SDNM and within the CESA (Figure 11) would add additional impacts to wildlife. The cumulative effects of the Ephemeral Use Only Alternative, in combination with other past, present, and RFFAs, would result in long-term, minor to moderate, beneficial impacts to general wildlife, special status species and migratory birds.

4.10 Soil Resources

Cumulative Impacts Common to All Alternatives

Soils in the CESA are currently impacted by activities such as urban sprawl, recreational activities, livestock grazing and trespass livestock, climate change and drought, agricultural developments, utility and road rights-of-way, mining operations, and solar development. Livestock have the potential to enter BLM land from adjacent State and private lands within the CESA due to the lack of fences or cut and damaged fences as the result of OHV use or other recreational use. If present, trespass livestock would add to soil disturbance. Urban sprawl, primarily in the northeast and eastern portions of the CESA, is likely to increase in the foreseeable future. There are also several solar developments proposed within the CESA. Construction has been shown to increase soil erosion by more than three times the impact of livestock grazing (Jeong & Dorn 2018). Climate change and drought may alter the composition of vegetation communities and potentially reduce soil protecting canopy structure and alter biologic crust communities like disturbance (Ferrenberg 2015), but the result may be community dependent (Steven 2015). Soil type can also influence the impact of disturbance on soil biotic crusts (Duniway et al. 2018) suggesting crusts on some soils are at more risk than others. Utility and road rights-of-way and mining operations damage and remove soil through clearing of vegetation and maintenance of right-of-ways. Clearing for road construction and maintenance has been shown to increase soil erosion by more than three times the impact of livestock grazing (Jeong & Dorn 2018).

The acreage associated with the proposed solar development may have an impact on sedimentation. Solar development in this region of Arizona has, to date, primarily resulted in clearing vegetation and grazing the soil surface and would likely have similar effects to building

and road development resulting in sedimentation increases along ephemeral washes downstream solar projects. The SDNM is at a higher elevation than most of the surrounding proposed solar development, so the sedimentation from water erosion is unlikely to impact the Monument, but wind erosion could blow additional sediment into the Monument.

The Sonoran Valley Parkway is an approved rights-of-way and is planned for construction in Rainbow Valley in the foreseeable future and would cause soil disturbance to approximately 472 acres. Developed recreational facilities will be constructed within the Juan Bautista de Anza RMZ of the SDNM, which would increase recreational opportunities and would increase the potential for soil damage from motor vehicle use and camping.

No Action Alternative (Current Management)

Under the No Action Alternative, five of the six allotments associated with the SDNM would be available for livestock grazing. Portions of the Big Horn Allotment, the Lower Vekol Allotment, and the entire Conley Allotment within the SDNM would be unavailable to grazing within the SDNM. The level and management of grazing on allotments within the SDNM would be determined at the implementation-level and could vary to meet Standards and adapt to other uses within the CESA. The areas unavailable to livestock grazing within the Big Horn, Lower Vekol, and Conley allotments would benefit soils as the areas would not be subject to compaction, disturbance, and potential erosion caused by livestock grazing where intensive use occurs. Urban sprawl and the development of recreational facilities within the SDNM would contribute to less impacts under the No Action Alternative than under the Maximum Acreage Alternative. The cumulative effects of the No Action Alternative, in combination with other past, present, and RFFAs, would result in minor to moderate, adverse, and long-term impacts to soils.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, all six allotments associated with the SDNM would be available for livestock grazing. The level and management of grazing on allotments within the SDNM would be determined at the implementation-level and could vary in order to meet Standards and adapt to other uses within the CESA. Under the Maximum Acreage Alternative, soils are more likely to be damaged by livestock through trampling and removal of vegetation when compared to the other alternatives. Soils on the non-SDNM portion of the CESA have the potential to be disturbed by livestock on all allotments available for grazing, in addition to impacts from other activities such as conversion of open space to residential and commercial developments. The cumulative effects of the Maximum Acreage Alternative, in combination with other past, present, and RFFAs, would result in minor to moderate, adverse, and long-term impacts to soils. These adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, reducing AUMs, and/or authorizing grazing seasonally/ephemerally.

