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BLM

SPRNCA Allotments Lease Renewals

Environmental Assessment

Babocomari Lease No. 5208
Brunckow Hill Lease No. 5251
Three Brothers Lease No. 5232
Lucky Hills Lease No. 5252

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LIST OF ACRONYMS AND ABBREVIATIONS

ADEQ	Arizona Department of Environmental Quality
AICA	Arizona-Idaho Conservation Act
APE	area of potential effect
AIB	analyzed in brief
AIM	Assessment, Inventory, and Monitoring
AUM	animal unit month
BLM	Bureau of Land Management
BMPs	best management practices
CFR	Code of Federal Regulations
cfs	cubic feet per second
DPC	desired plant community
EA	environmental assessment
E. coli	*Escherichia coli*
EIS	environmental impact statement
ESD	ecological site description
Guidelines	Guidelines for Grazing Administration
GPS	global positioning system
ID	interdisciplinary
IVM	integrated vegetation management
KA	key area
KOPs	key observation platforms
lb a.i./acre	pounds of active ingredient per acre
LHE	land health evaluation
PL	public land
PFYC	Potential Fossil Yield Classification
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
ORVs	outstandingly remarkable values
PEIS	programmatic environmental impact statement
Range PA	Arizona Vegetation and Range Management Programmatic Agreement
RMP	Resource Management Plan
ROD	Record of Decision
SPRNCA	San Pedro Riparian National Conservation Area
Standards	Arizona Standards for Rangeland Health
SVS	Sierra Vista Subwatershed
TFO	Tucson Field Office
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRI	Visual Resource Inventory
VRM	Visual Resource Management

1 INTRODUCTION

1.1 Background

The Bureau of Land Management (BLM) is proposing to renew 10-year term grazing authorizations (grazing leases) and to implement additional actions on the Babocomari, Brunckow Hill, Three Brothers, and Lucky Hills Allotments (hereafter called the "SPRNCA Allotments") partially located in the San Pedro Riparian National Conservation Area (SPRNCA). Three land health evaluations (LHEs) were completed for the four allotments in 2022 (see 2022 Babocomari LHE, 2022 Brunckow Hill LHE, and 2022 East SPRNCA Complex LHE). The Babocomari and Brunckow Hill Allotments were analyzed in individual LHE documents while the Three Brothers and Lucky Hills Allotments were analyzed in a joint LHE (called the "East SPRNCA Complex"). These three LHE documents were made available for public comment as drafts during the draft LHE comment period and scoping period on this environmental assessment (EA) (May-June 2021). The final LHE determinations are being made available at the same time as this preliminary EA.

The SPRNCA Allotments are located north of the city of Sierra Vista, in Cochise County, Arizona (Figure 1-1). The Three Brothers, Lucky Hills, and Brunckow Hill Allotments are adjacent to each other on the east side of the San Pedro River, with the western portion of the Brunckow Hill Allotment spanning the San Pedro River. The Babocomari Allotment is located on the west side of the San Pedro River as shown in Figure 1-1.

The SPRNCA Allotments encompass 51,514 acres of BLM, Arizona State Trust (referred to as state land), and private lands. Two of the allotments (Babocomari and Brunckow Hill) include riparian areas of the San Pedro and Babocomari Rivers which encompass a total of 208 acres of riparian area on BLM-administered land. All four allotments include BLM-administered lands inside (6,903 acres) and outside (9,019 acres) the SPRNCA boundaries (Table 1 and Figure 1-1). Currently, 1,540 animal unit months (AUMs) are available for grazing across the existing BLM leases for the four allotments.

All four of the SPRNCA Allotment leases are authorized under Section 15 of the Taylor Grazing Act. These leases establish AUMs only for BLM-administered lands and do not account for other lands within the allotment.

Table 1. SPRNCA Allotments land ownership acreage.

Land Ownership	Babocomari	Brunckow Hill	Three Brothers	Lucky Hills	SPRNCA Allotments Total
Public Acres inside the SPRNCA	*1,881*	*1,004*	*2,279*	*1,739*	***6,903***
Public Acres outside the SPRNCA	*149*	*224*	*340*	*8,306*	***9,019***
Total Public Acres (inside and outside the SPRNCA)	*2,030*	*1,228*	*2,619*	*10,045*	***15,922***
Arizona State Trust Land Acres	8,942	224	5,064	11,750	**25,980**
Controlled Private* Land Acres	676	741	160	800	**2,377**
Uncontrolled Private Land Acres**	1,529	--	910	4,796	**7,235**
Total Acres	**13,177**	**2,193**	**8,753**	**27,391**	**51,514**

***Controlled private** lands are owned or leased by the livestock operator on the allotment and contribute to the total grazing operation within the allotment.

****Uncontrolled private** lands within the allotment boundary are not under control of the livestock operator (e.g., housing developments) and do not contribute to the forage base on the allotment.

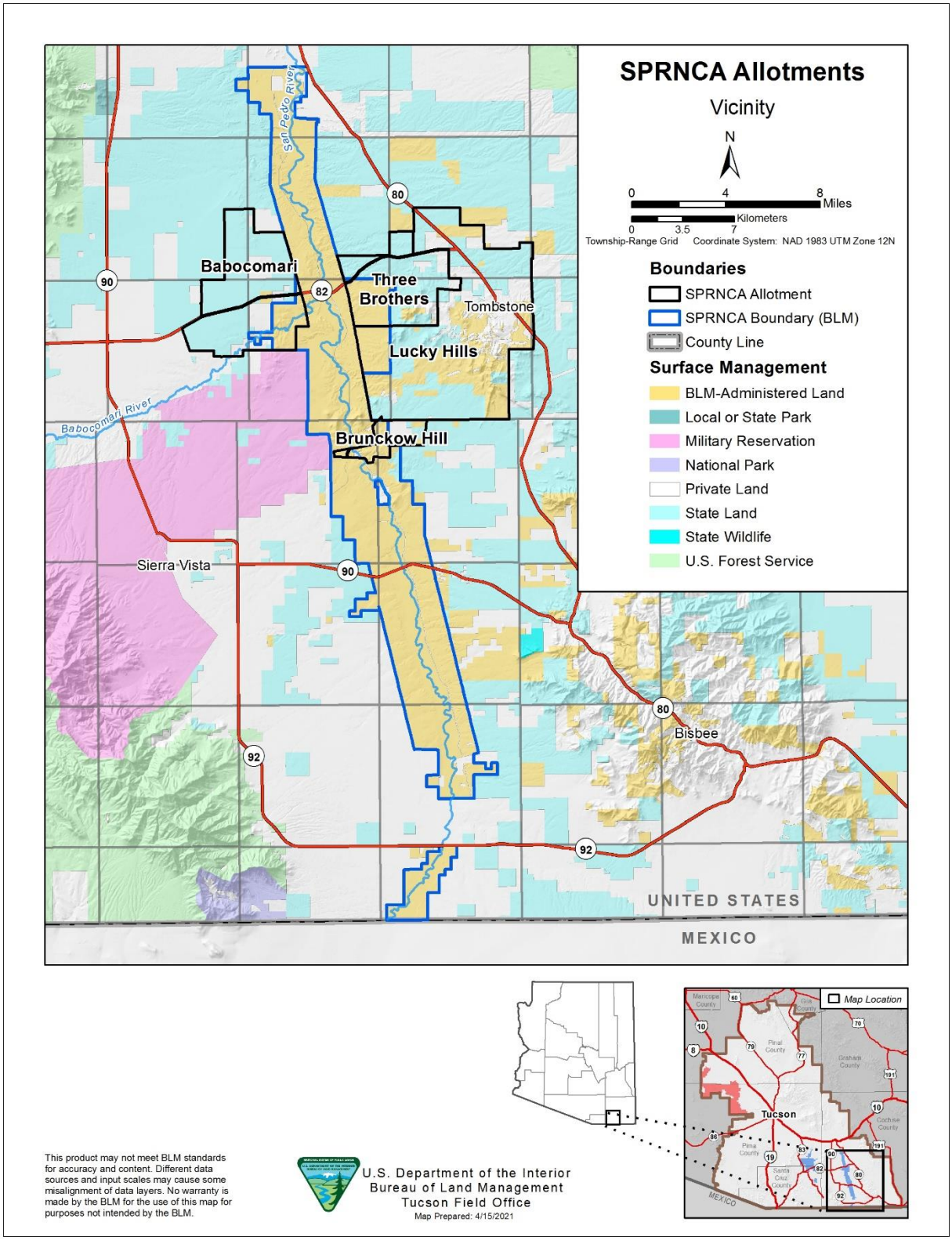

Figure 1-1. SPRNCA Allotments' location and vicinity.

1.2 Allotment Profile

1.2.1 Babocomari Allotment

The Babocomari Allotment consists of 13,177 acres of BLM-administered land, state land, and private land managed together in a voluntary nine-pasture rest-rotation grazing system. Rest-rotation grazing is a management scheme in which rest periods for individual pastures, paddocks, or grazing units are generally incorporated into a grazing rotation for the full growing season (SRM 2004). The BLM-administered lands comprise 15% of the total acreage (2,030 acres) within the Babocomari Allotment. Table 2 below shows the current number of livestock and AUMs authorized on the BLM portion of the allotment. The River Pasture includes the majority of BLM lands within the SPRNCA in the allotment, part of the Babocomari River Wild and Scenic Study River corridor, a San Pedro Trail route along Babocomari Canyon, as well as the riparian areas along the Babocomari River.

Table 2. Mandatory terms and conditions of the current Babocomari lease.

Total Livestock on the BLM acres of the Allotment	Livestock Kind	Grazing Period of Use	Percent Public Land*	Type Use	AUMs on Public Land
15	Cattle	3/1 to 2/28	100	Active	180

*The percentage of public land use is determined by the proportion of livestock forage available on public lands within the allotment compared to the total amount available from both public lands and those owned or controlled by the lessee. However, some leases may only consider the forage available on public lands (100% PL).

The Babocomari River crosses through the southern portion of the allotment from the west and into the SPRNCA where it joins the San Pedro River. The range improvements on BLM-administered lands consist of pasture and allotment boundary fences; other range improvements include three corrals and nine water troughs on state and private lands (See Appendix A: Figure A-4).

1.2.2 Brunckow Hill Allotment

The Brunckow Hill Allotment consists of 2,193 acres of BLM-administered land, state land, and private land managed together in a voluntary seven-pasture rest-rotation grazing system. The BLM-administered lands comprise 56% of the total acreage (1,228 acres) within the Brunckow Hill Allotment. Table 3 below shows the current number of livestock and AUMs authorized on the BLM portion of the allotment. The portion of the allotment to the west of the railroad grade fence line where the San Pedro River is located (Appendix A: Figure A-5) has not been grazed in the past 30 years due to the lack of fencing between BLM land and the San Pedro River.

Table 3. Mandatory terms and conditions of the current Brunckow Hill lease.

Total Livestock on the BLM acres of the Allotment	Livestock Kind	Grazing Period of Use	Percent Public Land*	Type Use	AUMs on Public Land
7	Cattle	3/1 to 2/28	100	Active	84

*The percentage of public land use is determined by the proportion of livestock forage available on public lands within the allotment compared to the total amount available from both public lands and those owned or controlled by the lessee. However, some leases may only consider the forage available on public lands (100% PL).

The San Pedro River crosses through the western portion of the allotment from the southeast. Private lands within the allotment border the San Pedro River to both the east and the west. Range improvements on BLM-administered lands include pasture and boundary fences as well as three temporary stock tanks which are filled with water hauled from the lessee's private well. Four other water troughs located on private land are filled from the same private well. The only corral is located on private land (Appendix A: Figure A-5). Vegetation treatments have occurred on private and state lands to reduce shrub cover. The section of the allotment along the San Pedro River includes part of the San Pedro River Wild and Scenic Study River corridor.

1.2.3 Three Brothers Allotment

The Three Brothers Allotment consists of 8,753 acres of BLM-administered land, state land, and private land managed together in a voluntary three-pasture rest-rotation grazing system. The BLM-administered lands

comprise 24% of the total acreage (2,619 acres) within the Three Brothers Allotment. Table 4 below shows the current number of livestock and AUMs authorized on the BLM portion of the allotment.

Table 4. Mandatory terms and conditions of the current Three Brothers lease.

Total livestock on the BLM acres of the allotment	Livestock Kind	Grazing Period of Use	Percent Public Land*	Type Use	AUMs on Public Land
68	Cattle	3/1 to 2/28	24	Active	196

*The percentage of public land use is determined by the proportion of livestock forage available on public lands within the allotment compared to the total amount available from both public lands and those owned or controlled by the lessee.

The Three Brothers Allotment is located approximately a half mile east of the San Pedro River. Range improvements on BLM-administered lands include fences, one well with a storage tank and trough, along with one set of corrals. There are two other corrals and four watering locations on state and private lands (See Appendix A: Figure A-6).

1.2.4 Lucky Hills Allotment

The Lucky Hills Allotment consists of 27,391 acres of BLM-administered land, state land, and private land which are managed together in a voluntary nine-pasture rest-rotation grazing system. The BLM-administered lands comprise 37% of the total acreage (10,045 acres) within the Lucky Hills Allotment. Table 5 below shows the current number of livestock and AUMs authorized on the BLM portion of the allotment.

Table 5. Mandatory terms and conditions of the Lucky Hills lease.

Total livestock on the BLM acres of the allotment	Livestock Kind	Grazing Period of Use	Percent Public Land*	Type Use	AUMs on Public Land
90	Cattle	3/1 to 2/28	100	Active	1080

*The percentage of public land use is determined by the proportion of livestock forage available on public lands within the allotment compared to the total amount available from both public lands and those owned or controlled by the lessee. However, some leases may only consider the forage available on public lands (100% PL).

The Lucky Hills Allotment is located approximately a half mile east of the San Pedro River. Range improvements on BLM-administered lands include fences, 11 watering locations, and three sets of corrals. One of those watering facilities is within the SPRNCA along the southern boundary. There are approximately 13 watering locations on state and private lands (See Appendix A: Figure A-7).

1.3 Purpose and Need for Action

The purpose of the action is to evaluate the potential renewal of 10-year livestock grazing leases and additional actions on the SPRNCA Allotments and move toward achieving land health standards.

The need for these actions are established by the Taylor Grazing Act, the Federal Land Policy and Management Act, Fundamentals of Range Health (43 Code of Federal Regulations [CFR] 4180), the SPRNCA Resource Management Plan (RMP) (BLM 2019a), and the Eastern Arizona Grazing Environmental Impact Statement (EIS) (BLM 1987) as incorporated into the BLM Safford District RMP (BLM 1994) to respond to the renewal of livestock grazing leases and to achieve land health standards on public land on the SPRNCA Allotments.

1.4 Decisions to Be Made

The decisions to be made are:

1. To renew or not renew the term grazing leases; and if renewed, determine the lease terms and conditions.
2. To implement or not implement the range improvement projects.
3. To implement or not implement integrated vegetation management (IVM).

1.5 Conformance with Applicable Land Use Plans

The Proposed Action is in conformance with the SPRNCA RMP and associated Record of Decision (ROD) (BLM 2019a), the 1994 Safford District RMP and ROD (BLM 1994), and the Eastern Arizona Grazing EIS (BLM 1987) as incorporated into the Safford District RMP (BLM 1994).

The SPRNCA RMP (BLM 2019a) makes livestock grazing available and allocates forage for the portions of the Babocomari, Brunckow Hill, Three Brothers, and Lucky Hills Allotments that are located within the SPRNCA boundary (see ama-GRAZ-1). It also allows for the use of chemical herbicide application, prescribed fire, native seed application, and erosion control structures for restoration (see ama-VEG-UP-1 and ama-SOIL-1 and -2).

The ROD for the Safford District portion of the Final Eastern Arizona Grazing EIS (BLM 1987) makes livestock grazing available and allocates forage on Babocomari Allotment No. 5208, Brunckow Hill Allotment No. 5251, Three Brothers Allotment No. 5232, and Lucky Hills Allotment No. 5252 for the portions of BLM-administered land on these allotments that are located outside of the SPRNCA boundary (see Eastern Arizona Grazing Draft Environmental Impact Statement [DEIS]: Appendix 1 which was incorporated by reference into the Eastern Arizona Grazing Final Environmental Impact Statement [FEIS]).

The following two sections describe the decisions that are applicable to the BLM-administered lands on the SPRNCA Allotments inside and outside the SPRNCA boundary. Each decision is preceded by the unique decision number that is assigned to each specific decision. The decision numbering scheme is different in the two RMPs.

1.5.1 SPRNCA RMP

This section outlines applicable SPRNCA RMP decisions that are directly applicable to the BLM-managed lands on the allotments inside the SPRNCA.

- **Soils and Watershed Management Objective (ob-SOIL-1)**: Maintain or improve ground cover that protects sensitive soils and prevents accelerated erosion.
- **Ama-SOIL-1**: Use a broad array of management tools and structures to control sheet, rill, and gully erosion in areas indicating accelerated erosion from lack of vegetation cover and soil erosivity.
- **Ama-SOIL-2**: Implement seeding and planting (using only native seeds and plants). If needed following fire, flood, or other disturbance.
- **Water Resources Objective (ob-WAT-1)**: Reduce or prevent contamination of surface and groundwater by nonpoint source pollution to meet state requirements (BLM 2019a, 2-3).
- **ob-WAT-5:** Conserve groundwater on the SPRNCA, while allowing for appropriate uses on the SPRNCA.
- **Vegetation Objective (ob-VEG-ALL-1)**: Ensure that the natural diversity and abundance of native vegetation occurs as expected for landform and ecological sites (BLM 2019a, 2-4).
- **ob-VEG-ALL-2:** Maintain or improve the ecological processes and function of habitats that support priority or special status plant species (BLM 2019a, 2-4).
- **Upland Vegetation Objective (ob-VEG-UP-1)**: Manage 6,572 acres of upland vegetation toward restoring the perennial native grass component to address shrub encroachment (BLM 2019a, 2-7).
- **ob-VEG-UP-2**: In the grassland vegetation community, maintain or enhance density, vigor, cover, and species richness of native perennial grass, shrub, and forb species based on ecological site potential (BLM 2019a, 2-7).
- **ob-VEG-UP-3:** In the Chihuahuan desertscrub vegetation community, increase native annual and perennial herbaceous plants based on ecological site potential (BLM 2019a, 2-7).