No Grazing Alternative

Under the No Grazing Alternative, the SDNM portions of six allotments would be unavailable for livestock grazing. Within the SDNM no soil disturbance associated with livestock grazing would occur. However, the non-SDNM portions of these allotments could potentially remain available for grazing. These allotments include an urban/interface outside the SDNM, and soils could be impacted by other uses listed in the RFFAs. The cumulative effects of the No Grazing Alternative,

in combination with other past, present, and RFFAs, would result in negligible, beneficial, and long-term impacts to soils.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, all six allotments associated with the SDNM would be allocated available for livestock grazing, except for portions of the Big Horn and Conley allotments north of SR-238, in addition to three other allotments outside the SDNM. The level and management of grazing on allotments within the CESA would be determined at the implementation-level and could vary in order to meet Standards and adapt to other uses within the CESA. The impacts to soils would depend on the level of grazing authorized under implementation-level decisions. However, under the Reduced Grazing Alternative soils are less likely to be damaged by livestock, when compared to the Maximum Acreage Alternative. Soils on the non-SDNM portion of the CESA has the potential to be damaged by livestock on the other allotments available for grazing. The cumulative effects of the Reduced Grazing Alternative, in combination with other past, present, and RFFAs, would result in minor to moderate, adverse, and long-term impacts to soils.

Ephemeral Use Only

Under the Ephemeral Use Only Alternative, all six allotments associated with the SDNM would be available for livestock grazing. The level and management of grazing on allotments within the SDNM, either zero AUMs or ephemeral use only, would be determined at the implementation-level and could vary in order to meet Standards and adapt to other uses within the CESA. Under the Ephemeral Use Only Alternative, soils are less likely to be damaged by livestock through trampling and removal of vegetation when compared to the No Action Alternative. Soils on the non-SDNM portion of the CESA have the potential to be disturbed by livestock on all allotments available for grazing, in addition to impacts from other activities such as conversion of open space to residential and commercial developments. The cumulative effects of the Ephemeral Use Only Alternative, in combination with other past, present, and RFFAs, would result in minor to minor, adverse, and long-term impacts to soils. These adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, and authorizing grazing for ephemeral use only.

4.11 Cultural and Heritage Resources

Cumulative Impacts Common to All Alternatives

Forty-four percent of the CESA (Figure 11) is non-BLM administered land, where the greatest impacts to cultural sites is from the conversion of lands from open space to residential and commercial uses associated with population growth. Cultural sites may also be impacted from other authorized uses on BLM-administered lands outside the SDNM including right-of-ways, renewable energy, mining, and exploration on unpatented mining claims. The Sonoran Valley Parkway is an approved rights-of-way and is planned for construction in Rainbow Valley in the foreseeable future and mitigation for impacts to cultural sites has been addressed through an approved Programmatic Agreement.

No Action Alternative (Current Management)

Under the No Action Alternative, five of the six allotments within the SDNM would be available for livestock grazing, in addition to three other allotments outside the SDNM (Figure 11). No

livestock grazing would occur in portions of the Big Horn Allotment, the Lower Vekol Allotment, and the entire Conley Allotment. The level of potential impacts to cultural sites would depend on the grazing management system set at the implementation-level. The potential for trampling and accelerated erosion due to loss of vegetation and topsoil would be eliminated in areas unavailable to livestock grazing. Impacts from livestock grazing to cultural sites within five allotments would continue, with the greatest potential for impacts to areas near concentrated livestock use near water developments which can lead to loss of vegetative cover and increase in potential for soil erosion. Impacts from livestock would be less where use is generally dispersed across the allotments. Other activities would be expected to continue such as recreation and motor vehicle use, which can lead to the loss of vegetative cover and potential for increase in soil erosion, which could impact cultural sites. Outside the SDNM, the conversion of open space into residential and commercial developments would also be expected to impact cultural sites. The cumulative effects of the No Action Alternative, in combination with other past, present, and RFFAs, would result in negative⁹, negligible to minor, and long-term impacts to cultural and heritage resources.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, all six allotments would be available for livestock grazing, in addition to three other allotments outside the SDNM (Figure 11). The level of potential impacts to cultural sites would depend on the level of grazing and adjustments of grazing management set at the implementation-level. Dispersed livestock grazing has low potential to impact cultural sites. Cultural sites adjacent to areas of concentrated use around water developments have the greatest potential to be impacted by livestock grazing. Concentrated use can lead to loss of vegetative cover and increase in potential for soil erosion, which could impact cultural sites. Other activities would be expected to continue such as recreation and motor vehicle use, which can lead to the loss of vegetative cover and potential for increase in soil erosion, which could impact cultural sites. Outside the SDNM, the conversion of open space into residential and commercial developments would also be expected to impact cultural sites. The cumulative effects of the Maximum Acreage Alternative, in combination with other past, present, and RFFAs, would result in negative, negligible to minor, and long-term impacts to cultural and heritage resources. These adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, reducing AUMs, and/or authorizing grazing seasonally/ephemerally.