- **Ama-VEG-UP-1:** Allow for mechanical, chemical, prescribed fire, biological vegetation treatments, as needed, to restore or enhance priority species habitat conditions within semidesert grasslands. Use prescribed fire to inhibit the invasion of woody plants.

- **Riparian Vegetation Objective (ob-VEG-RIP-3)**: Provide sufficient vegetated bank cover to prevent erosion, slow down water, and improve bank soil condition including porosity for recharge (BLM 2019a, 2-6).

- **Fish, Wildlife, and Special Status Species Objective (ob-WILD-1)**: Conserve, protect, and enhance wildlife and aquatic resources in accordance with the aquatic, wildlife, scientific, cultural, educational, and recreational values of the SPRNCA (BLM 2019a, 2-8).

- **ob-WILD-2:** Restore and maintain habitat of suitable quality and quantity to support identified priority fish and wildlife species (BLM 2019a, 2-8).

- **ob-WILD-5:** Manage springs for priority wildlife habitat (BLM 2019a, 2-8).

- **ob-WILD-6**: Conserve, protect, and enhance desert washes with adequate cover and width while considering habitat connectivity and adequate patch size (BLM 2019a, 2-8).

- **Livestock Grazing Objective (ob-GRAZ-2)**: Maintain productive, diverse upland, riparian, and wetland plant communities of native species (BLM 2019a, 2-15).

- **ob-GRAZ-3**: Ensure utilization of current year's growth on upland native perennial grass does not exceed 40 percent at the allotment scale, except for targeted grazing treatments (BLM 2019a, 2-15).

- **Livestock Grazing allocation (ama-GRAZ-1):** Livestock Grazing Availability (BLM 2019a, Figure 2-7):
  Available: 7,030 acres[1]
  Unavailable: 48,960 acres
  Total: 55,990 acres

- **Livestock Grazing Management Action (ama-GRAZ-4)**: The Arizona Standards for Rangeland Health will continue to be used to evaluate land health (BLM 2019a, 2-15).

- **ama-GRAZ-5**: Any changes to the existing grazing leases will be based on activity-level planning (BLM 2019a, 2-15).

- **ama-GRAZ-6**: Complete land health evaluations before renewing leases with terms and conditions designed to achieve allotment specific objectives (BLM 2019a, 2-15).

- **ama-GRAZ-7**: Develop allotment-specific objectives during implementation-level planning. This would ensure management of livestock would meet enabling legislation (BLM 2019a, 2-15).

- **ama-GRAZ-8**: Install, as needed, additional range improvements (BLM 2019a, 2-15).

- **ama-GRAZ-9**: Establish an adaptive management process on the SPRNCA to annually evaluate monitoring data and issues related to livestock grazing, with a primary goal of maintaining and achieving RMP goals and objectives (BLM 2019a, 2-15).

- **Wild and Scenic River Objective (ob-WSR-2):** Manage uses and activities to avoid adverse effects on the study river's water quality until Congress acts on the designation recommendations (BLM 2019a, 2-21).

[1] There is a slight difference between the number of acres that were allocated as available for livestock grazing and the number of acres in the allotments, this is due to how the acreage was calculated with improvements in land status information.

- **ob-WSR-3:** Manage uses and activities to avoid adverse effects on the study river's outstandingly remarkable values (ORVs) until Congress acts on the designation recommendations (BLM 2019a, 2-21).

- **ob-WSR-4:** Manage uses and activities consistent with protective management guidelines for the tentative study river classifications until Congress acts on the designation recommendations (BLM 2019a, 2-21).

- **ob-WSR-5:** Manage uses and activities to enhance water quality and ORVs, where feasible (BLM 2019a, 2-21).

1.5.2 Safford District RMP

This section outlines applicable Safford District RMP (BLM 1994) decisions. The Safford District RMP decisions are applicable to BLM-administered lands within the four SPRNCA Allotments that are outside of the SPRNCA boundary. Decisions from the Eastern Arizona Grazing EIS that are incorporated into the Safford District RMP are cited directly from the Eastern Arizona Grazing EIS.

- **Grazing Management (GM103):** For each of the four alternatives presented in the EIS, target stocking rates have been set for each allotment (refer to Appendices 13, 14 [of the Eastern Arizona Grazing DEIS]). In reviewing the target stocking rate figures and other recommended changes it is emphasized that the target AUM figures are not final stocking rates. Rather, all livestock use adjustments will be implemented through documented mutual agreement or decision. When adjustments are made through mutual agreement, they may be implemented once the Rangeland Program Summary (record of decision) has been adopted (BLM 1987, 5. II).

- **GM107:** BLM policy requires the use of protective measures during implementation of its rangeland programs to reduce or eliminate adverse environmental impacts and enhance resources. The following measures apply to developments built in the EIS area and are common to all alternatives. 1. An interdisciplinary team of resource specialists will review all rangeland development proposals to ensure the greatest multiple use benefits. 2. All proposals will be evaluated in an environmental study of appropriate scope to determine site-specific impacts. As a minimum, studies will address cultural resources, protected plants and animals, visual resources and wilderness values. Mitigating measures will be developed to reduce or eliminate site-specific impacts, if needed. Procedures for identifying and mitigating impacts on significant cultural resources are discussed in Appendix 4 [of the Eastern Arizona Grazing DEIS] **(**BLM 1987, 6. VI-C).

- **GM108:** Analysis of this alternative shows that the management goal of maintaining and improving rangeland conditions can be reached through rangeland improvements, monitoring programs, and refinement of grazing systems (BLM 1987, 6. V).

- **GM111**: Grazing management systems-including rest rotation, deferred rotation, deferred, seasonal, short duration or others which are various combinations of these-would be implemented where needs are identified through monitoring (maintain and improve categorized allotments). On custodial allotments, grazing systems or season of use would be coordinated with the private landowners, State Land Department or Soil Conservation Service (BLM 1987, 6-7. V).

- **GM112:** Fences would be needed to support grazing or land treatments and would be built to allow wildlife movement. Any fences that currently restrict wildlife movement would be modified to facilitate movement (BLM 1987, 7. V).

- **GM113**: Monitoring and surveys would determine if there were any need to develop new water sources to ensure better livestock distribution and improve wildlife habitat (BLM 1987, 7. V).

- **Wildlife/Fisheries (WF14)**: Manage habitat for optimum wildlife populations, based on ecological conditions, taking into consideration local, yearly climatic variations. The BLM will follow Arizona Game

and Fish Department's five-year strategic plans for the various species and will assist the Department in accomplishing its goals for the various species (BLM 1994, 34).

- **WF07**: Manage priority wildlife species habitat (vegetation communities) or special features of that habitat (water, riparian vegetation, cliffs, etc.) to maintain or enhance population levels (BLM 1994, p. 33).

- **WF08**: Focus management efforts on enhancing biological diversity (BLM 1994, 33).

- **Watershed (WS01)**: The Safford District goal, for all public land within the District, is to minimize soil erosion and rehabilitate eroded areas to maintain or enhance watershed condition and reduce non-point source pollution that may originate on public lands (BLM 1992, 10).

- **Vegetation Management (VM02):** Upland vegetation on public lands within the Safford District will be managed for watershed protection, livestock use, reduction of non-point source pollution, threatened and endangered species protection, priority wildlife habitat, firewood and other incidental human uses. Best management practices and vegetation manipulation will be used to achieve desired plant community management objectives. Treatments may include various mechanical, chemical and prescribed fire methods (Safford District RMP p. 24,45; Safford District RMP Partial, ROD I p. 10).

- **VM03:** Ecological site inventories will be combined with the desired plant community concept to develop management objectives for activity plans as they are written or revised (BLM 1994, 45).

- **VM04**: Public lands will be managed to preserve and enhance the occurrences of special status species and to achieve the eventual delisting of threatened and endangered species (BLM 1994, 45).

- **VM07**-Land treatments (vegetation manipulation) would be used to decrease invading woody plants and increase grasses and forbs for wildlife, watershed condition, and livestock. Treatment areas would be identified in activity plans. Treatments may include various artificial (mechanical, chemical, or prescribed fire) methods (BLM 1994, 45).

1.6 Relationships to Statutes, Regulations or Other Plans

The Proposed Action and alternatives must comply with the following laws and agency regulations and be consistent with applicable Federal, state and local laws, regulations, and plans.

The Arizona-Idaho Conservation Act of 1988 (AICA), the statute designating the SPRNCA, provides, "The Secretary shall manage the conservation area in a manner that conserves, protects, and enhances, the riparian area, and the aquatic, wildlife, archeological, paleontological, scientific, cultural, educational, and recreational resources of the conservation area [and] shall only allow such uses of the conservation area as [the Secretary] finds will further the primary purposes for which the conservation area is established" (Public Law 100-696, Section 102(a)-(b), 16 U.S.C. § 460xx-1(a)-(b)). The objectives in the SPRNCA RMP implement the AICA's command to "conserve, protect[], and enhance[]" the SPRNCA's conservation values. The Proposed Action and alternatives are consistent with the AICA and the SPRNCA RMP.

Regulations that govern grazing lease renewals appear at 43 CFR § 4100. 43 CFR § 4100.0-2 states: "The objectives of these regulations are to promote healthy sustainable rangeland ecosystems; to accelerate restoration and improvement of public rangelands to properly functioning conditions; to promote the orderly use, improvement and development of the public lands; to establish efficient and effective administration of grazing of public rangelands; and to provide for the sustainability of the western livestock industry and communities that are dependent upon productive, healthy public rangelands. These objectives – shall be realized in a manner that is consistent with land use plans, multiple use, sustained yield, environmental values, economic and other objectives stated in 43 CFR part 1720, Subpart (§) 1725; the Taylor Grazing Act of June 28, 1934, as amended (43 United States Code [U.S.C.] 315, 315a-315r); section 102 of the Federal Land Policy and Management Act of 1976 (43 U.S.C. §1740)" (43 CFR § 4100.0-2).

The Proposed Action is consistent with 43 CFR § 4100.0-8 which states, in part, "The authorized officer shall

manage livestock grazing on public lands under the principle of multiple use and sustained yield, and in accordance with applicable land use plans." The Proposed Action also is consistent with 43 CFR § 4130.2(a) which states, in part, "Grazing permits or leases shall be issued to qualified applicants to authorize use on the public lands and other lands under the administration of the Bureau of Land Management that are designated as available for livestock grazing through land use plans."

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

In addition, the Proposed Action would comply with the following laws and agency regulations, and would be consistent with applicable Federal, state and local laws, regulations, and plans.

- Taylor Grazing Act of 1934
- Federal Land Policy and Management Act of 1976, as amended
- Public Rangelands Improvement Act of 1978
- 43 CFR Part 4100 Grazing Administration – Exclusive of Alaska
- Clean Water Act of 1972, as amended
- Arizona Water Quality Standards, Title 18, Arizona Administrative Code Chapter 11
- Clean Air Act of 1973, as amended
- Endangered Species Act of 1973, as amended
- Migratory Bird Treaty Act of 1918, as amended
- Section 106 of the National Historic Preservation Act of 1966, as amended
- Native American Graves Protection and Repatriation Act of 1990
- Wild and Scenic Rivers Act of 1968
- Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (BLM 2007)

1.7 Scoping and Public Involvement

Issues were identified by the BLM Tucson Field Office (TFO) interdisciplinary (ID) team, as well as through public scoping, which took place from May 18th-June 24th, 2021. The BLM TFO received 71 comment letters from which 164 unique substantive comments were identified. The full response to public scoping comments is provided in Appendix C. The TFO ID team also reviewed the SPRNCA RMP public comments which helped inform the list of issues.

The BLM made the preliminary EA available for a 30-day public comment period from April 29th-May 29th, 2022. The BLM received 21 comment letters from which 199 unique substantive comments were identified. The full response to public comments is provided in Appendix I.

1.8 Issues

The Council on Environmental Quality (CEQ) regulations at 40 CFR § 1500.4(i) direct that the scoping process should be used "not only to identify significant environmental issues deserving of study, but also to deemphasize insignificant issues, narrowing the scope of the [National Environmental Policy Act (NEPA)] process accordingly." 40 CFR § 1501.9(f)(1) indicates the agency "shall identify and eliminate from detailed study the issues that are not significant or have been covered by prior environmental review(s), narrowing the discussion of these issues in the statement to a brief presentation of why they will not have a significant effect on the human environment or providing a reference to their coverage elsewhere".

Through scoping, seven issues were identified for detailed analysis in this environmental assessment (EA):

Issue 1: Water Quality

- How would livestock grazing affect *Escherichia coli* (*E. coli*) levels in the Babocomari and San Pedro Rivers?
- What is the potential of herbicide applications to enter streams or impact groundwater quality?

Issue 2: Vegetation
- How would livestock grazing, range improvements, and IVM treatments on the SPRNCA Allotments affect vegetation?

Issue 3: Riparian
- How would the presence of livestock and grazing affect riparian ecology and function on the Babocomari Allotment?

Issue 4: Migratory Birds, Priority Species, and Habitats
- How would livestock grazing, range improvements, and IVM treatments impact migratory birds and priority species listed in the SPRNCA RMP?

Issue 5: Threatened and Endangered Species
- How would livestock grazing, range improvements, and IVM treatments impact threatened and endangered species (Huachuca water umbel, western yellow-billed cuckoo, southwestern willow flycatcher, and the northern Mexican gartersnake) and associated habitat?

Issue 6: Cultural Resources
- How would livestock grazing impact cultural resources in areas where cattle are most likely to concentrate?

Issue 7: Visual Resources
- How would the uses and activities authorized under the lease affect visual resources and visual quality?

An additional 12 issues were identified, considered, and analyzed in brief (AIB) by members of the ID team in review of the Proposed Action. These issues are presented in Chapter 3, Section 3.3.

2 PROPOSED ACTION AND ALTERNATIVES

This section describes the alternatives to be analyzed in detail. Based on the management recommendations presented in the 2022 Babocomari Land Health Evaluation (LHE), the 2022 Brunckow Hill LHE, and the 2022 East San Pedro Riparian National Conservation Area (SPRNCA) Complex LHE (BLM 2022a, BLM 2022b, and BLM 2022c), the interdisciplinary (ID) team developed Alternative A (the Proposed Action) and a modification of the Proposed Action (Alternative A.1) as well as Alternative B (the No Grazing with IVM alternative) to comparatively analyze against Alternative C (the No Action alternative) and Alternative D (the No Grazing without IVM alternative). Public scoping led to the development of a second modification of the Proposed Action, which is Alternative A.2.

2.1 Features Common to All Action Alternatives

The following would apply to each of the action alternatives described below.

2.1.1 Arizona Standards for Rangeland Health

All of the action alternatives were designed to meet or make significant progress toward meeting the following Arizona Standards for Rangeland Health (Standards).

Standard 1: Upland Sites
"Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate and landform (ecological site)."

Standard 2: Riparian-Wetland Sites
"Riparian-wetland areas are in proper functioning condition."

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

2.1.2 Allotment-Specific Desired Plant Community Objectives

As part of the LHE process, allotment-specific desired plant community (DPC) objectives were established for biological resources at either key areas (KA[2]) or Assessment Inventory and Monitoring (AIM) study plots (see Section 4 in the 2022 Brunckow Hill LHE, and the 2022 East SPRNCA Complex LHE). Section 4.3 of the Babocomari LHE (BLM 2022a), the Brunckow Hill LHE (BLM 2022b), and the East SPRNCA Complex LHE (BLM 2022c) describes these allotment-specific DPC objectives and provides detailed rationale on how they align with the relevant Resource Management Plan (RMP) objectives. The RMP vegetation objectives (see Section 1.5.1) are directly related to ecological site potential, so the allotment-specific DPC objectives were developed based on site potential as described in the Ecological Site Descriptions (ESDs), as well as, site-specific monitoring data, professional judgement, and wildlife habitat requirements.

The specific objectives described below are the allotment-specific KA[2] and AIM study plot DPC objectives for each allotment as categorized by ecological site.

2.1.2.1 Limy Upland 12-16 inch Precipitation Zone Ecological Site

Babocomari Allotment

KA GRZ-02 DPC Objective

- Perennial grass foliar cover of ≥10%
- Shrub foliar cover <30%

KA Babo-05 DPC Objective

- Perennial grass foliar cover of ≥1%
- Shrub foliar cover <30%

[2] A key area is defined as a relatively small portion of a range selected because of its location, use, or value as a monitoring location for grazing use. Key areas are indicator areas that can reflect the overall conditions at larger scales, such as a pasture, grazing allotment, wildlife habitat area, herd management area, watershed area, etc. Key areas are usually non-randomly selected but can be randomly generated locations.

Brunckow Hill Allotment

KA BK-023 DPC Objective

- Perennial grass foliar cover of ≥2%
- Shrub foliar cover <30%

AIM Study Plot GRZ-01 DPC Objective

- Perennial grass foliar cover of ≥1%
- Shrub foliar cover of <30%

Three Brothers Allotment

KA TB-01 DPC Objective

- Perennial grass foliar cover of ≥11%
- Shrub foliar cover <30%

KA TB-081 DPC Objective

- Perennial grass foliar cover of ≥8%
- Shrub foliar cover <30%

KA GRZ-04 DPC Objective

- Perennial grass foliar cover of ≥2%
- Shrub foliar cover <30%

Lucky Hills Allotment

KA LH-042 DPC Objective

- Perennial grass foliar cover of ≥24%
- Shrub foliar cover <30%

2.1.2.2 Shallow Upland 12-16 inch Precipitation Zone Ecological Site

Babocomari Allotment KA Babo-03 and GRZ-05, Brunckow Hill Allotment KA BK-01, and Lucky Hills Allotment KA LH-041 DPC Objectives

- Perennial grass foliar cover of ≥20%.
- Shrub foliar cover <10%.

2.1.2.3 Shallow Hills 12-16 inch Precipitation Zone Ecological Site

Lucky Hills Allotment KA LH-04 and LH-06 DPC Objectives

- Perennial grass foliar cover ≥15%
- Shrub foliar cover <10%

2.1.2.4 Limestone Hills 12-16 inch Precipitation Zone Ecological Site

Lucky Hills Allotment KA LH-043 DPC Objectives

- Perennial grass foliar cover ≥15%
- Shrub foliar cover <10%

2.1.2.5 Clay Loam Upland 12-16 inch Precipitation Zone Ecological Site

Three Brothers AIM Study Plots TB-02 and TB-083 DPC Objectives

- Perennial Grass foliar cover >5%

2.1.3 Cultural Resources: Standard Procedures and Best Practices

BLM grazing authorizations are considered undertakings subject to compliance with Section 106 of the National Historic Preservation Act (NHPA; 54 United States Code [U.S.C.] § 306108 *et seq.*) and its implementing regulations at 36 Code of Federal Regulations (CFR) 800, under which the BLM has the responsibility to consider the effects of its actions on historic properties. Newly proposed range improvements (e.g., construction of pasture and boundary fencing, exclosures, and livestock waters) would be subject to individual project review and

assessment in accordance with the BLM's Arizona Vegetation and Range Management Programmatic Agreement (Range PA; Appendix D; executed September 30, 2020). The BLM's primary and preferred method to protect historic properties is avoidance of impacts through redesign or relocation of proposed activities and facilities. Should the BLM identify potential impacts to historic properties, the BLM may, accordingly, redesign or relocate proposed range improvements or develop plans to mitigate potential adverse effects in consultation with the State Historic Preservation Office, Tribes, and other potentially affected parties.

For the purposes of this environmental assessment (EA), a cultural resources evaluation is being conducted in accordance with the provisions of the Range PA.

2.2 Alternative A – Proposed Action

The Proposed Action is to renew the Babocomari, Brunckow Hill, Three Brothers, and Lucky Hills grazing leases for a period of 10 years subject to ongoing adaptive management and includes construction of new fencing and associated livestock water infrastructure modifications necessary to implement the proposed adaptive management. In addition, the Proposed Action includes IVM treatments that are intended to address areas on the SPRNCA Allotments not meeting Standard 3 for DPC objectives. This Proposed Action is informed by the Babocomari LHE (BLM 2022a), the Brunckow Hill LHE (BLM 2022b), and the East SPRNCA Complex LHE (BLM 2022c).

2.2.1 AUM Reduction Common to All Allotments

All four allotments are failing to achieve the DPC objectives as defined in Standard 3 (Desired Resource Conditions) of the Arizona Standards for Rangeland Health. As a result, 50% of authorized use for each allotment (90 AUMs for the Babocomari Allotment, 42 AUMs for the Brunckow Hill Allotment, 98 AUMs for the Three Brothers Allotment, 540 AUMs for the Lucky Hills Allotment) would be placed in Temporary Suspended Use until DPC objectives are met.

2.2.2 Adaptive Management Parameters Common to All Allotments

Under the adaptive management for each allotment (described below), ecological triggers and thresholds were determined based on monitoring data, ESDs, and professional judgment (BLM 2022a, BLM 2022b, BLM 2022c). Thresholds are defined as the point at which an action must be taken, and triggers are defined as the management changes resulting from meeting that threshold (e.g., when perennial grass foliar cover is reduced below the adaptive management objective [threshold], AUMs must be reduced by 50% [trigger]). Perennial grass foliar cover is a good indicator of potential livestock grazing impacts, and bare ground is a good indicator of overall watershed health. Although reducing shrub cover is a management objective, shrub cover was not used as an adaptive management indicator for determining authorized livestock numbers because it is not directly affected by livestock grazing (as described in Section 7.3 of the 2022 Babocomari LHE, 2022 Brunckow LHE, and 2022 East SPRNCA Complex LHE). So, it is not appropriate to include shrub cover adaptive management thresholds in the grazing lease terms and conditions. The perennial grass foliar cover thresholds are the perennial grass foliar cover DPC objectives for each KA (see Section 2.1.2). The bare ground thresholds are described under the adaptive management for each allotment. The adaptive management Terms and Conditions associated with each allotment would be implemented using the following parameters:

- The adaptive management thresholds for perennial grass foliar cover are based on DPC objectives set in Section 4.3 of the Babocomari LHE (BLM 2022a), Brunckow Hill LHE (BLM 2022b), and East SPRNCA Complex LHE (BLM 2022c), which rely heavily on the 2019 and 2020 Assessment, Inventory, and Monitoring (AIM) foliar cover data. As a result, an additional two years of AIM data would be collected at KAs and un-grazed reference sites. Following the additional two years of AIM data collection, the perennial grass foliar cover adaptive management objectives would be updated through a new livestock grazing decision (including a protest and appeal period) that would update each allotment lease's terms and conditions (see also Section 4.3.1 of the Babocomari LHE [BLM 2022a], Brunckow Hill LHE [BLM 2022b], and East SPRNCA Complex LHE [BLM 2022c]). At that point, the BLM would re-evaluate whether the updated adaptive management objectives are being met on each allotment and make management adjustments as necessary per the adaptive management triggers as outlined under each allotment. The BLM would seek to utilize a working group[3] who would review AIM data and provide input on the updated adaptive management objectives. Through a decision, updated adaptive management

[3] A working group would be comprised of technical experts for the applicable resource area such as wildlife, vegetation, and soils, who review monitoring data and provide input. A working group would be composed of representatives from other federal, state, and local agencies and organizations who have specific technical expertise and qualifications.

objectives, along with the associated rationale for how the adaptive management objectives were updated, would be posted on the BLM's ePlanning website.

- The bare ground indicator is not as variable as the perennial grass foliar cover indicator. Adaptive management triggers and thresholds for bare ground take into account site-specific AIM data but are based more heavily on the ESDs and scientific literature. Thus, the bare ground thresholds would not be updated as a result of additional monitoring data and would remain as they are described in this EA and the LHEs.
- The BLM would conduct monitoring or routine inspections to assess compliance with lease terms and conditions on a yearly basis. The BLM would assess achievement of adaptive management objectives and make management adjustments after reviewing monitoring data and consistent with the terms of the adaptive management provisions discussed below for each allotment.
- Monitoring resource conditions for adaptive management is the responsibility of the BLM. Monitoring data used to make adaptive management changes would be collected by the BLM, a BLM-approved contractor, partner agency, or other manner acceptable to the authorized officer. This monitoring would occur in the fall after the growing season.
- If an adaptive management objective is not being achieved at one or more KAs within the allotment, management adjustments consistent with the adaptive management described in terms and conditions would be made for all of the BLM land within the SPRNCA for that allotment.

2.2.3 Range Improvement Features Common to All Allotments

As described above, range improvements are included in the Proposed Action for each allotment to help implement the adaptive management. All four of the allotments include proposed SPRNCA boundary fences so that if adaptive management triggers are activated, the SPRNCA portion of the allotment could be managed separately from the rest of the allotment. In addition, some allotments include proposals for livestock water modifications if the implementation of proposed fences would eliminate a water source for livestock and livestock waters may later be used for wildlife.

The following are specific features that would apply to range improvement construction:

- **Cadastral Survey:** A cadastral survey in accordance with BLM Manual 6120 may be required to identify the exact location of the SPRNCA boundary prior to any boundary fence construction.
- **Wildlife-Friendly Fence Standards:** New fence construction would follow the specifications in BLM Manual H-1741-1 and Arizona Game and Fish Department wildlife-friendly standards, shown in Appendix A: Figure A-1. The bottom strand would be barb-less. The top strand would be 40 inches (maximum 42 inches) above ground level, and the bottom strand no less than 16 inches above ground level.
- **Wildlife-Friendly Water Developments**: Livestock water developments would be equipped with wildlife escape ramps and would follow the specifications in BLM Handbook H-1741-2 "Water Developments" and BLM Idaho Technical Bulletin 89-4 "Wildlife Watering and Escape Ramps on Livestock Water Developments: Suggestions and Recommendations".
- **New Fence Construction:** With the exception of water gap fences, all fence construction would be four-strand wire on steel T-posts with steel angle iron assemblies for corners and H-braces, with the posts set in concrete footers mixed onsite. The typical line post (T-post) spacing would be 16.5 feet. On the SPRNCA boundary fence, the fence line would be located one foot inside the legal boundary, and no construction, excavation, or related soil disturbance would occur on non-federal land without permission from the landowner.
- **Water Gaps:** Fence construction across rivers, gulches, and large washes would be designed to provide for the passage of water and debris flows, while blocking passage by cattle. Break away water gap fences would be typically installed across dry washes that infrequently flood. Break away water gap fences would require annual inspection and repair prior to livestock turnout. Suspended water gap fences would be typically installed across a running river. Suspended fence water gap structures would be designed to swing away with stream and debris flows and consist of fence panels suspended from a cable spanning the drainage. Fence panels would be designed to follow the natural ground line along the fence line and to minimize catching debris.
- **Vegetation, Soil, and Wildlife Considerations:** Fence construction would typically require clearing and brushing vegetation within an area that is no more than 15 feet wide along the fence line. Fence construction (including clearing and brushing) would be accomplished with the minimum amount of soil disturbance, and only as needed for safe operation of construction crews and equipment. After construction, vegetation would be allowed to resprout and revegetate in the construction area naturally. Vegetation clearing for fence construction would occur October 1 through May 24 (10/1 – 5/24). In yellow-billed cuckoo

critical habitat along the San Pedro and Babocomari Rivers, fence construction would occur October 1 through April 30 (10/1 – 4/30).

- **Access:** Access for fence construction would be from existing primitive routes in the SPRNCA, along the fence line, and using administrative or reclaiming routes and major washes with minimal vegetation brushing or trimming for passage by construction crews and equipment (access for fence construction is depicted on maps as “access for fence construction”). Old fence posts and wire would be replaced with new fence, and scrap would be hauled off the SPRNCA for disposal. Gates for roads and trails, and public access routes, would be incorporated in new fence construction.
- **Maintenance:** Existing and newly constructed fences would be maintained to the specifications laid out under new construction, using the same materials and using the access routes as described above.

2.2.4 Integrated Vegetation Management Treatments Common to All Allotments

The proposed integrated vegetation management (IVM) treatments are intended to address areas on the SPRNCA allotments not meeting Standard 3 for DPC objectives due to high shrub cover and low perennial grass cover. The primary target shrub species in Limy Upland ecological sites are creosote bush and whitethorn acacia. In Shallow Upland, Shallow Hills, and Limestone Hills ecological sites, the target species is primarily whitethorn acacia and creosote; however, a variety of other shrubs contribute to high shrub cover, including tarbush, catclaw mimosa, catclaw acacia, and mariola. Due to the high level of departure from ecological site potential, the BLM would not implement treatments to reduce shrub cover in the Clay Loam Upland ecological site. In this highly departed state, the ID Team has identified shrubs to play a significant role in site stability and function.

Currently, none of the KA and AIM study plot monitoring locations are achieving shrub cover DPC objectives. The Clay Loam Upland sites are not achieving perennial grass foliar cover DPC objectives. Objectives for IVM treatments would be the same as the DPC objectives described in the LHEs and are listed above in section 2.1.2. In general, the objective is to reduce shrub cover to a level appropriate for ecological site potential and to increase perennial grass cover, not to eliminate the shrub component from the vegetation communities altogether.

Proposed IVM Treatments

Table 6. Acres proposed for IVM treatments on the SPRNCA Allotments by alternative.

Alternative	Herbicide or RX Fire	RX Fire	Seeding and Erosion Control	Total
Alternative A, A1, and A2	10,062	3,736	406	14,204
Alternative B - No Grazing with IVM	10,062	3,736	406	14,204
Alternative C - No Action	0	0	0	0
Alternative D – No Grazing without IVM	0	0	0	0

Table 7. Acres proposed for IVM treatments on the SPRNCA Allotments by allotment.

Allotment	Herbicide or RX Fire	RX Fire	Seeding and Erosion Control	Total
Babocomari	1,150	473	0	1,623
Brunckow Hill	964	141	0	1,105
Lucky Hills	6,695	2,861	0	9,556
Three Brothers	1,253	261	406	1,920
Total	**10,062**	**3,736**	**406**	**14,204**

Broadcast Herbicide Application

Broadcast application of pelletized tebuthiuron, i.e. Spike 20P, would be applied at a rate of 0.33 to 0.5 pound (lb.) active ingredient (a.i.)/acre (0.37 to 0.56 kilogram (kg) a.i./hectare) to the soil to thin and reduce shrub cover to achieve DPC objectives. Tebuthiuron is a relatively non-selective herbicide that is used at low application rates in a dry granular form to control and thin woody plant species. Treatments could occur in areas shown in Appendix A: Figure A-8, which depict ecological sites not meeting DPC objectives for shrub cover, and exclude areas within 984

feet (300 meter) buffers on both sides of the Babocomari and San Pedro Rivers, 100 feet (30.5 meter) buffers on both sides of other drainages, 100 feet (30.5 meter) buffers around springs and wells, any areas with a slope greater than 15%, and ecological sites not suited for treatments (i.e. Sandy Wash ecological site). According to label specifications, tebuthiuron is most effective when applied before the primary growing season or before expected seasonal rainfall. To avoid herbicide runoff during monsoon storms, tebuthiuron would be applied to the soil October 1 through March 31 (10/1-3/31) before low-intensity winter rainstorms for incorporation into the soil for root uptake by shrubs in the spring. Tebuthiuron would be broadcast with ground (truck, UTV, or ATV-mounted spreader) or aerial (rotor-wing or fixed-wing aircraft) applicators with a global positioning system (GPS) and calibrated emitters to ensure only intended areas are treated and that the intended volume of herbicide is applied.

Tebuthiuron is approved for use on BLM-administered public lands as documented in the Programmatic Environmental Impact Statement (PEIS) for Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States (BLM 2007).

Prescribed Fire – Broadcast Burning

Broadcast burning via handheld or aerial ignition devices would be used to reduce shrub cover in accordance with DPC objectives. Broadcast burning is a deliberately planned burn for areas where similar fuel types, safety concerns, and other constraints allow. Burn units could occur anywhere in the areas depicted in Appendix A: Figure A-8 where there is adequate perennial grass and fine fuels to carry fire. Prescribed broadcast burn timing would be October 1 through May 24 (10/1 – 5/24). In addition to initial burns, broadcast burning would also be used to maintain shrub reduction and remove dense standing dead shrub cover over time in areas that have demonstrated sufficient increase in perennial grasses to carry fire on the landscape. Thus, prescribed fire may follow an initial herbicide or seeding treatment (generally there would be at least 3 years of recovery for fine fuels to increase before a prescribed fire would follow an herbicide treatment). To minimize the need for hand line construction, burn plan boundaries would be aligned with natural and man-made features, such as roads, utility lines, and areas with naturally sparse fuels to the extent possible. Areas of ground disturbance, such as hand line construction and staging areas, would be subject to individual cultural and paleontological resources assessment prior to implementation.

All broadcast burn treatments would be conducted under a site-specific prescribed fire burn plan. This plan would specify the weather and fuel conditions, fire behavior modeling, holding resources, and preparation, such as what sites would be protected, and line construction needed to meet the treatment objectives safely and efficiently. The burn plan would identify any agencies, lessees, or other interested parties who would be notified concerning the prescribed fire project. It also would identify any potential receptor sites and smoke management mitigation measures necessary to minimize impacts on the airshed and receptor sites.

Seeding

Seeding of native plant species, especially perennial grass species, would be used to increase perennial grasses in the Clay Loam Upland ecological site. In addition, seeding treatments would be used to achieve adequate perennial grass cover prior to chemical or prescribed fire treatments. As seen in the treatment map (Appendix A: Figure A-8), seeding and erosion control are the only treatments proposed in the Clay Loam Upland ecological site where chemical and prescribed burn treatments are not proposed due to inadequate perennial grass cover and soils susceptible to erosion. Seed would be sown through multiple methods including aerial broadcast, hand seeding, hydroseeding, and seed balls. Timing of seeding would be optimized to promote germination.

Native perennial grasses could include three awn grasses, grama grasses, bush muhly grass, Arizona cottontop, curly mesquite grass, and vine mesquite grass.

Erosion Control

Erosion control structures using rock or other natural material would be installed in drainages and erosional features to trap sediment and increase soil moisture in the same area where seeding treatment is proposed. Erosion control treatments would aid in the success of seeding treatments in the Clay Loam Upland ecological site by trapping sediment and water which would aid in seed germination and seedling establishment. Erosion control treatments would occur in areas where soils are limited for broadscale treatments, perennial grass cover DPC objectives are not being met, or areas not meeting standards for soils (i.e., Clay Loam Upland). Rock and/or wood structures would be constructed from off-site sourced material. Areas of ground disturbance would be subject to individual cultural and paleontological resources assessment prior to implementation. Erosion control structures would be installed manually or mechanically.

Upland Manual Erosion Control Treatments

In smaller upland tributary drainages, rocks or wood would be placed by hand in erosional features or channels. This involves minor earth work with hand tools to reduce the grade of features or to prepare sites for treatment. Rock or wood structures would be similar to one-rock dams, Zuni bowls, rock rundowns, media lunas, baffles, or others outlined in Zeedyk and Clothier (2009).

During treatment construction, materials would be staged in designated areas and temporary access routes would be required. Staging areas and temporary access routes would be remediated after construction. This could include raking tracks, mulching, reseeding, or other techniques proven to be effective for remediation.