No Grazing Alternative

Under the No Grazing Alternative, all six allotments would be unavailable for livestock grazing within the SDNM. Three other allotments outside the SDNM would continue to be available for livestock grazing (Figure 11). The potential for trampling and accelerated erosion due to loss of vegetation and topsoil from livestock grazing would be eliminated in the SDNM. Under the No Grazing Alternative, there would be no livestock grazing within the Anza NHT Corridor and Management Area, eliminating potential impacts to historic trails. Other activities would be expected to continue such as recreation and motor vehicle use, which can lead to the loss of

⁹ In this Section the term 'negative' is used instead of adverse (as defined in Section 3.1), because adverse has a specific meaning under the NHPA.

vegetative cover and potential for increase in soil erosion, which could impact cultural sites. Outside the SDNM, the conversion of open space into residential and commercial developments would also be expected to impact cultural sites. The cumulative effects of the No Grazing Alternative, in combination with other past, present, and RFFAs, would result in negative, negligible to minor, and long-term impacts to cultural and heritage resources.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, all six allotments within the SDNM would be available for livestock grazing, except for portions of the Conley and Big Horn allotments north of SR-238, in addition to three other allotments outside the SDNM (Figure 11). The level of potential impacts to cultural sites would depend on the grazing management system set at the implementation-level. The potential for trampling and accelerated erosion due to loss of vegetation and topsoil would be eliminated in areas unavailable to livestock grazing. Impacts from livestock grazing to cultural sites within the allotments would continue, with the greatest potential for impacts to areas near concentrated livestock use near water developments which can lead to loss of vegetative cover and increase in potential for soil erosion. Impacts from livestock would be less where use is generally dispersed across the allotments. Under the Reduced Grazing Alternative, there would be no livestock grazing within the Anza NHT Corridor and Management Area, eliminating potential impacts to historic trails. Other activities would be expected to continue such as recreation and motor vehicle use, which can lead to the loss of vegetative cover and potential for increase in soil erosion, which could impact cultural sites. Outside the SDNM, the conversion of open space into residential and commercial developments would also be expected to impact cultural sites. The cumulative effects of the Reduced Grazing Alternative, in combination with other past, present, and RFFAs, would result in negative, negligible to minor, and long-term impacts to cultural and heritage resources.

Ephemeral Use Only Alternative

Under the Ephemeral Use Only Alternative, all six allotments would be available for livestock grazing, in addition to three other allotments outside the SDNM (Figure 11). The level of potential impacts to cultural sites would depend on the level of grazing, zero AUMs to ephemeral use only, and adjustments of grazing management set at the implementation-level. Dispersed livestock grazing has low potential to impact cultural sites. Cultural sites adjacent to areas of concentrated use around water developments have the greatest potential to be impacted by livestock grazing. Concentrated use can lead to loss of vegetative cover and increase in potential for soil erosion, which could impact cultural sites. Other activities would be expected to continue such as recreation and motor vehicle use, which can lead to the loss of vegetative cover and potential for increase in soil erosion, which could impact cultural sites. Outside the SDNM, the conversion of open space into residential and commercial developments would also be expected to impact cultural sites. The cumulative effects of the Ephemeral Use Only Alternative, in combination with other past, present, and RFFAs, would result in negative, negligible, and long-term impacts to cultural and heritage resources. These adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, and authorizing grazing for ephemeral use only.