Upland Mechanical Erosion Control Treatments

In a limited number of areas, where the above manual erosion control treatments are not practical, specifically on larger head-cuts (>4 feet deep) and erosion features, treatment would involve the use of heavy equipment to reduce the grade of erosional features before a protective layer of plant material, rocks, mulch, or soil tackifiers would be properly placed. Mechanical erosion control treatments would be done October 1 – May 24.

In limited areas where sheet erosion occurs and placing rocks or plant material is not a practicable approach, the BLM could use such techniques as contour ripping (key line plowing) and emplacing berms or using other comparable methods proven to be effective.

Hydroseeding – a combination of certified weed free mulch, native seed, and water applied across a large area – may also be required in areas with extensive sheet erosion. This would include reseeding of native grasses appropriate to the site.

Guidelines Applicable to All Proposed IVM Treatments

The acres of proposed treatment depicted in Table 6 and Table 7 only portray the total acres that could be potentially treated, not individual treatment units. Treatments would be implemented in phases over space and time and typical treatment units may range in size from 200-2,500 acres. Treatment unit development would involve an ID team review of the following criteria and considerations for each proposed IVM treatment to determine which treatment option, if any, is appropriate:

1. Any planned treatments or maintenance treatments must be the most appropriate treatment based on target species, soil type, topography, weather, resource concerns, and other site characteristics. Some areas on the SPRNCA Allotments not meeting land health standards may not be candidate treatment areas due to unfavorable conditions related to slope, soil, lack of perennial grass seed source, or conflict with other resource values.
2. Appropriate best management practices (BMPs) and standard operating procedures (SOPs), described in Appendix G and H, would be applied to a proposed treatment unit to minimize potential impacts to resources.
3. Guidelines in the BLM Manual 9011-Chemical Pest Control and Department of Interior Integrated Pest Management Policy (517 DM 1) would be adhered to, and an approved Pesticide Use Proposal (PUP) would be required for any proposed tebuthiuron treatments.
4. Native seed sources must be available within a proposed treatment unit in sufficient quantities to allow natural re-establishment of vegetation, or seeding must be a viable option. If a treatment area is determined to not have the sufficient resources for revegetating itself naturally and with native species, then the ID team would design a pre- and/or post-treatment native seeding treatment to ensure non-native and invasive or noxious weeds do not encroach and invade the treated area.
5. The treatment must not predispose a proposed treatment unit to invasion by undesirable invasive plants.
6. After an IVM treatment, cattle would be excluded from the treatment unit for a minimum of two growing seasons (July-December) or until resource objectives are met (BLM 2019) to allow for perennial grasses to grow and drop seed before cattle enter the unit.
7. Before an IVM treatment, consider resting the unit from cattle grazing to aid in treatment success. For example, grazing deferment on a planned prescribed burn unit would help increase fine fuels to carry fire when burning.
8. Coordinate with U.S. Fish and Wildlife Service (USFWS) prior to any treatment unit implementation.

2.2.5 Babocomari Allotment

Mandatory Terms and Conditions

Table 8. Babocomari Allotment proposed mandatory terms and conditions.

Allotment	Pasture	Livestock		Period		% PL	Type Use	AUMs
		Number	Kind	Begin	End			
Babocomari	--	89	Cattle	3/1	2/28	100	Adaptive	9
Babocomari	River	89	Cattle	3/1	2/28	100	Adaptive	159
Babocomari	River Canyon	89	Cattle	11/1	3/31	100	Adaptive	12

Other Terms and Conditions

- Type use "Adaptive" identifies the maximum, not-to-exceed values for livestock numbers for each individual mandatory term and condition and does not represent what is actually allowed. In order to accommodate the maximum number of livestock (89 cattle) on the River Pasture, the season of use must be less (cannot exceed 54 days) than the identified period of use, in order to not exceed the allowable 159 AUMs.[4]
- The livestock operator shall submit an annual application prior to the start of the grazing year (3/1) to identify the grazing use that will occur. The application shall include livestock number, season of use, and AUMs.
- Mandatory terms and conditions (e.g., livestock number, season of use, and/or AUMs) would be adjusted based on adaptive management triggers outlined below under "Adaptive Management".
- Once the Babocomari River Canyon fence is implemented, cattle may be actively pushed across the River Canyon Pasture no more than ten times per year.
- The lessee shall ensure all livestock are vaccinated with the *Escherichia coli* (*E. coli*) vaccine subject to availability.
- Each year, the lessee shall submit a report of the actual grazing use made on this allotment for the previous grazing period, 3/1-2/28. This report shall also include a statement about whether or not livestock were able to be vaccinated with the *E. coli* vaccine. Failure to submit such a report by 3/15 of the current year may result in suspension or cancellation of the grazing lease.
- In order to improve livestock distribution on the public lands, salt and mineral supplements shall not be placed within a ¼ mile of any riparian area, wet meadow or watering facility (either permanent or temporary) unless stipulated through a written agreement or decision in accordance with 43 CFR § 4130.3-2(C).
- The operator is responsible for informing all persons who are associated with the authorized operations that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. Any cultural (historic or prehistoric site or object) or paleontological (fossil remains of plants or animals) resource discovered during operations shall be immediately reported to the Authorized Officer or their official designee. A qualified archaeologist or paleontologist shall make an evaluation of the discovery to determine appropriate actions to prevent the loss of significant cultural or scientifically important values.

2.2.5.1 Adaptive Management

Babocomari Allotment Adaptive Management Objectives

The adaptive management perennial grass foliar cover objectives for the Babocomari Allotment are based on DPC objectives set in Section 4.3 of the 2022 Babocomari LHE. The adaptive management bare ground objectives are based on current conditions.

Table 9. Babocomari Allotment adaptive management objectives and current conditions.

Key Area	Ecological Site	Adaptive Management Objective	Current Condition (2019 data)
GRZ-02	Limy Upland	Perennial grass foliar cover of ≥10%	12.0% perennial grass foliar cover
		Bare ground of <26.7%	26.7% bare ground cover

[4] Under the scenario where the maximum number of livestock use the River Pasture, the remaining season of use (311 days) would occur outside the River Pasture on either the River Canyon Pasture or the area north of the River Pasture with a maximum of 12 AUMs being consumed from the River Canyon Pasture and 9 AUMs being consumed from the BLM-managed land north of the River Pasture.

Key Area	Ecological Site	Adaptive Management Objective	Current Condition (2019 data)
Babo-05	Limy Upland	Perennial grass foliar cover of ≥1%	0.0% perennial grass foliar cover
		Bare ground of <25.3%	25.3% bare ground cover
Babo-03	Shallow Upland	Perennial grass foliar cover of ≥20%	18.1% perennial grass foliar cover
		Bare ground of <19.3%	19.3% bare ground cover
GRZ-05	Shallow Upland	Perennial grass foliar cover of ≥20%	3.4% perennial grass foliar cover
		Bare ground of <30.0%	30.0% bare ground cover

The adaptive management criteria are as follows:

Perennial grass foliar cover and bare ground

Limy Upland and Shallow Upland Sites

Maintain perennial grass foliar cover objectives (see Table 9) at each Limy Upland and Shallow Upland KA and decrease bare ground cover as compared to current conditions (see Table 9).

1. If adaptive management perennial grass foliar cover objectives are not being met or there has not been a decrease in bare ground cover compared to current conditions, livestock numbers would be reduced by 50% of remaining authorized use (through temporary suspension) in the portion of the allotment within the SPRNCA boundary.
2. If reassessment after 3 years from a reduction under number 1 (above) shows that adaptive management perennial grass foliar objectives continue not to be met or there is no improvement with respect to bare ground, livestock would be completely removed (through temporary suspension) from the portion of the allotment within the SPRNCA boundary until perennial grass foliar cover meets adaptive management objectives and bare ground decreases as compared to current conditions.

Livestock reduction as part of adaptive management would be carried out through the temporary suspension of AUMs. The AUMs placed in temporary suspension would be reassessed after 3 years. Once perennial grass foliar cover meets the adaptive management objectives and bare ground cover decreases as compared to current conditions, all AUMs placed in temporary suspension under this adaptive management framework would be restored.

Water Quality

Monitoring for Water Quality Adaptive Management

Considering the sources of contaminants in the watershed, the best way to isolate the impacts from cattle in this allotment is to sample during baseflow conditions, during which there is higher confidence in attributing the source of any exceedance to the livestock in the allotment. This sampling would occur quarterly at two monitoring points, one upstream of the allotment and one inside the allotment within the SPRNCA boundary. Quarterly monitoring would continue until there is a sample exceedance, at which point monitoring frequency would increase to monthly. If, during one year of monthly monitoring, there are no exceedances found, then the monitoring frequency would return to quarterly. The sampling threshold would be the same as the Arizona Department of Environmental Quality (ADEQ) assessment: two samples in three years cannot exceed the standard. If a sample taken upstream of the allotment exceeds the *E. coli* indicator criteria, then a downstream exceedance (if found) would not be attributed to livestock grazing within the Babocomari Allotment.

Water Quality Adaptive Management Criteria

1. If two baseflow *E. coli* samples (attributable to livestock grazing in the Babocomari Allotment) in three years exceed the state water quality standards, the remaining AUMs would no longer be authorized for the River Canyon Pasture for that season of use in which the second exceedance occurs. For the next period of use (starting 11/1), cattle could be returned to the River Canyon Pasture with AUMs reduced (through temporary suspension) by 25% of the original stocking rate. If there is an additional state water quality exceedance in any subsequent years (attributable to livestock grazing in the Babocomari Allotment), all cattle would be removed from the River Canyon Pasture for the remainder of that period of use. For the next period of use, cattle could be returned to the River Canyon Pasture with AUMs reduced by an additional 25% of the original stocking rate (through temporary suspension). This process would continue until no AUMs are authorized in the River Canyon Pasture.

2. When the water quality adaptive management is activated such that no AUMs are authorized in the River Canyon Pasture (see number 1 above), livestock grazing would be excluded (with the exception of crossing) from the River Canyon Pasture for the life of the lease.

   Rationale: Gary et al. (1983) (the authors) found that reducing livestock to 25% of the original stocking rate allowed for fecal bacteria levels to reduce to levels similar to a nearby un-grazed pasture. Given the uncertainties created by differences between the climatic, hydrologic, and management of the authors' study pasture compared to the Babocomari Allotment, there is no direct correlation to determine the level of livestock reductions necessary to reduce fecal bacteria levels. Thus, the BLM would use adaptive management and associated monitoring to determine the threshold at which fecal bacteria levels are reduced below the state standard for *E. coli*.

2.2.5.2 Range Improvements

Babocomari SPRNCA Boundary Fence

Approximately 6.5 miles (34,240 feet) of the SPRNCA boundary is located within the Babocomari Allotment, of which approximately 5.9 miles (30,900 feet) fall within the River Pasture. Approximately 3.6 miles (19,130 feet) of the SPRNCA boundary is currently fenced, and approximately 4.17 miles (22,008 feet) is unfenced (T. 20 S., R. 21 E., sections 4, 9, 17 and 18). The BLM would construct approximately 4.17 miles (22,008 feet) of new fencing along the SPRNCA boundary within the Babocomari Allotment, south of Highway 82 where fencing has not previously been installed (Appendix A: Figure A-9 and Figure A-10).

River Canyon Pasture and Fence

The BLM would build approximately 4 miles (21,000 feet) of new fence along the riparian corridor of the Babocomari River, as shown in Appendix A: Figure A-9, Figure A-10. The fencing would allow establishment of the River Canyon Pasture encompassing approximately 132 acres with 12 AUMs authorized for 11/1-3/31 (see Babocomari Allotment lease terms and conditions). The Babocomari River Canyon fence would be used to prevent livestock from accessing the Babocomari riparian corridor during the growing season (4/1-10/31) and may also be used to exclude livestock from the Babocomari River if water quality thresholds are exceeded multiple times (see water quality adaptive management). Prior to construction of the Babocomari River Canyon fence, the 11/1-3/31 season of use restriction would be implemented in the whole of the River Pasture. Once the Babocomari River Canyon fence is implemented, the season of use restriction would be applied only to the newly created River Canyon Pasture, and no season of use restriction would apply to the remainder of the River Pasture.

The northern boundary of the Babocomari River Canyon fence (same Township and Range as above) would follow the old railroad right-of-way fence line on the north side of the grade for approximately 1.5 miles (7,800 feet) and follow a new fence line for approximately 0.36 miles (1,900 feet) west of the railroad river crossing. Livestock currently move north and south of the railroad grade through the large culvert; thus the BLM would need to install a wildlife-friendly gate to restrict livestock movement in the culvert.

The southern boundary of the Babocomari River Canyon fence would be approximately 1.9 miles (10,000 feet) of new construction and would connect to a water gap that has been rebuilt across the Babocomari River. Fence construction would require the construction of eight new water gaps (for a total of nine water gaps). The largest water gap would be approximately 300 feet. The western water gap, at the western SPRNCA boundary across the Babocomari River, would be set back into the BLM lands 320 feet so that it would be located on a natural pinch point rock outcrop. The existing water gap where the Babocomari River crosses the eastern boundary of the Babocomari Allotment inside the SPRNCA would be rebuilt to create a more permanent and reliable allotment boundary. The entire River Canyon Pasture and associated fence would be located in T. 20 S., R. 21 E., sections 3, 4, 8, 9,17, and 18.

Construction of the River Canyon Pasture Fence would require livestock to cross the Babocomari River to access the north and south sides of the River Pasture (Appendix A: Figure A-10). Livestock would primarily use two major washes and would be actively moved across the Babocomari River and would not be allowed to remain in the River Canyon Pasture.

Expanded River Canyon Pasture and Fence

If cultural sites or other sensitive resource values or features would preclude the BLM from constructing the southern part of the Babocomari River Canyon fence as described above and depicted in Appendix A: Figure A-9 and Figure A-10, the BLM would construct the southern part of the fence so that it is set further back from the Babocomari riparian corridor as depicted in Appendix A: Figure A-14 and Figure A-15. This would create an

expanded River Canyon Pasture (Proposed Action with Expanded River Canyon [RC] Pasture) increasing the size of the pasture to 340 acres of BLM-administered land (Appendix A: Figure A-14 and Figure A-15). The expanded River Canyon Pasture would have 36 AUMs authorized subject to a season of use restriction limiting cattle between 11/1 and 3/31.

If the expanded River Canyon Pasture is implemented, approximately 3.25 miles (17,165 feet) of new fence would be constructed in T. 20 S., R. 21 E., sections 8, 9, 17, and 18, including approximately 1.0 mile (5,300 feet) of new fence on the south side of the canyon as shown on Appendix A: Figure A-14 and Figure A-15. Fencing along the north side of the historic railroad grade and water gaps across the Babocomari River would be constructed as described above for the Babocomari River Canyon fence. The fencing along the south side of the Babocomari River Canyon would be located on the northeast and northwest quarters on the north half of section 17 and would connect to the existing Babocomari Allotment boundary fence (Appendix A: Figure A-14 and Figure A-15). Nine water gaps would need to be installed, and seven gates would be provided for access to the railroad grade and for public access. All fence construction would be as described above in Section 2.2.3.

Livestock would primarily use three crossing lanes which use two major washes and gradual uplands slopes to cross between the area south and north of the expanded River Canyon Pasture (Appendix A: Figure A-15). Livestock would be actively moved across the Babocomari River and would not be allowed to remain in the expanded River Canyon Pasture.

Livestock Waters

Implementation of either the River Canyon Pasture or the expanded River Canyon Pasture would exclude cattle from the Babocomari River water source for either the growing season (4/1-10/31) or year-round if the water quality adaptive management is fully implemented and cattle are excluded from the Babocomari riparian corridor. As a result, new watering locations on both the area north and south of the Babocomari River would be required for the cattle to have permanent reliable water. The BLM and the lessee would develop a cooperative range improvement agreement for water infrastructure on BLM land.

North of the Babocomari River, water would be supplied from an existing well located on private land in T. 20 S., R. 21 E., section 5. The proposed pipeline, which is on private and BLM-administered land, is approximately 0.20 miles (1,076 feet) of below-ground poly pipe that would feed water to a new proposed 10,000-gallon storage tank and 700-gallon drinker located on BLM-administered land, all located in T. 20 S., R. 21 E., section 8 (see Appendix A: Figure A-10).

In the River Pasture south of the Babocomari River, water would be supplied from an existing well located on private property west of the SPRNCA, to a new 5,000-gallon storage tank and 700-gallon drinker located on BLM-administered land all in T. 20 S., R. 21 E., section 18 (see Appendix A: Figure A-10). The pipeline would be approximately 0.64 miles (3,390 feet) of poly pipe installed mostly below-ground along the new proposed fence on the southern boundary of the River Pasture (Appendix A: Figure A-10). The portion of the pipe that crosses the Babocomari River Canyon would be elevated above-ground on the proposed water gap fence. The water storage and trough system would be installed on the southern boundary of the River Pasture fence (see Appendix A: Figure A-10).

The watering sites would be located to avoid sensitive resource values or features and minimize visibility from the travel routes. Associated structures would be painted to blend in with the landscape.

2.2.6 Brunckow Hill Allotment

Mandatory Terms and Conditions

Table 10. Brunckow Hill Allotment proposed mandatory terms and conditions.

Allotment	Pasture	Livestock		Period		% PL	Type Use	AUMs
		Number	Kind	Begin	End			
Brunckow Hill	--	20	Cattle	3/1	2/28	100	Adaptive	15
Brunckow Hill	West SPRNCA	20	Cattle	3/1	2/28	100	Adaptive	7
Brunckow Hill	East SPRNCA	20	Cattle	3/1	2/28	100	Adaptive	62

Other Terms and Conditions:

- Type use “Adaptive” for the Brunckow Hill Allotment will primarily be season of use flexibility. Total herd size (total livestock number) has been changed from the current lease terms to reflect the actual total maximum use within the entire allotment and within any given timeframe in the year the authorized AUMs can be utilized.
- The livestock operator must submit an annual application prior to the start of the grazing year (3/1) to identify the grazing use that will occur. The application must include livestock number, season of use, and AUMs.
- Seven AUMs will be placed in temporary suspension, and cattle will continue to be excluded from the West SPRNCA Pasture until infrastructure is in place to exclude cattle from all BLM lands that access the San Pedro River.
- Livestock grazing within the riparian zone of the San Pedro River is not permitted on the BLM-administered land.
- Mandatory terms and conditions (e.g., livestock number, season of use, and/or AUMs) would be adjusted based on adaptive management triggers outlined below under “Adaptive Management”.
- The lessee shall submit a report of the actual grazing use made on this allotment for the previous grazing period, 3/1-2/28. Failure to submit such a report by 3/15 of the current year may result in suspension or cancellation of the grazing lease.
- In order to improve livestock distribution on the public lands, salt and mineral supplements shall not be placed within a ¼ mile of any riparian area, wet meadow or watering facility (either permanent or temporary) unless stipulated through a written agreement or decision in accordance with 43 CFR 4130.3-2(C).
- The operator is responsible for informing all persons who are associated with the authorized operations that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. Any cultural (historic or prehistoric site or object) or paleontological (fossil remains of plants or animals) resource discovered during operations shall be immediately reported to the Authorized Officer or their official designee. A qualified archaeologist or paleontologist shall make an evaluation of the discovery to determine appropriate actions to prevent the loss of significant cultural or scientifically important values.

2.2.6.1 Adaptive Management

Brunckow Hill Allotment Adaptive Management Objectives

The adaptive management perennial grass foliar cover objectives for the Brunckow Hill Allotment are based on DPC objectives set in Section 4.3 of the 2022 Brunckow Hill LHE. The adaptive management bare ground objectives are based on current conditions.

Table 11. Brunckow Hill Allotment adaptive management objectives and current conditions.

Key Area	Ecological Site	Adaptive Management Objective	Current Condition (2019 AIM data)
BK-023	Limy Upland	Perennial grass foliar cover of ≥2%	2.0% perennial grass foliar cover
		Bare ground cover of <31.3%	31.3% bare ground cover
BK-01	Shallow Upland	Perennial grass foliar cover of ≥20%	12.7% perennial grass foliar cover
		Bare ground cover of <14.0%	14.0% bare ground cover

The adaptive management criteria are as follows:

Perennial grass foliar cover and bare ground

Limy Upland and Shallow Upland Sites

Maintain perennial grass foliar cover objectives (see Table 11) at each Limy Upland and Shallow Upland KA and decrease bare ground cover as compared to current conditions (see Table 11).

1. If adaptive management perennial grass foliar cover objectives are not being met or there has not been a decrease in bare ground cover compared to current conditions, livestock numbers would be reduced by 50% of remaining authorized use (through temporary suspension) in the portion of the allotment within the SPRNCA boundary (East and West SPRNCA Pastures).

2. If reassessment after 3 years from a reduction under number 1 (above) shows that adaptive management perennial grass foliar objectives continue not to be met or there is no improvement with respect to bare ground, livestock would be completely removed (through temporary suspension) from the portion of the allotment within the SPRNCA boundary until perennial grass foliar cover meets adaptive management objectives and bare ground decreases as compared to current conditions.

Livestock reduction as part of adaptive management would be carried out through the temporary suspension of AUMs. The AUMs placed in temporary suspension would be reassessed after 3 years. Once perennial grass foliar cover meets the adaptive management objectives and bare ground cover decreases as compared to current conditions, all AUMs placed in temporary suspension under this adaptive management framework would be restored.

2.2.6.2 Range Improvements

Brunckow Hill SPRNCA Boundary Fence and Riparian Fence

Approximately 2.0 miles (10,700 feet) of the SPRNCA boundary is located within the Brunckow Hill Allotment, 0.17 miles (912 feet) of which are currently unfenced. The BLM proposes to construct approximately 0.17 miles (912 feet) of new SPRNCA boundary fence on the northern portion in the East SPRNCA Pasture south of Charleston Road and across South Brunckow Road in T. 21 S., R. 21 E., section 6, as shown in Appendix A: Figure A-11. Boundary fence construction would be as depicted in Appendix A: Figure A-9 and Figure A-11. A cattleguard with associated gate would be installed at the South Brunckow Road crossing. Access for fence construction would be from South Brunckow Road along the new fence line between Arizona State Trust (state) land and the SPRNCA.

Approximately 1.96 miles (10,349 feet) of fence would be completely reconstructed on BLM-administered land along the Brunckow Hill Allotment boundary in T. 21 S., R. 21 E., section 11 and 12. Through consultation and coordination with the Brunckow Hill Allotment lessee, the lessee defined a fence line that is approximately 0.6 miles (3,168 feet) along the western side of the San Pedro River primarily located on private land in T. 21 S., R. 21 E., section 11 and 12. The BLM and the lessee have identified that building fences across the San Pedro River is not feasible and thus the BLM will not construct any fencing across the San Pedro River. All existing allotment boundary fences would have to be reconstructed for the area west of the railroad grade to be available for livestock grazing.

Livestock Water

The Proposed Action includes improving and connecting an existing well located in T. 21 S., R. 22 E., section 6, on private land, to two new watering sites located on BLM-managed lands within two separate pastures (Appendix A: Figure A-11). At each site, a 1,500-gallon storage tank and 700-gallon trough would be placed. This would require above ground placement of approximately 7,000 feet of poly pipe (5,700 feet on BLM-managed land) alongside the existing roadway in T. 21 S., R. 22 E., section 6 and 7. This is the only water source for the pastures within the SPRNCA boundary east of the railroad grade.

2.2.7 Three Brothers Allotment

Mandatory Terms and Conditions

Table 12. Three Brothers Allotment proposed mandatory terms and conditions.

Allotment	Pasture	Livestock		Period		% PL	Type Use	AUMs
		Number	Kind	Begin	End			
Three Brothers	--	68	Cattle	3/1	2/28	100	Adaptive	25
Three Brothers	SPRNCA	68	Cattle	3/1	2/28	100	Adaptive	171

Other Terms and Conditions:

- Type use “Adaptive” for the Three Brothers Allotment will primarily be season of use flexibility. Total herd size (total livestock number) has been changed from the current lease terms to reflect the actual total maximum use within the entire allotment and within any given timeframe in the year the authorized AUMs can be utilized.
- The livestock operator must submit an annual application prior to the start of the grazing year (3/1) to identify the grazing use that will occur. The application must include livestock number, season of use, and AUMs.

- Mandatory terms and conditions (e.g., livestock number, season of use, and/or AUMs) may be adjusted based on adaptive management triggers outlined below under “Adaptive Management.”
- The lessee shall submit a report of the actual grazing use made on this allotment for the previous grazing period, 3/1-2/28. Failure to submit such a report by 3/15 of the current year may result in suspension or cancellation of the grazing lease.
- In order to improve livestock distribution on the public lands, salt and mineral supplements shall not be placed within a ¼ mile of any riparian area, wet meadow, or watering facility (either permanent or temporary) unless stipulated through a written agreement or decision in accordance with 43 CFR 4130.3-2(C).
- The operator is responsible for informing all persons who are associated with the authorized operations that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. Any cultural (historic or prehistoric site or object) or paleontological (fossil remains of plants or animals) resource discovered during operations shall be immediately reported to the Authorized Officer or their official designee. A qualified archaeologist or paleontologist shall make an evaluation of the discovery to determine appropriate actions to prevent the loss of significant cultural or scientifically important values.

2.2.7.1 Adaptive Management

Three Brothers Allotment Adaptive Management Objectives

The adaptive management perennial grass foliar cover objectives for the Three Brothers Allotment are based on DPC objectives set in Section 4.3 of the 2022 East SPRNCA Complex LHE. The adaptive management bare ground objectives are based on current conditions.

Table 13. Three Brothers Allotment adaptive management objectives and current conditions.

Key Area	Ecological Site	Adaptive Management Objective	Current Condition (2019 data)
TB-01	Limy Upland	Perennial grass foliar cover of ≥11%	12.7% perennial grass foliar cover
		Bare ground of <41.3%	41.3% bare ground cover
TB-081	Limy Upland	Perennial grass foliar cover of ≥8%	8.7% perennial grass cover
		Bare ground of <34.0%	34.0% bare ground cover
GRZ-04	Limy Upland	Perennial grass foliar cover of ≥2%	2.0% perennial grass foliar cover
		Bare ground of <25.3%	25.3% bare ground cover

The adaptive management criteria are as follows:

Perennial grass foliar cover and bare ground

Limy Upland Site

Maintain perennial grass foliar cover objectives (see Table 13) at each Limy Upland KA and decrease bare ground cover as compared to current conditions (see Table 13).

1. If adaptive management perennial grass foliar cover objectives are not being met or there has not been a decrease in bare ground cover compared to current conditions, livestock numbers would be reduced by 50% of remaining authorized use (through temporary suspension) in the portion of the allotment within the SPRNCA boundary (SPRNCA Pasture).
2. If reassessment after 3 years from a reduction under number 1 (above) shows that adaptive management perennial grass foliar objectives continue not to be met or there is no improvement with respect to bare ground, livestock would be completely removed (through temporary suspension) from the portion of the allotment within the SPRNCA boundary until perennial grass foliar cover meets adaptive management objectives and bare ground decreases as compared to current conditions.

Livestock reduction as part of adaptive management would be carried out through the temporary suspension of AUMs. The AUMs placed in temporary suspension would be reassessed after 3 years. Once perennial grass foliar cover meets the adaptive management objectives and bare ground cover decreases as compared to current conditions, all AUMs placed in temporary suspension under this adaptive management framework would be restored.

2.2.7.2 Range Improvements

Three Brothers SPRNCA Boundary Fence

Approximately 5.3 miles (29,000 feet) of the SPRNCA boundary is located withing the Three Brothers Allotment, approximately 2.3 miles (11,900 feet) of which are currently unfenced. The BLM proposes to construct approximately 2.26 miles (11,953 feet) of new SPRNCA boundary fence east of Fairbank in T. 20 S., R. 21 E., section 1 and 12 and in T. 20 S., R. 22 E., section 6, (Appendix A: Figure A-9 and Figure A-12). All fence construction would be as described above in Section 2.2.3. There are nine water gaps, four gates, and one cattle guard within this section of the SPRNCA boundary that would need to be constructed.

2.2.8 Lucky Hills Allotment

Mandatory Terms and Conditions

Table 14. Lucky Hills Allotment proposed mandatory terms and conditions.

Allotment	Pasture	Livestock		Period		% PL	Type Use	AUMs
		Number	Kind	Begin	End			
Lucky Hills	--	181	Cattle	3/1	2/28	100	Adaptive	893
Lucky Hills	SPRNCA	181	Cattle	3/1	2/28	100	Adaptive	187

Other Terms and Conditions:

- Type use “Adaptive” for the Lucky Hills Allotment will primarily be season of use flexibility. Total herd size (total livestock number) has been changed from the current lease terms to reflect the actual total maximum use within the entire allotment and within any given timeframe in the year the authorized AUMs can be utilized.
- The livestock operator must submit an annual application prior to the start of the grazing year (3/1) to identify the grazing use that will occur. The application must include livestock number, season of use, and AUMs.
- Mandatory terms and conditions (e.g., livestock number, season of use, and/or AUMs) may be adjusted based on adaptive management triggers outlined below under “Adaptive Management.”
- The lessee shall submit a report of the actual grazing use made on this allotment for the previous grazing period, 3/1 to 2/28. Failure to submit such a report by 3/15 of the current year may result in suspension or cancellation of the grazing lease.
- In order to improve livestock distribution on the public lands, salt and mineral supplements shall not be placed within a ¼ mile of any riparian area, wet meadow or watering facility (either permanent or temporary) unless stipulated through a written agreement or decision in accordance with 43 CFR 4130.3-2(C).
- The operator is responsible for informing all persons who are associated with the authorized operations that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. Any cultural (historic or prehistoric site or object) or paleontological (fossil remains of plants or animals) resource discovered during operations shall be immediately reported to the Authorized Officer or their official designee. A qualified archaeologist or paleontologist shall make an evaluation of the discovery to determine appropriate actions to prevent the loss of significant cultural or scientifically important values.

2.2.8.1 Adaptive Management

Lucky Hills Allotment Adaptive Management Objectives

The adaptive management perennial grass foliar cover objective for the Lucky Hills Allotment is based on the DPC objective set in Section 4.3 of the 2022 East SPRNCA Complex LHE. The adaptive management bare ground objective is based on current conditions.

Table 15. Lucky Hills Allotment adaptive management objectives and current conditions.

Key Area	Ecological Site	Adaptive Management Objective	Current Condition (2019 data)
LH-042	Limy Uplands	Perennial grass foliar cover of ≥24%	24.0% perennial grass foliar cover
		Bare ground of <12.7%	12.7% bare ground cover

The adaptive management criteria are as follows:

Perennial grass foliar cover and bare ground

Limy Upland Site

Maintain the perennial grass foliar cover objective (see Table 15) at the Limy Upland KA and decrease bare ground cover as compared to current conditions (see Table 15).

1. If adaptive management perennial grass foliar cover objectives are not being met or there has not been a decrease in bare ground cover compared to current conditions, livestock numbers would be reduced by 50% of remaining authorized use (through temporary suspension) in the portion of the allotment within the SPRNCA boundary (SPRNCA Pasture).
2. If reassessment after 3 years from a reduction under number 1 (above) shows that adaptive management perennial grass foliar objectives continue not to be met or there is no improvement with respect to bare ground, livestock would be completely removed (through temporary suspension) from the portion of the allotment within the SPRNCA boundary until perennial grass foliar cover meets adaptive management objectives and bare ground decreases as compared to current conditions.

Livestock reduction as part of adaptive management would be carried out through the temporary suspension of AUMs. The AUMs placed in temporary suspension would be reassessed after 3 years. Once perennial grass foliar cover meets the adaptive management objectives and bare ground cover decreases as compared to current conditions, all AUMs placed in temporary suspension under this adaptive management framework would be restored.

2.2.8.2 Range Improvements

Lucky Hills SPRNCA Boundary Fence

Approximately 5.5 miles (29,000 feet) of the SPRNCA boundary is located within the Lucky Hills Allotment, approximately 2.0 miles (10,545 feet) of which are currently unfenced. The BLM proposes to construct approximately 2.0 miles (10,545 feet) of SPRNCA boundary fence north of Charleston Road in T. 20 S., R. 21 E., sections 13 and 24, (Appendix A: Figure A-9 and Figure A-13). All fence construction would be as described above in Section 2.2.3. There are four water gaps, three gates, and one cattle guard within this section of the SPRNCA boundary that would need to be constructed.

Livestock Water Reconstruction

With the construction of the SPRNCA boundary fence, livestock would not have access to water in the SPRNCA pasture. The BLM proposes the installation of a new water system that consists of a new 5,000-gallon storage tank, a trough in T. 20 S., R. 21 E., section 24, and approximately 2.5 miles (13,380 feet) of poly line (Appendix A: Figure A-13). The proposed new water system would replace a non-functional storage tank, trough, and pipelines. The poly line would be buried to the side of the existing powerline road, then under the existing two track road going to the new water system in T. 20 S., R. 21 E., sections 36, 25 and 24. The source of water would be the lead mine on state land in T. 20 S., R. 21 E., section 36. This would be the only water source in this part of the SPRNCA.

2.3 Alternative A.1 – Proposed Action with Brunckow Hill Allotment Boundary Modification

Alternative A.1 is a modified version of the Proposed Action in which the Brunckow Hill Allotment boundary would be modified to exclude 136 acres of BLM land west of the Union Pacific Railroad private property and grade. As a result of the modified allotment boundary, the BLM would remove seven AUMs from the lease instead of placing them in temporary suspension as they are under the Proposed Action. The BLM is considering this alternative in response to public comments suggesting that the BLM not authorize the portion of the Brunckow Hill Allotment that has voluntarily not been actively grazed by livestock in 30 years. Under this alternative, the lease would have the following terms and conditions:

Table 16. Brunckow Hill Allotment proposed mandatory terms and conditions under Alternative A.1.

Allotment	Pasture	Livestock		Period		Percent Public Land	Type Use	AUMs
		Number	Kind	Begin	End			
Brunckow Hill	--	20	Cattle	3/1	2/28	100	Adaptive	15
Brunckow Hill	East SPRNCA	20	Cattle	3/1	2/28	100	Adaptive	62

The “Other Terms and Conditions” would remain the same as under the Proposed Action (see Section 2.2.6), with the exception of the following term and condition which would not be included since the seven AUMs would be removed and not placed in temporary suspension:

- Seven AUMs will be placed in temporary suspension, and cattle will continue to be excluded west of the railroad grade, unless infrastructure is in place to exclude cattle from all BLM lands that access the San Pedro River.

Under Alternative A.1, the BLM proposes to construct approximately 0.17 miles (912 feet) of new SPRNCA boundary fence on the northern portion in the East SPRNCA Pasture south of Charleston Road and across South Brunckow Road in T. 21 S., R. 21 E., section 6, as shown in Appendix A: Figure A-17. A cattleguard with associated gate would be installed at the South Brunckow Road crossing. Access for fence construction would be from South Brunckow Road along the new fence line between state land and the SPRNCA. This is not a change from what would occur under the Proposed Action.

The fence construction to the west of the San Pedro River that is proposed under the Proposed Action would not occur under Alternative A.1.

The rest of Alternative A.1 would be the same as Alternative A – Proposed Action.

2.4 Alternative A.2 – Proposed Action without the Babocomari River Canyon Fence

Alternative A.2 would be implemented as described in the Proposed Action (Section 2.2), with the exception of the Babocomari River Canyon fence and livestock waters as described in Section 2.2.5.1. Under this modified version of the Proposed Action, the Babocomari River Canyon fence would not be constructed and the River Canyon Pasture would not be created (see Appendix A: Figure A-19). In addition, the livestock waters as described in Section 2.2.5.1 would not be implemented. There would be a 11/1-3/31 season of use restriction on the River Pasture. The BLM is considering this alternative in response to public comments regarding impacts from constructing the Babocomari River Canyon fence.