4.12 Air Resources

Cumulative Impacts Common to All Alternatives

Portions of the CESA are in non-attainment for three regulated pollutants. Approximately 58 percent of the CESA is in non-attainment for Ozone (O₃), 29 percent of the CESA is in non-attainment for large particulates (PM₁₀), and seven percent of the CESA is in non-attainment for fine particulates (PM_{2.5}). Vehicle travel on paved roads in the CESA represents the largest single emission source which contributes to the formation of O₃. The largest source of particulate matter emissions in the CESA are surface-disturbing activities, including construction, mining, and off-highway (recreation-related) travel. Emissions from agricultural facilities, particularly during field tilling and harvest, also contributes to particulate emissions (BLM 2018).

On all lands within the CESA, climate change and drought would influence vegetation communities. The exact timing, changes, and intensity are unknown but are likely to include more extreme fluctuations in precipitation patterns and temperatures. Drought is an inherent characteristic of the Sonoran Desert and will likely continue into the foreseeable future. There is no methodology to assess the incremental increases in dust, motor vehicle emissions, and methane from climate change outside the CESA to specific impacts within the CESA. There is no methodology to assess incremental increases in fugitive dust, motor vehicle emissions and methane, and their specific impacts outside of the CESA on climate change. Human- and natural-caused climate change can influence precipitation levels and drought patterns in the southwest.

No Action Alternative (Current Management)

Under the No Action Alternative, portions of five allotments within the SDNM, in addition to three allotments outside the SDNM, would be available for livestock grazing within the CESA. Sources of pollutants on non-BLM lands within the CESA include agricultural, residential and commercial uses, and transportation. Within the SDNM the primary source of Ozone and fugitive dust is from recreation-related motor vehicle use. Livestock grazing would contribute to methane emissions. The cumulative effects of the No Action Alternative, in combination with other past, present, and RFFAs, would result in negligible to minor, adverse, and long-term impacts to air resources.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, all nine allotments within the CESA would be available for livestock grazing. Sources of pollutants on non-BLM lands within the CESA include agricultural, residential and commercial uses, and transportation. Within the SDNM the primary source of Ozone and fugitive dust is from recreation-related motor vehicles. Livestock grazing would contribute to methane emissions. The cumulative effects of the Maximum Acreage Alternative, in combination with other past, present, and RFFAs, would result in negligible to minor, adverse, and long-term impacts to air resources. These adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, reducing AUMs, and/or authorizing grazing seasonally/ephemerally.

No Grazing Alternative

Under the No Grazing Alternative, six allotments within the SDNM would be unavailable for livestock grazing. Portions of six allotments outside the SDNM, in addition to three other allotments, would be available for livestock grazing within the CESA. Sources of pollutants on

non-BLM lands within the CESA include agricultural, residential and commercial uses, and transportation. Within the SDNM the primary source of Ozone and fugitive dust is from recreation-related motor vehicles. Livestock grazing outside the SDNM would contribute to methane emissions. The cumulative effects of the No Grazing Alternative, in combination with other past, present, and RFFAs, would result in negligible, adverse, and long-term impacts to air resources.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, all six allotments within the SDNM would be available for livestock grazing, although portions of two allotments would be unavailable. Three allotments outside the SDNM would continue to be available for livestock grazing. Sources of pollutants on non-BLM lands within the CESA include agricultural, residential and commercial uses, and transportation. Within the SDNM the primary source of Ozone and fugitive dust is from recreation-related motor vehicles. Livestock grazing would contribute to methane emissions. The cumulative effects of the Reduced Grazing Alternative, in combination with other past, present, and RFFAs, would result in negligible to minor, adverse, and long-term impacts to air resources.

Ephemeral Use Only Alternative

Under the Ephemeral Use Only Alternative, all nine allotments within the CESA would be available for livestock grazing. Sources of pollutants on non-BLM lands within the CESA include agricultural, residential and commercial uses, and transportation. Within the SDNM the primary source of Ozone and fugitive dust is from recreation-related motor vehicles. Livestock grazing would contribute to methane emissions. The cumulative effects of the Ephemeral Use Only Alternative, in combination with other past, present, and RFFAs, would result in negligible, adverse, and long-term impacts to air resources. These adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, and authorizing grazing for ephemeral use only.