Under this alternative, AUMs would be removed altogether from the BLM-managed lands within the River Pasture if water quality thresholds are exceeded multiple times (see water quality adaptive management under Section 2.2.5.1). The SPRNCA boundary fence would prevent cattle grazing on adjacent private and state lands from entering the SPRNCA. Under this alternative if water quality thresholds are exceeded multiple times, the BLM would remove the 171 AUMs from the lease and the BLM would no longer authorize grazing in the BLM-managed portions of the River Pasture. Under this alternative, the lease would have the following terms and conditions:

Table 17. Babocomari Allotment proposed mandatory terms and conditions under Alternative A.2.

Allotment	Pasture	Livestock		Period		% PL	Type Use	AUMs
		Number	Kind	Begin	End			
Babocomari	--	89	Cattle	3/1	2/28	100	Adaptive	9
Babocomari	River	89	Cattle	11/1	3/31	100	Adaptive	171

The “Other Terms and Conditions” would remain the same as under the Proposed Action (see Section 2.2.5), but the following term and condition would be modified to read as follows:

- Type use “Adaptive” identifies the maximum, not-to-exceed values for livestock numbers for each individual mandatory term and condition and does not represent what is actually allowed. In order to accommodate

the maximum number of livestock (89 cattle) on the River Pasture, the season of use must be less (should not exceed 58 days) than the identified period of use, in order to not exceed the allowable 171 AUMs.[5]

The following term and condition would not be included because under this alternative, cattle would be removed altogether from the River Pasture if the water quality adaptive management is activated and there would not be a reason for cattle to cross the Babocomari River:

- Once the Babocomari River Canyon fence is implemented, cattle may be actively pushed across the River Canyon Pasture no more than ten times per year.

2.5 Alternative B – No Grazing with IVM Alternative

Under Alternative B, the No Grazing with IVM alternative, the BLM would not authorize grazing on the SPRNCA Allotments on the BLM-managed lands both inside and outside of the SPRNCA boundary. Grazing on private lands, and on Arizona State Trust Land leases would be expected to continue at current stocking rates adjacent to the SPRNCA and other BLM lands within the grazing allotments.

Under the No Grazing with IVM alternative, the BLM would construct fencing along the SPRNCA boundary (as described in Alternative A – Proposed Action, Sections 2.2.5.2, 2.2.6.2, 2.2.7.2, and 2.2.8.2) to prevent livestock from grazing on the BLM lands within the SPRNCA. Fence construction would be implemented as described in Section 2.2.3. No new fences would be constructed on BLM-managed lands outside of the SPRNCA; these areas would be monitored for resource concerns. Range improvements would be addressed on a case-by-case basis.

Under Alternative B (the No Grazing with IVM alternative), IVM treatments would be implemented as described in Alternative A – Proposed Action, Section 2.2.4, to address BLM land on the SPRNCA Allotments not meeting Land Health Standard 3.

2.6 Alternative C – No Action Alternative

Alternative C (the No Action alternative) would renew the SPRNCA Allotment leases for a period of 10 years with the existing terms and conditions of the current leases. Under the No Action alternative, none of the fences or livestock waters described in Alternative A would be constructed (any future proposed range improvements would be considered on a case-by-case basis and with site specific NEPA), and no adaptive management criteria or season of use restrictions would be implemented. The following existing terms and conditions as they currently appear on the existing leases for the four SPRNCA Allotments would be implemented.

2.6.1 Babocomari Allotment

Table 18. Babocomari Allotment mandatory terms and conditions.

Allotment	Pasture	Livestock		Period		Percent Public Land Use	Type Use	AUMs
		Number	Kind	Begin	End			
Babocomari	--	15	cattle	3/1	2/28	100	Active	180

No “other terms and conditions” are described on the existing Babocomari Allotment livestock grazing lease.

2.6.2 Brunckow Hill Allotment

Table 19. Brunckow Hill Allotment mandatory terms and conditions.

Allotment	Pasture	Livestock		Period		Percent Public Land Use	Type Use	AUMs
		Number	Kind	Begin	End			
Brunckow Hill	--	7	cattle	3/1	2/28	100	Active	84

[5] Under the scenario where the maximum number of livestock use the River Pasture, the remaining season of use (279 days) would occur outside the River Pasture with 9 AUMs being consumed from BLM-managed land.

No “other terms and conditions” are described on the existing Brunckow Hill Allotment livestock grazing lease.

2.6.3 Three Brothers Allotment

Table 20. Three Brothers Allotment mandatory terms and conditions.

Allotment	Pasture	Livestock		Period		Percent Public Land Use	Type Use	AUMs
		Number	Kind	Begin	End			
Three Brothers	--	68	cattle	3/1	2/28	24	Active	196

Other Terms and Conditions:

- An allotment management plan will be prepared to provide for continued livestock grazing, and protection of the riparian values of the San Pedro Riparian National Conservation Area.

2.6.4 Lucky Hills Allotment

Table 21. Lucky Hills Allotment mandatory terms and conditions.

Allotment	Pasture	Livestock		Period		Percent Public Land Use	Type Use	AUMs
		Number	Kind	Begin	End			
Lucky Hills	--	90	cattle	3/1	2/28	100	Active	1080

Other Terms and Conditions:

This lease is issued subject to the following terms and conditions:

To protect lesser long-nosed bat:

1. Prior to construction of range improvement projects, preconstruction surveys shall be conducted for paniculate agaves that may be directly affected by construction activities, or in the case of new water sources, may occur within 0.5 mi of the proposed water source.
2. If agaves are found during pre-construction surveys, the following measures shall be implemented:
   a) Fences, pipelines, waters, and other range improvement projects shall be located to reduce as much as possible injury and mortality of agaves.
   b) Disturbance shall be limited to the smallest area practicable, and projects shall be located in previously-disturbed areas whenever possible.
   c) Vehicle use shall be limited to existing routes and areas of disturbance except as necessary to access or define boundaries for new areas of construction or operation.
   d) All workers shall strictly limit their activities and vehicles to designated areas. Construction workers shall be informed of these terms and conditions.
3. No seeding/planting of nonnative plants shall occur on any public lands in the allotment.
4. Any chemical and mechanical vegetation manipulation, or use of prescribed fire shall be designed and planned to minimize adverse effects to lesser long-nosed bat forage plants. Measures shall be developed to ensure that no more than 20% of agaves that are burned during prescribed fire are killed by the fire.
5. A mitigation plan shall be developed by the BLM in coordination with the service for each prescribed fire or chemical or mechanical vegetation management project within 0.5 mile of a lesser long-nosed bat roost or in areas that support paniculate agaves. The mitigation plan shall ensure that effects to lesser long-nosed bat roosts and forage plants are minimized and shall include monitoring of effects to forage plants. The plan shall be approved by the service.

To protect huachuca water umbel:

6. Livestock grazing will be managed in accordance with the provisions of the Lucky Hills CRMP. The plan implements management practices to establish long-term upward trend in range conditions in those areas where condition is fair or poor and implement watershed improvement projects tha[t] will increase infiltration. Other actions may include planning and developing range improvement and vegetati[o]n management projects.

To protect jaguar:

7. Jaguars will not be subjected to any predator control activities on this allotment.

2.7 Alternative D – No Grazing without IVM Alternative

Under Alternative D (the No Grazing without IVM alternative), the BLM would not authorize grazing on the SPRNCA Allotments on the BLM-managed lands inside or outside of the SPRNCA boundary. Grazing on private lands, and on Arizona State Trust Land leases would be expected to continue at current stocking rates adjacent to the SPRNCA and other BLM lands within the grazing allotments.

Under the No Grazing without IVM alternative, the BLM would construct fencing along the SPRNCA boundary (as described in Alternative A – Proposed Action, Sections 2.2.5.2, 2.2.6.2, 2.2.7.2, and 2.2.8.2) to prevent livestock from grazing on the BLM lands within the SPRNCA. Fence construction would be implemented as described in Section 2.2.3. The BLM-managed lands outside of the SPRNCA would remain unfenced and monitored for resource concerns. Range improvements would be addressed on a case-by-case basis.

Under the No Grazing without IVM alternative, IVM treatments as described in Alternative A – Proposed Action, Section 2.2.4, would not be implemented. No vegetation treatments would be done to address BLM land on the SPRNCA Allotments not meeting Land Health Standard 3.

2.8 Alternatives Considered but Eliminated from Detailed Analysis

2.8.1 Remove Livestock Grazing from the SPRNCA

Under this alternative, the BLM would not authorize livestock grazing on BLM-managed lands within the SPRNCA but would continue to authorize livestock grazing on BLM-managed lands located within the allotments outside of the SPRNCA.

Rationale for elimination from detailed analysis: The BLM is analyzing the Proposed Action under which adaptive management, if adaptive management objectives are not being met, would result in the suspension of livestock grazing on BLM-managed lands within the SPRNCA. Thus, the analysis of the Proposed Action includes a scenario under which grazing could be completely removed from the BLM-managed lands within the SPRNCA. In addition, the BLM is analyzing the No Grazing alternative which analyzes the effect of eliminating livestock grazing on the BLM-managed lands within the SPRNCA.

2.8.2 Remove Livestock Grazing from All Areas that Do Not Meet Standards for Rangeland Health

Under this alternative, the BLM would not authorize livestock grazing on BLM-managed lands that are not meeting Standards for Rangeland Health as described in the Babocomari, Brunckow Hill, and the SPRNCA East Complex LHEs (BLM 2022a, BLM 2022b, and BLM 2022c).

Rationale for elimination from detailed analysis: The BLM is analyzing the No Grazing alternative which analyzes the effect of eliminating grazing on any BLM-managed lands within the four SPRNCA Allotments. This would functionally be the same analysis as would be required for this alternative because all four of the allotments are not meeting Standard 3, as described in the Final Determinations documents for the Babocomari, Brunckow Hill, and the SPRNCA East Complex Allotments LHEs (BLM 2022d, BLM 2022e, and BLM 2022f).

2.8.3 Proposed Action with No Livestock Crossings in the Babocomari River Canyon Pasture

This alternative would be the same as the Proposed Action, but livestock would not be allowed to cross the Babocomari River once either the River Canyon Pasture or the expanded River Canyon Pasture is implemented.

Rationale for elimination from detailed analysis: Alternative A.2 includes water quality adaptive management criteria to remove livestock completely from the BLM-managed lands within the River Pasture of the Babocomari Allotment if the water quality thresholds are exceeded multiple times. Thus, the analysis of Alternative A.2 includes a scenario under which livestock would not be allowed to cross the Babocomari River.

2.8.4 Remove Livestock Grazing from the SPRNCA and Increase Other Lands Available for Grazing

Under this alternative, the BLM would not authorize livestock grazing on BLM-managed lands within the SPRNCA but would continue to authorize livestock grazing on BLM-managed lands outside of the SPRNCA including by authorizing new lands for grazing to compensate for the reduction in acreage from elimination of grazing within the SPRNCA.

Rationale for elimination from detailed analysis: In addition to the reasons discussed under Section 2.8.1, there is insufficient BLM-managed land outside the SPRNCA and in the geographic vicinity of the allotments that is not already authorized for grazing.

2.8.5 Other IVM Treatment Methods

The BLM also considered, but eliminated from detailed analysis, including the following additional IVM treatment methods as part of the Proposed Action and other alternatives that include IVM, in addition to those treatment methods described under 2.2.4.

Mechanical

Mechanical methods use vehicles and heavy equipment to modify, thin, reduce, or remove vegetation. Equipment may include tracked and rubber-tired vehicles like backhoes, front-end loaders, skid steers, and trucks, all outfitted with special attachments (e.g., rotary- and drum-style cutting devices) suited for the mastication or thinning of vegetation.

Rationale for elimination from detailed analysis: Mechanical treatments would reduce shrub cover in the short term; however, whitethorn acacia and creosote bush are vigorous re-sprouting shrubs that would grow back after a mechanical treatment. Grubbing or otherwise completely uprooting the whitethorn/creosote would not be feasible because their growth form is too small. Mechanical treatments with tracked or rubber-tired vehicles and heavy equipment would cause widespread disturbance of the soils on the SPRNCA Allotments and increase soil susceptibility to erosion and compaction. Compared to low rates of tebuthiuron application, mechanical treatments are less effective at controlling white thorn acacia and creosote and more damaging to perennial grasses (Morton et al. 1990). In summary, the BLM eliminated mechanical methods from consideration due to the high risk of damage to natural resources and low chance of success in long-term achievement of DPC objectives.

Manual

Manual vegetation treatment methods generally consist of modifying, thinning, reducing, or removing vegetation using powered and non-powered hand tools including handsaws, chainsaws, weed-eaters, field and brush mowers, and other specialized tools.

Rationale for elimination from detailed analysis: In addition to the rationale described for elimination of mechanical, areas that are not meeting shrub cover objectives are not easily accessible from roadways and are too large and widespread for manual removal of shrubs to be effective.

Biological control

Biological control is the use of living organisms to suppress an invasive species.

Rationale for elimination from detailed analysis: There are no known biological control agents available for the target shrubs described in this EA.

Targeted grazing

Targeted grazing is the controlled use of livestock grazing to accomplish specific vegetation management objectives.

Rationale for elimination from detailed analysis: Livestock would not browse on the leaves of shrubs enough to remove them from the landscape, thus targeted grazing would not meet the purpose and need of reducing shrub cover to shift the vegetation communities toward meeting Land Health Standards.

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

3.1 Introduction

Chapter 3 contains the impacts analysis related to the issues presented in Section 1.8. Section 3.2 describes the analysis assumptions related to the Proposed Action and alternatives presented in Section 2. Section 3.3 presents the issues that are analyzed in brief. Section 3.4 presents the issues that are analyzed in detail.

3.2 Analysis Assumptions

3.2.1 Assumptions Common to All Alternatives

- The proposed fences would generally be effective at preventing livestock movement between the various pastures and fences would be maintained and remain effective.

3.2.2 Alternative B and D – No Grazing with IVM Alternative and No Grazing without IVM Alternative Assumptions

- Livestock grazing would not be authorized on BLM lands but may continue on private and Arizona State Trust (state) lands at the same level as described in the No Action alternative.
- On the Three Brothers Allotment a new water facility that would include water storage and troughs would likely need to be developed within the state and private lands because with the removal of livestock grazing on BLM lands livestock would lose access to an existing water source.
- Cattle crossing from state or private lands onto BLM-managed land could not be physically excluded from the BLM-managed lands outside of the SPRNCA because it is neither proposed nor feasible to fully fence the non-BLM owned lands outside of the SPRNCA.

3.2.3 Alternative C – No Action Alternative Assumptions

- On the Brunckow Hill Allotment it is assumed that no livestock grazing would occur on the west side of the railroad grade and thus livestock would continue not to graze the riparian area around the San Pedro River from the Brunckow Hill Allotment.

  Rationale: The Brunckow Hill Allotment livestock grazing lease, currently and under the No Action alternative, does and would allow for livestock grazing west of the railroad grade. However, it is reasonable to assume that without the proposed SPRNCA boundary fence under the Proposed Action, the lessee would continue to not graze the area west of the railroad grade as has been the case for the past 30 years.
- The proposed SPRNCA boundary fence, the Babocomari River Canyon Pasture fence, and the livestock waters would not be built under the No Action alternative.

3.3 Issues Analyzed in Brief

Following internal and public scoping, 12 issues were identified, considered, and analyzed in brief (AIB) by members of the interdisciplinary (ID) team in review of the Proposed Action. Each of these issues is outlined below with a concise discussion regarding the context and intensity of the effect related to each issue.

3.3.1 AIB-1 Recreation

How would the uses and activities authorized under the leases affect recreational opportunities (including birding activities), recreation use, the recreational setting, and experience?

There are no existing developed recreation sites on the SPRNCA Allotments, although existing primitive roads and designated trail routes in the Allotments receive recreational use for hiking, equestrian and bicycle riding as part of the San Pedro Trail. The Brunckow Hill Allotment includes historic mining structures and a historic cabin which is allocated for public use and attracts high recreational visitation; the Allotment boundary on the San Pedro River is

adjacent to the Charleston bridge recreation site and the Millville Trailhead, which provide access to the river and uplands for dispersed recreation, and existing interpretive trails in the Millville-Charleston area. Babocomari Canyon attracts dispersed recreational use along the existing administrative road and trail on the historic railroad grade. The Three Brothers and Lucky Hills Allotments attract dispersed recreational use along the existing primitive roads, including the powerline road in the SPRNCA. Recreational opportunities available in the Allotments include hiking, bicycling, equestrian riding on the existing road and trail network, sightseeing, viewing historic sites, viewing wildlife and the San Pedro River and riparian area, undeveloped camping, and hunting among other activities.

Recreational opportunities would continue to be available in the Allotments and managed according to the Recreation Management Zones (RMZs) identified in the SPRNCA RMP (BLM 2019a, Figure 2-8). The RMZs in the Allotments include Rural and Back Country-Motorized in portions of the Brunckow Hill Allotment; Back country and Primitive in the Three Brothers and Lucky Hills Allotments, and Back Country and Primitive in the Babocomari Allotment. Cattle grazing and range improvements are commonly encountered by outdoor recreational visitors in multiple use settings such as those found in the Allotments in and outside the SPRNCA. Potential impacts to the recreational setting, uses, and experiences in the Allotments due to livestock grazing activities and operations would be insignificant due to small scale and infrequent encounters in localized areas within the allotments. Range improvements that attract concentrated livestock activity (e.g., permanent cattle trails, waters, and salt licks) creating bare ground areas may attract recreational use but also detract from the natural setting; these would be located away from recreational travel routes and recreation sites or activity areas as much as possible to avoid impacts on the quality of the setting. Access routes needed for grazing operations would be available for shared recreational use and requiring non-motorized access where appropriate would eliminate potential conflict between livestock grazing and recreational uses. Passages through fences – gates, pedestrian gaps – for trails and dispersed hunting access routes would be provided in proposed fences (under the Proposed Action, Alternatives A.1 and A.2, and the No Grazing alternatives [Alternatives B and D]) to minimize barriers. Potential encounters between livestock and recreational visitors in undeveloped settings is anticipated to be infrequent, with potential encounters occurring where unconfined space is available for visitors to avoid interacting with cattle. Some visitors may be deterred from visiting or entering an area where cattle are present and may be displaced. Recreational visitors may be exposed to *E. coli* if they ingest or come in contact with contaminated water in the San Pedro or Babocomari River, however, the rivers are not managed to provide water contact recreation opportunities such as swimming, wading, or water play, and the risk of incidental exposure would be minimal. The Charleston bridge parking area, located adjacent to the Brunckow Hill Allotment, is not currently grazed and would not be grazed under any alternative; construction of fencing would be coordinated with recreational access in the area to avoid conflicts with public access to BLM land. Potential recreational visitor encounters with livestock in the SPRNCA outside the allotments may occur if cattle escape the allotments or pastures (unauthorized livestock from permitted livestock on the four SPRNCA Allotments has not been documented), or if unauthorized livestock enters the SPRNCA from other areas; these encounters could have potential impacts on the recreational user's experience by disrupting access or displacing users, or detracting from the natural setting in areas where cattle are not expected.

The integrated vegetation management (IVM) treatments would reduce dense shrub cover in the upland terraces and rolling hills and would improve accessibility for dispersed recreation. Herbicide treatments would leave dense dead standing scrub cover until the dead top-growth breaks down naturally or is removed by prescribed fire. The recreational setting in the treatment areas would become dominated by grasslands with no change in other characteristics. Temporary impacts on recreational visitors would occur during treatment operations when needed for safety reasons.

3.3.2 AIB-2 Educational Resources

How would the uses and activities authorized under the leases affect educational resource values?

The SPRNCA Allotments include historic and natural heritage features that attract public interest and provide opportunities for viewing those features, and for education and interpretation. In the Babocomari Allotment such features include the Babocomari River and its riparian area; a historic railroad grade, and structure remnants associated with the historic Fairbank townsite and railroad history. In the Brunckow Hill Allotment, such features include Brunckow Cabin which attracts visitation due to its history and association with the historic Millville and Charleston townsites. The San Pedro River and its riparian area are also an educational and interpretation resource in the Brunkow Hill Allotment. The Proposed Action and alternatives would not alter or destroy the condition of educational resource values and they would continue to provide opportunities for viewing and learning about them. IVM treatment units would exclude sensitive features. Though planned educational and interpretive programs or

developments are not present in the grazing allotments, they can be provided or developed as the recreation and visitor services programs are implemented in the area and coordinated with grazing operations to avoid potential conflicts. The presence of cattle in the pasture around the Brunckow Cabin may deter some visitors, but there are no cattle gathering or watering areas near the cabin and potential encounters between cattle and visitors is expected to be infrequent. The IVM treatments, their need, and the vegetation conditions in the different ecological sites in the project area provide opportunities for education and interpretation of the ecological conditions in the SPRNCA, and efforts to achieve natural conditions.

3.3.3 AIB-3 Wild and Scenic Rivers

How would the uses and activities authorized under the leases affect the river values for which the Babocomari River and San Pedro River were determined eligible and suitable for addition to the National Wild and Scenic Rivers system?

Authorized uses within the Wild and Scenic River study corridors are subject to protective management measures identified in the SPRNCA RMP (BLM 2019a). There are no activities proposed that would affect the rivers' free-flowing condition. The Proposed Action (and modifications to the Proposed Action [Alternatives A.1 and A.2]) includes adaptive management to respond if exceedances of water quality standards for *E. coli* are caused by livestock grazing. Potential effects on the study rivers' Outstanding Remarkable Values (ORVs) would be alleviated by protective measures identified in the SPRNCA RMP (BLM 2019a, 2-22) which are incorporated into the Proposed Action and modifications to the Proposed Action for the range infrastructure. Vegetation treatments would not occur within the Babocomari River Canyon study corridor, and only a few acres would be treated in the San Pedro River study corridor east of the railroad in the Brunckow Hill Allotment, avoiding impacts on scenic, riparian vegetation and recreation values. Recreational access would be accommodated in fencing, and the recreational setting in the river corridors would be preserved. The proposed range improvements and vegetation treatments would be located in areas screened by topography and not affect the river values for which the San Pedro and Babocomari Rivers were determined eligible and suitable for designation in the National Rivers System.

3.3.4 AIB-4 Socio-Economics

How would livestock grazing on the SPRNCA Allotments impact income and employment?

The SPRNCA Proposed RMP and Final EIS (BLM 2019b) analyzed the impact of livestock grazing from the allotments on the SPRNCA on income and employment. The SPRNCA Proposed RMP and Final EIS (BLM 2019b) analyzed a No Grazing alternative which illustrated the impact that a No Grazing alternative would have on income and employment. The analysis in the SPRNCA Proposed RMP and Final EIS (BLM 2019b) found that the total contributions for the beef industry in Cochise County was estimated in 2014 at 289 total jobs and $7.7 million in labor income (Kerna et al. 2014). Based on this, grazing on the SPRNCA is estimated to support less than 1% of jobs and income for the beef industry in the county (BLM 2019b, 3-160).

There would be little to no change to local social or economic conditions under the alternatives.

3.3.5 AIB-5 Invasive Species

How would livestock grazing and IVM treatments introduce or spread non-native invasive plant species?

Livestock grazing can introduce and spread non-native invasive plant species through transportation of weed seed in livestock coats, feet, and feces; preferential grazing of native plants, and soil disturbance (Belsky and Gelbard, 2000). However, the proposed grazing and IVM treatments would be conducted consistent with applicable Best Management Practices (BMPs) (see Appendix H of the SPRNCA Proposed RMP and Final EIS [BLM 2019b]) to limit the introduction and spread of non-native invasive plant species from grazing operations and IVM treatments. The BLM would engage in early detection and rapid response of any new potential invasive plant infestations, which would help prevent the introduction and spread of non-native invasive plant species throughout the area.

Lehmann lovegrass is a non-native perennial grass found throughout southern Arizona, including the SPRNCA Allotments, and can spread without disturbance caused by grazing (Anabel et al. 1992). However, grazing has been

shown to increase dominance and spread of Lehmann lovegrass (McClaran and Anabel 1992, Bock et al. 2007, and McDonald and McPherson 2011). Legacy data reported in the SPRNCA Allotments Land Health Evaluations (LHEs) show that Lehmann lovegrass cover fluctuates from year to year (BLM 2022a, BLM 2022b, and BLM 2022c), likely due to fluctuations in rainfall. The AIM data analyzed in the LHEs shows that Lehmann lovegrass occurs on 6 of the 18 monitoring locations on the SPRNCA allotments and ranges in foliar cover from 0.7-3.3%, except for LH-06, which had 12% Lehmann lovegrass foliar cover (BLM 2022a, BLM 2022b, and BLM 2022c). Due to the widespread presence of Lehmann lovegrass across Southeastern Arizona grasslands and the lack of feasible large-scale treatment options, the BLM is not actively managing the species.

3.3.6 AIB-6 Soils

How would livestock grazing and fence installation in the uplands impact erodible soils and soil erosion rates in the Babocomari and Brunckow Hill Allotments?

Soils that are susceptible to erosion properties have been identified and analyzed in the SPRNCA Proposed RMP and Final EIS (BLM 2019b) for all allotments in the SPRNCA. The SPRNCA Proposed RMP and Final EIS (BLM 2019b) analyzed the impacts of livestock grazing, from the allotments on the SPRNCA, on soils susceptible to erosion. That analysis identified that livestock grazing can compact soil, leading to decreased infiltration rates and increased overland flow and erosion rates. The analysis also noted that, although grazing can result in temporary increases in soil nutrients, there is a potential for long-term loss in nutrients, depending on grazing intensity. The analysis noted that within the SPRNCA on the four allotments relevant to this EA, only 135 acres with a “severe” erosion hazard rating would be impacted and 6,840 acres with a “slight” erosion hazard rating would be impacted from livestock grazing (BLM 2019b, 3-11 to 3-12). The erosion hazard ratings are from the U.S. Department of Agriculture (USDA) Web Soil Survey (USDA 2021).

The Babocomari and Brunckow Hill LHEs (BLM 2022a and BLM 2022b) found that on all monitoring sites on the BLM-managed portion of the allotments, upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and ecological site. The data collected at these sites show ground cover that is adequate for soil stabilization and permeability within the ecological system. Bare ground, litter cover and movement, and wind scouring of the sites are within their natural range of variability.

The adaptive management triggers and thresholds for perennial grass foliar cover and bare ground in the Proposed Action and modifications to the Proposed Action (Alternatives A.1 and A.2) would maintain the soil stability through maintenance of protective vegetative cover. It would also allow for reductions in AUMs if perennial grass foliar cover is not meeting adaptive management objectives or if bare ground exceeds the threshold. The ecological triggers and thresholds are based on monitoring data, ESDs, and professional judgement (BLM 2022a and BLM 2022b). They were selected because they are either directly affected by livestock grazing or are an indication of overall watershed health. Thus, reductions in AUMs when objectives are not being met and thresholds have been exceeded is expected to maintain the ecological sites within their normal range of variability for annual sediment yields.

Table 22 below indicates the acres disturbed per alternative based on a 25-foot buffer around the proposed fence lines per erosion hazard rating. These ratings are interpreted products from the USDA Web Soil Survey (USDA 2021) based on soil site characteristics that would indicate what level of erosion is possible from disturbance.

Table 22. Acres of each erosion hazard per rating in proposed fence 25-foot buffers by alternative (all surface managers).

Alternative	Severe	Moderate	Slight	Total Acres
Proposed Action	32.8	44.4	16.0	93.2
Proposed Action with expanded RC Pasture	*31.1*	*40.8*	*16.0*	*87.8*
Alternative A.1	32.8	39.5	17.3	89.6
Alternative A.1 with expanded RC Pasture	*31.1*	*35.8*	*17.3*	*84.2*
Alternative A.2	19.5	38.0	13.1	70.7
Alt. B and D - No Grazing alternatives	19.5	33.1	14.5	67.1
Alt. C - No Action alternative	0.0	0.0	0.0	0.0

The largest total disturbance acreage (93.2) (in the Proposed Action) represents 0.6% of the BLM acres in the allotments, all other alternatives would impact less acreage. The Fence Suitability interpretation (from USDA) indicates that 86% of these soils are suitable for fence construction and the likelihood of soils eroding as a result of construction is low. Fence installation would cause only minor temporary surface disturbance to soil, given that the construction of the fence does not involve any blading of soil and only trimming of vegetation. Fence lines can cause cattle trailing along the side but given the high rock fragments in most of the ecological sites monitored in the LHEs, this impact is expected to be minor to negligible.

How would IVM treatments affect runoff and sediment yields?

Alternative A (Proposed Action), Alternative A.1, Alternative A.2, and Alternative B (No Grazing with IVM)
The Proposed Action and Alternatives A.1, A.2, and B include IVM treatments including prescribed fire, herbicide, seeding, and erosion control. The following analysis describes in brief the effects of those actions on watershed condition particularly on runoff and sediment yields. In general, runoff and sediment yield in these areas are highly variable and heavily dependent on rainfall and, in particular, high-intensity rainfall events (Polyakov et. al. 2010).

Regarding post-fire runoff, prescribed fire is expected to reduce vegetation cover and consume accumulated litter in the short term. Neary et al. (2008) indicate that prescribed fires with low-intensity burns typically do not alter watershed conditions enough to cause a significant increase in peak flows at the watershed scale. A study in the Santa Rita Experimental Range found runoff and sediment delivery within the natural range of variability of the unburned plot after a controlled burn, concluding that rainfall variability was an essential component to determining erosion rates (Emmerich and Cox 1992). The proposed prescribed fire treatments are designed to be low-intensity burns which usually create a mosaic of burned and unburned areas. At the hillslope scale, for proposed IVM treatment areas, a short-term decrease in vegetation cover caused by the prescribed fire could cause increases in rainfall-induced runoff and sediment delivery downslope in the 1 to 3 years following a burn particularly in areas with steeper slopes. It is expected that this runoff would be greatest in the first year and subsequently decrease as vegetation reestablishes (Neary et al. 2008).

For herbicide treatments, Michael and Neary (1995) report both increases and decreases in sediment yields from studies of herbicide treatments. The increase in sediment post-herbicide treatment is attributed to a destabilization of steep slopes by the loss of shrubs. The authors note that, compared to wildland fire, the potential increase in sediment yields from herbicide treatments is much smaller. Notably, tebuthiuron-specific treatments in Arizona resulted in reduced sediment yields in the first year after the treatment (Michael and Neary, 1995). In tebuthiuron treatments of creosote in New Mexico, infiltration rates were higher immediately post-treatment, which is speculated to be from higher litter amounts caused by the vegetation defoliation and decomposition over time (Perkins and McDaniel 2005). In general, as opposed to prescribed fire treatments, there is lower risk of increasing runoff and sediment yield immediately after herbicide treatments because the vegetation and litter are not removed and treatment of steep slopes (>15%) would be avoided.

In general, shrub treatments, such as those proposed, would not appreciably increase water yields from the long-term change in vegetation communities (Hibbert 1983 and Wilcox 2002). This is because of the area's high potential evapotranspiration rate, limited precipitation amounts, and generally large vertical distance to groundwater of the upland sites in the project area.

The Proposed Action includes building erosion control structures in limited areas (403 acres) in the Three Brothers Allotment. Similar techniques have been used in southern Arizona and found to trap sediment and increase infiltration and soil moisture (Polyakov et al. 2014, Nichols et al. 2016, Norman et al. 2017, and Norman et al. 2019). This allows site conditions to exist that would facilitate perennial grass growth, resulting in a potential decrease in local site erosion and downstream sediment yields.

In the Upper San Pedro Watershed, the proposed IVM treatments could occur on 14,204 acres, which represent 2.1% of the total watershed area. In the Babocomari Watershed, the vegetation treatments in the Proposed Action and alternatives would occur on 1,623 acres, which is less than 1% of the watershed area. This area is the extent of where impacts (as described above) from vegetation treatments would occur.

Alternative C (No Action) and Alternative D (No Grazing without IVM)

Under Alternative C (No Action) and Alternative D (No Grazing without IVM), there would be no new impacts on soil and water resources from IVM treatments. Not implementing IVM treatments would continue to allow those areas to transition further from the reference condition in their respective ecological site's state and transition model. This transition towards a more departed state is typically characterized as a shrub-dominated or eroded state that has higher hydrologic susceptibility (Williams et al. 2016). As with shrub removal, major changes in water yield from shrub growth are unlikely because of the already high evapotranspiration rate and high rainfall intensity (Wilcox 2002 and Goodrich et al. 2008).

Impacts to Biological Soil Crusts from Grazing and IVM Treatments.

Desert soil surfaces often have biological soil crusts that are vital in creating and maintaining soil fertility in desert soils (Belnap 2003). Biological soil crusts are a combination of cyanobacteria, lichen, and mosses. They are fragile and have relatively slow recovery times (Belnap 2003). The main threats to crust integrity include heavy livestock grazing, high-severity fires, and mechanical disturbance such as off-road vehicle traffic, especially when they occur during or followed by a dry period (Beymer and Klopatek 1992, USDA 2017). Compaction of biological soil crusts by these stressors influences the soil's water and nutrient-holding capacity. Surface disturbance to biological soil crusts can decrease infiltration and increase runoff (Belnap et al. 2001). Of the 18 terrestrial AIM plots monitored from 2018 to 2020 in the allotments only one (SP-351) recorded biological soil crusts, as Lichen, at 0.67% cover. This was found on a Limestone hills 12-16 inch p. z. ecological site in the Lucky Hills Allotment. Assuming the AIM data is representative of the cover across the allotments, this would indicate that currently biological soil crusts do not represent a substantial portion of ground cover in the allotments.

3.3.7 AIB-7 Water Quantity

How would livestock water use impact base flows on the Babocomari and San Pedro River?

Groundwater withdrawals associated with livestock grazing within SPRNCA Allotments have been identified and analyzed in the SPRNCA Proposed RMP and Final EIS (BLM 2019b) for all allotments in the SPRNCA. The SPRNCA Proposed RMP and Final EIS (BLM 2019b) quantified the amount of water that would be required for livestock use on BLM for all the allotments including this Proposed Action and No Action alternatives (1.1 acre-feet) and that of the No Grazing alternatives (0 acre-feet) (BLM 2019b Table 3-8).That analysis concluded that the No Grazing alternatives would decrease the overall need for groundwater pumping, whereas the Proposed Action would only minimize the amount of water that is pumped through water conservation measures. The analysis also noted that groundwater withdrawal in the Upper San Pedro Basin (which includes the Babocomari River) has captured water from the regional aquifer that would have contributed to the San Pedro River and Babocomari Rivers as base flows and riparian evapotranspiration. It also notes that this capture will continue to increase in the future because current recharge, both natural and artificial, is not able to offset current groundwater withdrawal (BLM 2019b, 3-17).

Any new livestock waters proposed to be developed in the Proposed Action, Alternative A.1, or Alternative A.2 would not increase the total water-use, only a change the location of the use. These proposed developments are for transportation of water (pipeline) and storage to accommodate use of pastures as a result of fencing; the source and quantity of the water used remains the same.

The water budget for the watershed is used here to assess the context of the impact. This method does not take into account the distances or the physical processes between the river and the locations of recharge and groundwater withdrawal. The last published water budget for the Sierra Vista Subwatershed (SVS) is for the year 2012 and states that the annual balance (difference of withdrawals and recharge) is -5,000 acre-feet per year (Gungle et al. 2016), indicating an overdraft of the aquifer. The withdrawals associated with the Proposed Action and No Action alternatives (estimated at 1.1 acre-feet) represent 0.02% of this balance, while the No Grazing alternatives would represent 0% and would not contribute to the deficit.