4.13 Visual Resources Management

Cumulative Impacts Common to All Alternatives

BLM-managed lands within the CESA have been allocated a VRM Classification. Approximately 19 percent of the CESA is Class I, 10 percent of the CESA is Class II, 15 percent of the CESA is Class III, and 12 percent of the CESA is Class IV. Class IV is defined as: “The objective is to provide for management activities that require major modification of the existing landscape character. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention; however, every attempt should be made to minimize the impact of these activities, through careful location, minimal disturbance, and repeating of the basic elements.” All Class IV areas are outside the SDNM. VRM classes apply to BLM-managed lands only. Within the CESA, significant alterations of the visual setting on non-BLM lands are the result of the conversion of open space to agricultural fields west of State Route 85 and in Rainbow Valley. Open space has been converted to residential and commercial uses; Gila Bend is the largest community in the CESA. The four-lane State Route 85 is a significant north-south transportation corridor. On BLM-managed lands, there are mining activities outside the SDNM, and rights-of-ways for transportation and utilities. Within the SDNM there are unpaved travel routes outside of wilderness areas and areas of concentrated recreational

shooting sports. SR-238 is an east-west transportation corridor which includes a Union Pacific Railroad line.

No Action Alternative (Current Management)

Under the No Action Alternative, portions of five allotments within the SDNM, in addition to three allotments outside the SDNM, would be available for livestock grazing within the CESA. Alteration of the visual character on non-BLM lands through conversion of open space to agricultural, residential, or commercial uses would be expected to continue. Existing and new livestock infrastructure such as water developments and fencing has impacted the visual character at these sites through loss of vegetative cover and soil compaction. These changes are weak in consideration that the CESA involves all or portions of nine livestock grazing allotments and nearly three-quarters of a million acres. The cumulative effects of the No Action Alternative, in combination with other past, present, and RFFAs, would result in negligible, adverse, and long-term impacts to visual resources management.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, all nine allotments within the CESA would be available for livestock grazing. Alteration of the visual character on non-BLM lands through conversion of open space to agricultural, residential, or commercial uses would be expected to continue. Existing and new livestock infrastructure such as water developments and fencing have and would impact the visual character at these sites through loss of vegetative cover and soil compaction. These changes are weak in consideration that the CESA involves all or portions of nine livestock grazing allotments and nearly three-quarters of a million acres. The cumulative effects of the Maximum Acreage Alternative, in combination with other past, present, and RFFAs, would result in negligible to minor, adverse, and long-term impacts to visual resources management. These adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, reducing AUMs, and/or authorizing grazing seasonally/ephemerally.

No Grazing Alternative

Under the No Grazing Alternative, six allotments within the SDNM would be unavailable for livestock grazing. Portions of six allotments outside the SDNM, in addition to other three allotments, would be available for livestock grazing within the CESA. Alteration of the visual character on non-BLM lands through conversion of open space to agricultural, residential, or commercial uses would be expected to continue. Existing and new livestock infrastructure (outside the SDNM) such as water developments and fencing has impacted the visual character at these sites through loss of vegetative cover and soil compaction, although none of the existing infrastructure has been used or maintained since at least 2015. These changes are weak in consideration that the CESA involves all or portions of nine livestock grazing allotments and nearly three-quarters of a million acres. The cumulative effects of the No Grazing Alternative, in combination with other past, present, and RFFAs, would result in negligible, adverse, and long-term impacts to visual resources management.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, all six allotments within the SDNM would be available for livestock grazing, although portions of two allotments would be unavailable. Alteration of the visual character on non-BLM lands through conversion of open space to agricultural, residential,

or commercial uses would be expected to continue. Existing and new livestock infrastructure such as water developments and fencing have and would impact the visual character at these sites through loss of vegetative cover and soil compaction. These changes are weak in consideration that the CESA involves all or portions of eight livestock grazing allotments and nearly three-quarters of a million acres. The cumulative effects of the Reduced Grazing Alternative, in combination with other past, present, and RFFAs, would result in negligible, adverse, and long-term impacts to visual resources management.

Ephemeral Use Only Alternative

Under the Ephemeral Use Only Alternative, all nine allotments within the CESA would be available for livestock grazing. Alteration of the visual character on non-BLM lands through conversion of open space to agricultural, residential, or commercial uses would be expected to continue. Existing and new livestock infrastructure such as water developments and fencing have and would impact the visual character at these sites through loss of vegetative cover and soil compaction. These changes are weak in consideration that the CESA involves all or portions of nine livestock grazing allotments and nearly three-quarters of a million acres. The cumulative effects of the Ephemeral Use Only Alternative, in combination with other past, present, and RFFAs, would result in negligible, adverse, and long-term impacts to visual resources management. These adverse impacts could be avoided or reduced at the implementation-level by redistributing livestock through the potential addition of new water sources, excluding livestock from sensitive areas, and authorizing grazing for ephemeral use only.

4.14 Special Designations - Wilderness

Cumulative Impacts Comment to All Alternatives

The wilderness areas of the CESA are currently impacted by activities such as urban sprawl, recreational activities, and livestock grazing. Three wilderness areas are present within the CESA, two within the SDNM and one outside (Figure 12). The North and South Maricopa Mountains Wilderness areas are within the SDNM and span the entirety of the Maricopa Mountains, and the Sierra Estrella Wilderness area is in the northeast portion of the CESA encompassing a portion of the Estrella Mountains and its foothills. These three wilderness areas are receiving a continuous increase in visitation due to the urban sprawl of the Phoenix metropolitan area which has also resulted in illegal off-road travel. Urban sprawl and therefore increased recreational activity, primarily in the northeast and southeast portions of the CESA, is likely to increase in the foreseeable future.

The three wilderness areas are also entirely within BLM grazing allotments. The North Maricopa Mountains Wilderness contains portions of four grazing allotments, the South Maricopa Mountains Wilderness contains portions of three grazing allotments, and the Sierra Estrella Wilderness is entirely within one grazing allotment. The majority of these wilderness areas are steep, rugged, and remote which prevents significant livestock grazing from occurring.

No Action Alternative (Current Management)

Under the No Action Alternative, portions of five allotments within the wilderness areas of SDNM, in addition to one allotment in the wilderness area outside the SDNM, would be available for livestock grazing. Impacts related to the continuation of livestock grazing in these areas as well as the existing livestock infrastructure such as water developments and fencing is expected to continue in the areas available for grazing. These impacts are negligible as the level of livestock

grazing and the amount of livestock grazing infrastructure is minimal when compared to the overall acreage of the wilderness areas. The cumulative effects of the No Action Alternative, in combination with other past, present, and RFFAs, would result in negligible, adverse, and long-term impacts to wilderness.

Maximum Acreage Alternative

Under the Maximum Acreage Alternative, all five allotments within the wilderness areas of SDNM, in addition to one allotment in the wilderness area outside the SDNM, would be available for livestock grazing. Impacts related to the continuation of livestock grazing in these areas as well as the existing livestock infrastructure such as water developments and fencing is expected to continue. These impacts are negligible as the level of livestock grazing and the amount of livestock grazing infrastructure is minimal when compared to the overall acreage of the wilderness areas. The cumulative effects of the Maximum Acreage Alternative, in combination with other past, present, and RFFAs, would result in negligible, adverse, and long-term impacts to wilderness. These adverse impacts can be avoided or reduced at the grazing implementation-level by consideration of adjustments to livestock grazing management and range improvements consistent with BLM policies regarding the management of grazing in wilderness areas.

No Grazing Alternative

Under the No Grazing Alternative, all five allotments within the wilderness areas of SDNM would be unavailable to grazing and the portions of one allotment in the wilderness area outside the SDNM would be available for livestock grazing. Impacts related to livestock grazing in the SDNM would end. The existing livestock infrastructure, such as water developments and fencing, within the SDNM would no longer be maintained by the permittees and may be maintained or removed on a case-by-case basis by the BLM. The cumulative effects of the No Grazing Alternative, in combination with other past, present, and RFFAs, would result in negligible, beneficial, and long-term impacts to wilderness.

Reduced Grazing Alternative

Under the Reduced Grazing Alternative, portions of five allotments within the wilderness areas of SDNM, in addition to one allotment in the wilderness area outside the SDNM, would be available for livestock grazing. Impacts related to the continuation of livestock grazing in these areas as well as the existing livestock infrastructure such as water developments and fencing is expected to continue in the areas available for grazing. These impacts are negligible as the level of livestock grazing and the amount of livestock grazing infrastructure is minimal when compared to the overall acreage of the wilderness areas. The cumulative effects of the Reduced Grazing Alternative, in combination with other past, present, and RFFAs, would result in negligible, adverse, and long-term impacts to wilderness.

Ephemeral Use Only Alternative

Under the Ephemeral Use Only Alternative, all five allotments within the wilderness areas of SDNM, in addition to one allotment in the wilderness area outside the SDNM, would be available for livestock grazing. Impacts related to the continuation of livestock grazing in these areas as well as the existing livestock infrastructure such as water developments and fencing is expected to continue. These impacts are negligible as the level of livestock grazing and the amount of livestock grazing infrastructure is minimal when compared to the overall acreage of the wilderness areas. The cumulative effects of the Ephemeral Use Only Alternative, in combination with other past,

present, and RFFAs, would result in negligible, adverse, and long-term impacts to wilderness. These adverse impacts can be avoided or reduced at the grazing implementation-level by consideration of adjustments to livestock grazing management and range improvements consistent with BLM policies regarding the management of grazing in wilderness areas.

5.0 PERSONS, GROUPS, AND AGENCIES CONSULTED

5.1 List of Preparers

The following individuals were involved in the preparation of this RMPA/EA:

Bureau of Land Management

Name	Title	Project Expertise
Dale Ohnmeiss	Planning and Environmental Specialist	National Environmental Policy Act, Cumulative Effects
Laura Howland	Wildlife Biologist	Biological Resources, Wildlife, Sensitive Species
Chris Bowman-Prideaux	Rangeland Management Specialist	Livestock Grazing, Vegetation, Noxious and Invasive Weeds, Soils, Wilderness
Doug Whitbeck	State Rangeland Management Lead	Livestock Grazing, Vegetation, Noxious and Invasive Weeds, Soils
Hebin Lin	Socioeconomic Specialist	Socioeconomics and Environmental Justice
Amber Redger	Archeologist	Cultural and Heritage Resources
Cynthia Barrett	Outdoor Recreation Planner	Wilderness, Visual Resources, Recreation Management

5.2 Tribes, Individuals, Organizations or Agencies Consulted

The following tribes, individuals, organizations, or agencies were consulted during public scoping and/or public review of the 2020 SDNM Grazing RMPA/EA. To keep interested parties informed of the changes, the individuals, agencies, and organization on this list were contacted directly by mail or email to notify them of the current comment period for the Proposed RMPA starting May 6, 2024.

5.2.1 Individuals

Alcock, J	Brach, D	Chamberlin, L	DeJong, H
Allison, K	Braukis, Y	Chizmar, M	Devlin, M
Amorosi, P	Bridges, A	Chizmar, RE E	Dixon, K
Ashby, L	Brooker, E	Cohen, E	Dollard, N
Backman, J	Brooks, S	Cooke, D	Donofrio, M
Baranow, R	Boothe, S	Coors, J	Downer, C
Beck, M	Brown, J	Corless, S	Downer, D
Berkson, L	Bryant, E	Cox, A	Draper, M & P
Besinger, M	Burgess, J	Crocker, K	Driskill, D
Blackstone, E	Burriss, C	Cuezze, T	Drosendahl, A
Boggs, D	Caldwell, D	Cusick, J	Dugan, L
Bolbol, D	Campbell, C	Dahl, K	Eagle, J
Boothe, S	Campbell, K	Dalley, C & K	Edwards, L
Borg, C	Castillo, L	DeJong, C	Eisenberg, A

Ericsson, T	Knauer, H	Morris, A	Smith, H
Evans, S	Kobylarz-	Moss, A	Smith, L
Feeney, J	Chouvarda, W	Moss, P	Smith, R
Finchum, K	Koehler, M	Motzer, R	Smith , J
Finnell, D	Kozarsky, D	Murillo, E	Soler, J
Floren, K	Krajewski, B	Nessel, L	Solomon, A
Gaines , D	Kreemer, C	Ogg, G	Spencer, M
Gentile, D	Krupp, C	Oster, S	Spotts, R
Gill, M	Kueltzo, C	Paramore, E	Stevens, R
Glaccum, E	LaLoggio, P	Parry, R	Stringham, R
Goldberg, V	Lappin, L	Pearson, R	Stromberg, J
Goldsmith, K	Larson, M	Pierce, N	Thill, R
Grace, A	LaRue, E	Prather, E	Tiede, M
Gregg, K	LaRue, E	Public, J	Trew, T
Haas, R	LaRue, E	Quartuccio, J	Trudeau, J
Hand, D	Leonard, P	Ramias, CJ	Tuell, C
Hanken, J	Licon, A	Ramirez, C	Turner, D
Harrington, C	Lines, P	Rasmussen, M	Utz, T
Harris, M	Lybarger, L	Reber, L	Vaaler, J
Hedgecoke, S	Mac Farlane, G	Reilly, C	Vazquez, D
Henderson, B	Marcus, S	Robinson, M	Wagner, R
Henry, J	Marsh, J	Roeder, C	Walsh, M
Hill, A	Marvel, J	Roy, S	Wederski, B
Holm, D	Matteson, B	Russman, L	Weiss, A
Hoover, C	Mauceli, G	Samples, L	Welch, J
Hughes, B	McCully, C	Sanchez, E	Welsh, J
Hughes, B	McDermott, P	Sauber, M	Welsh, S
Imig, C	McEwan, S	Saubolle, S	Wennes, J
Ingram, J	McGeough, K	Schmid, B	West, K
Jackson, A	McKever, L	Schnitzer, K	Whitlock, G
Jacobs, S	McMahon, A	Schoolcraft, G	Williams, L
James, A	McNeil, B	Sealing, C	Williams, M
Jean, L	Meachum, C	Seibert, J & C	Williamson, J
Johnson, D	Meehan, K	Shelton, J	Wilson, J
Johnson, J	Menor, C	Shumaker, J	Womack, K
Johnson, P	Menor, P	Sibley, R	Wuerthner, G
Kelley, S	Mercier, M	Singleton, D	Yule, K
Klug, K	Miyake, J	Singleton, N	

5.2.2 Organizations, Tribes, Agencies

Organizations and Corporations

Arizona Wilderness Coalition
Archeology Southwest
Arizona Cattlemen's Association
Arizona Wilderness Coalition
Bureau of Reclamation, Arizona Project Office
Center for Biological Diversity
Conservation Congress
City of Goodyear
Defenders of Wildlife
Desert Tortoise Council
Federal Highway Administration
El Paso Natural Gas Company
Friends of Cabeza Prieta
Friends of Saddle Mountain
Friends of the Sonoran Desert National Monument
Keith Cattle LLC
K Cross Cattle Co.
Land and Water Fund
Leibold Livestock LLC
Pacific Biodiversity Institute
Plains Pipeline LP
Public Lands Foundation
Public Lands Guardian
Qwest dbA CenturyLink
Roberts Enterprises Inc.
Sierra Club
Southern Pacific Railroad
Southern Pacific Transportation
Southwest Gas Corporation
Transwestern Pipeline Company
The Wilderness Society
Roberts Enterprises Inc.
UTZ Enterprises Inc.
Western Watersheds Project
Wild Earth Guardians
Wilderness Watch

Tribes

Ak-Chin Indian Community
Gila River Indian Community
Hopi Tribe
Pasua Yaqui Tribe
Salt River Pima-Maricopa Indian Community
Tohono O'odham Nation
Gila River Indian Community

Agencies

Arizona Department of Administration
Arizona Department of Agriculture
Arizona Department of Environmental Quality
Arizona Department of Transportation
Arizona Game and Fish Department, Regions 4 and 6
Arizona Public Service
Arizona State Health Services Department
Arizona State Lands Department
AZ State Highway Department
AZ State Health Services
AZ State Historic Preservation Office
Bureau of Reclamation AZ Project Office
City of Goodyear
Federal Highways Administration
Maricopa Department of Transportation
Maricopa County
Maricopa County Flood Control District
Paloma Irrigation & Drainage
Pinal County
Salt River Project Land Department
U.S. Army Corps of Engineers, Arizona Project Office
U.S. Fish and Wildlife Service, AZ Ecological Services
U.S. Geological Services, Tempe Field Office
U.S. National Park Service

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