3.3.8 AIB-8 Paleontological Resources

How would livestock grazing impact significant paleontological resources, such as vertebrate fossils, within the allotment?

Review of Potential Fossil Yield Classification (PFYC) data shows that most of the BLM-administered lands within the SPRNCA Allotments are PFYC Class 1 or Class 2 (very low and low sensitivity). PFYC Class U and Class 4 areas (unknown and high sensitivity) where significant vertebrate fossils may exist are primarily located on hilltops and slopes that lack livestock forage, so livestock use and concentration in those areas is unlikely.

3.3.9 AIB-9 Native American Concerns

How would livestock grazing and IVM treatments impact Tribal uses or interests within the SPRNCA Allotments?

The BLM initiated government-to-government consultation with nine Native American Tribes who claim cultural affiliation to or traditional use of the area. Letters summarizing the cultural resources assessment data and the preliminary range of action alternatives were sent to the Fort Sill Apache Tribe, Hopi Tribe, Mescalero Apache Tribe, Pascua Yaqui Tribe, San Carlos Apache Nation, Tohono O'odham Nation, White Mountain Apache Tribe, Yavapai-Apache Nation, and Zuni Tribe on January 13, 2021.

The White Mountain Apache Tribe responded via email on February 6, 2021, that "the proposed lease renewal[s] will 'Not have an Adverse Effect' on the tribe's cultural heritage resources or traditional cultural properties." The Hopi Tribe responded in a letter dated February 12, 2021, requesting additional information to determine the likelihood of potential impacts. No other responses or comments have been received. The BLM's Tribal consultations will continue throughout the environmental assessment (EA) process.

Currently, there are no known or likely impacts to any culturally significant plants, items, sites, or landscapes. Ongoing consultation with potentially affected Tribes may yield traditional knowledge or other new information which could have the potential to prompt issue(s)-analysis or alternatives development. Likewise, the BLM may later apply mitigation to protect or restore resource values deemed important through tribal consultation and shared traditional ecological knowledge.

3.3.10 AIB-10 Fire and Fuels

How would livestock grazing impact wildfire risk?

The SPRNCA Proposed RMP and Final EIS (BLM 2019b) analyzed the impacts of livestock grazing, from the allotments on the SPRNCA, on fire behavior and risk. This analysis identified that in general, changes in vegetation, especially woody species encroachment into perennial grasslands, along with fire suppression polices and land use practices, have altered fire regimes in the San Pedro River Watershed. Many areas have shifted from grass-dominated to shrub- and tree-dominated ecosystems. The analysis further noted that this reduction in grasses may result in decreased potential for fire ignition and spread, due to a lack of fine fuels. Livestock grazing may reduce the level of fine fuels, affecting fire size and behavior (Davies et al. 2010), but this effect is strongest in grassland systems and mild weather conditions (Strand et al. 2014). Impacts of grazing on fire behavior would vary based on specific vegetation type and weather conditions. The vegetation section (Section 3.4.1.2) describes how there has been very little wildland fire activity on the SPRNCA Allotments for the past 30 years (see Table 29). In addition, there has only been some wildland fire activity on areas within the SPRNCA that are outside of the allotments (see SPRNCA Proposed RMP and Final EIS, 3-70 to 3-71 [BLM 2019b]). This trend is expected to continue under all of the alternatives including the No Grazing and No Action alternatives.

3.3.11 AIB-11 Cultural Resources and IVM

How would IVM treatments impact cultural resources?

BLM-funded or approved vegetation management and/or landscape restoration projects are considered undertakings subject to compliance with Section 106 of the National Historic Preservation Act (NHPA; 54 USC 306108 et seq.) and its implementing regulations at 36 CFR 800. Newly proposed actions as described in this EA would be subject to individual project review and assessment in accordance with the BLM's Arizona Vegetation and Range Management Programmatic Agreement (PA; executed September 30, 2020, see Appendix D). The BLM's primary and preferred methods to protect historic properties is avoidance of impacts through redesign or relocation of proposed activities and/or facilities. Should the BLM identify potential impacts to historic properties, the BLM may, accordingly, redesign or relocate proposed activities or constructions; or develop plans to mitigate potential adverse effects in consultation with the State Historic Preservation Office, Tribes, and other potentially affected parties.

For projects involving any jurisdictional entity who is not currently a party to the BLM's Arizona Vegetation and Range Management PA, that entity would be invited to participate. In the event that any jurisdictional entity declines PA participation, the BLM would negotiate applicable compliance procedures to either follow the BLM's Arizona Statewide Protocol (executed December 14, 2014, see Appendix D) or standard compliance procedures as directed under 36 CFR 800.

3.3.12 AIB-12 Fisheries and IVM

How would herbicide treatments impact fish, amphibian, and aquatic insect species in the Babocomari and San Pedro Rivers?

Historically, 13 native fishes occupied the San Pedro River and large tributaries such as the Babocomari River (Minkley 1987). The majority of the species have been eradicated from the area due to habitat loss and degradation and introduction of nonnative fish. Two native BLM listed fish species, the desert sucker and longfin dace, still occur in the upper mainstem of the San Pedro River. Five native fish species, the longfin dace, the desert sucker, the Sonora sucker, the Gila topminnow, and the Gila chub, occur in small numbers in the upper Babocomari River. Desert pupfish have been reestablished in one wetland adjacent to the river near Saint David. The segment of the Babocomari River located within the Babocomari Allotment has been reduced by climate change, groundwater pumping, and severe drought to a series of small pools and isolated perennial segments in the summer (TNC 2021), severely reducing habitat suitability for native fish or eliminating aquatic habitat altogether.

Environmental impacts of tebuthiuron on freshwater fish were analyzed in the 2007 PEIS for BLM herbicide use, and tebuthiuron was determined to have no effect on freshwater fish except for accidental spill scenarios which could result in negative effects (BLM 2007). Toxicity tests on bullfrogs indicated tebuthiuron is "practically non-toxic" to amphibians (BLM 2007). The 2007 PEIS for BLM herbicide use (p 4-84) concluded, "[T]ebuthiuron may have a moderate residence time in water bodies (over 1 year in anaerobic conditions). Under an accidental spill scenario, tebuthiuron would pose a low risk to fish and aquatic invertebrates in ponds. Accidental direct spray of tebuthiuron over a pond would pose a low chronic risk to aquatic invertebrates, and accidental direct spray over a stream would pose a low to moderate chronic risk to aquatic invertebrates. Fish are not at risk from accidental direct spray. Off-site drift and surface runoff of tebuthiuron does not pose a risk to fish or aquatic invertebrates. If tebuthiuron is applied at the typical application rate, under normal application scenarios, it is likely to have little or no impact on fish or aquatic invertebrates."

Following the BMPs of the Proposed Action and safe storage and handling guidelines in the BLM Manual 9011-Chemical Pest Control would reduce the possibility of spills to near zero. Tebuthiuron would not be loaded into applicator equipment near the Babocomari River, San Pedro River, ephemeral washes, ponds and wetlands, or springs. In addition, the type of tebuthiuron proposed is a dry pelletized form that could be easily picked up and removed from the ground if it is accidentally spilled at a staging area. Application would be done in fall through spring (11/1-3/31) to minimize risk of herbicide movement in runoff. Winter rains are reliably gentle, eliminating the potential for severe storms that could cause pellets to be washed off-site prior to dissolving. Due to the low toxicity of tebuthiuron (BLM 2007), low application rates, the low off-site movement potential, and the distance to perennial water, fisheries and aquatic organisms would not be affected by these treatments.

Tebuthiuron application in aquatic habitat is not proposed. Timing of application and buffers around aquatic habitat (at least 300 meters) included in the Proposed Action largely negate the potential for impacts to aquatic or riparian species. The 0.33 to 0.5 lb a.i./acre proposed application rate is consistent with the typical application rate used in the 2007 PEIS for BLM herbicide use risk assessment and is well below the allowable maximum application rate of 4 lb a.i./acre per acre. In addition, because pelletized tebuthiuron would be used, the potential for exposure and ingestion scenarios would be reduced as compared to liquid application. These factors combined with design features including the application period and associated gentle rainfall and the buffers near perennial streams and major ephemeral washes minimize direct impacts.

3.4 Issues Analyzed in Detail

The issues identified for detailed analysis in this EA were developed in accordance with CEQ regulations using input from internal and public scoping. Issues were retained for detailed analysis if that analysis is necessary to make a

reasoned choice between alternatives; to determine significance; if there is disagreement about the best way to use a resource; or if there is conflict between resource impacts or uses.

3.4.1 Issue 1: Water Quality

3.4.1.1 How would livestock grazing affect Escherichia Coli *(*E. coli*) levels in the Babocomari and San Pedro Rivers?*

Background

In accordance with the Clean Water Act, the Arizona Department of Environmental Quality (ADEQ) produces a section 305(b) water quality assessment and section 303(d) listing of threatened or impaired waters for the state of Arizona every two years. In the 2012/2014 report, the San Pedro River from the Babocomari River Confluence to Dragoon Wash is listed as impaired for exceedances of applicable standards for *Escherichia coli* (*E. coli.*). In the same report, the Babocomari River is listed as category 2, attaining for some uses, and noting one sample of *E. coli* above the standard for the Full Body Contact use (ADEQ 2014). According to ADEQ, the Babocomari River is now provisionally listed as impaired for exceedances of *E. coli* standards and is pending Environmental Protection Agency review before official listing (Huth 2020a). In the 2016 305(b) Report, the reach of the San Pedro River from the border of Mexico to the Charleston gage is listed as category 5, impaired, for exceedances of the *E. coli* standard for the Full Body Contact designated use.

E. coli is a species of fecal coliform bacteria that is specific to humans and other mammals, including livestock. Sources of *E. coli* include leaky septic tanks, improper waste disposal, livestock, and wildlife (Coronado RC&D 2013, ADEQ 2013). In the Upper San Pedro Basin (including samples from the Babocomari Watershed), an analysis of bovine and human DNA markers on water samples with high amounts of *E. coli* present indicated the bovine source presence was greater overall compared to human sources (Rock et al. 2018).

There are two main mechanisms by which *E. coli* enters the stream, through runoff from rainfall on the uplands and through direct contribution. In general, the *E. coli* levels during flood flows can be attributed to upland sources, and *E. coli* levels during baseflows can be attributed to near-stream direct contributions. The following analysis is therefore split between a flood flow analysis, which analyzes impacts from the Proposed Action and alternatives on *E. coli* levels during flood flow, and a baseflow analysis, which focuses on *E. coli* levels during baseflow. This distinction is made in the 2013 Lower San Pedro Total Mean Daily Load Assessment (ADEQ 2013); however, there is no distinction between baseflows and flood flow exceedances when ADEQ considers whether waters are impaired.

Flood Flow Analysis

The flood flow analysis examines impacts on *E. coli* levels in both the San Pedro and Babocomari Rivers.

The spatial scale for the analysis of impacts to the San Pedro River is the watershed area above the U.S. Geological Survey (USGS) gage on the San Pedro River near Tombstone (see Appendix A: Figure A-22), known as the SVS because that is the closest established outlet point by which the influence of all the SPRNCA Allotments can be analyzed. All four of the SPRNCA Allotments are considered in the analysis for the impacts to the San Pedro River because all four SPRNCA Allotments have the potential to contribute to impacts on the San Pedro River.

The spatial scale for analysis of impacts to the Babocomari River is the Babocomari River tributary watershed, a subwatershed of the Upper San Pedro River Watershed, because sources of contamination upstream in the watershed have the potential to impact the reach within the allotment located near the Babocomari River's confluence with the San Pedro River. Only the Babocomari Allotment is considered in the analysis for the impacts to the Babocomari River as the other three SPRNCA Allotments do not contribute to impacts to the Babocomari River. The temporal scale is 10 years as that is the period of the lease renewal.

Analysis Assumptions

- Flood flows, if sampled, would result in exceedances of water quality standards.
- Livestock utilization across the acreage is approximately the same for BLM, USDA Forest Service, and Arizona State Trust Land grazing leases.

Affected Environment

San Pedro River

The SVS is a semi-arid watershed in Southern Arizona, which starts in its headwaters in Mexico and reaches its terminus at the USGS streamgage on the San Pedro River, near Tombstone. The watershed is composed of various land-uses and potential non-point sources of pollution including grazed lands, agricultural lands, and urban/developed lands (ADEQ 2013). Effluent recharge sites could also be sources of contamination. The border barrier construction along the international border with Mexico can impact flood flow, through the increased bare ground resulting from construction, concentration of overland flow along the uplands, and increased flow resistance along the San Pedro River. These effects could result in increased sediment loads to the stream, particularly in the reach immediately downstream of the international border.

Only the U.S. portion of the watershed is considered for data because of the location of impacts and the lack of available data for grazed lands across the border. According to National Land Cover Dataset and state and federal grazing leases, the U.S. portion of the watershed consists approximately of 0.18% agricultural, 4% urban/developed, and 59% grazed lands. The remaining 36.8% are ungrazed lands in the SPRNCA, on private land, or on Fort Huachuca which are not considered substantial non-point sources. Summer monsoon season rainfall accounts for approximately 60% of annual rainfall totals. Summer rains fall July through September, originate in the Gulf of Mexico, and are convective, usually brief, intense thunderstorms. The individual storm rainfall is typically unevenly distributed across the landscape. These storms are usually the largest contributor to annual runoff. Cool season moisture originates in the Pacific and Gulf of California, tends to be frontal, and falls in widespread storms with long duration and low intensity. The pre-monsoon summer months of May and June are the driest months of the year. Thomas and Pool (2006) computed the long-term average from 1902 to 2002 at the Tombstone Weather Station to be 13.6 inches. Naturally, rainfall varies across the watershed during an individual storm and annually, with larger amounts of rain typically occurring at higher elevations.

Rainfall that occurs faster than it can soak into the ground will cause water to runoff and enter smaller drainages and, if rainfall intensity is great enough, major tributary drainages and the San Pedro River itself. This sediment-laden water can carry *E. coli* bacteria if sediment is exposed to source materials. From the data provided by ADEQ, the majority of samples taken during flood flow events exceeded the single sample maximum water quality standard for *E. coli.* Flood flow status for each sample is determined from field notes and gage data.

Babocomari River

The Babocomari Allotment is located west of the San Pedro River and is located within the Babocomari River tributary watershed that has a drainage area of 306 square miles and is a subwatershed of the Upper San Pedro River Watershed. The spatial scale for analysis of impacts related to this issue is this watershed because sources of contamination in the upper parts of the watershed have the potential to impact the reach within the allotment located near the Babocomari River's confluence with the San Pedro River. The temporal scale of the analysis is the 10-year lease period.

As a subwatershed of the San Pedro River, it has a similar climate and seasonality associated with precipitation events. There is a USGS streamgage (USGS 09471400) located on the Babocomari River approximately 3.1 miles upstream from the confluence with the San Pedro River. It's period of record starts from 2001 to present. The highest flow was recorded in 2006 at 9,600 cubic feet per second (cfs) while the lowest annual peak flood was 157 cfs in 2015. The annual peak for 2019 (2,410 cfs) was the highest in the last 10 years (USGS 2020). Samples have been collected by ADEQ and trained volunteers from 2017 to 2020 along the Babocomari River. As with the San Pedro River, all samples taken during flood flow events exceeded the single sample maximum water quality standard for *E. coli.* The Babocomari Allotment and the included section of the Babocomari River are located at the bottom of the watershed. The exceedances found in samples taken upstream of the allotment (ADEQ 2020) indicate many sources of *E. coli* in the watershed upstream of the allotment. The watershed is composed of various land uses and potential non-point sources of pollution including grazed lands, agricultural lands, and urban/developed lands (ADEQ 2013). According to National Land Cover Dataset and state and federal leases, these acreages are 0.01% agricultural, 3.4% urban/developed, and 48.6% grazed lands. The remaining 48% are ungrazed lands in the SPRNCA, on private land, or on Fort Huachuca which are not considered substantial non-point sources.

Environmental Effects

Fecal coliform bacteria (which *E. coli* is a species of) are found in bovine fecal deposits as old as 30 days or older and are thus a source of contaminants in the watershed (Thelin and Gifford 1983 and Kress and Gifford 1984). During flood flows, the fecal bacteria can be transported into the soil and into downstream waterways (Doran and Linn 1979, Jawson et al. 1982, Muirhead et al. 2005, and Stocker et al. 2015). The analysis below will focus on

the contribution of grazing and not on agriculture or urban sources of *E. coli*. The alternatives are compared based on the number of acres of grazed land in the watershed proposed to be authorized by BLM on the SPRNCA Allotments. This approach assumes that each acre contributes the same amount of runoff and has the same or similar levels of fecal material (from similar stocking rates). Soils, vegetation community, topography, and downstream distance can have considerable effect on the amount of runoff that actually reaches tributary channels and/or the mainstem of the San Pedro River. Spatial variations in rainfall locations during a single storm event, or even over the course of a single year, can be considerable (Goodrich et al. 2008), which complicates the sourcing of contaminants during flood events. Gungle (2006) found that most ephemeral tributary flood flows originating closer to the mountains are lost to infiltration in the channel before reaching the San Pedro River. Areas closer to the river corridor have a higher probability of source material entering the stream as a result of the short distance required for runoff to travel. Although flow from potentially larger events will pass through the channels in this area and collect contaminants that potentially exist there. In addition to comparing the total grazed area, the grazed acres within ¼ mile of the stream under each alternative are shown below. The ¼ mile buffer represents the acreage of sources that are near the major stream course. This same buffer is used in the Total Mean Daily Load Assessment for the Lower San Pedro River (ADEQ 2013).

Table 23. SVS acre differences between alternatives for lands within the U.S. portions of the watershed.

	BLM Allotment Acres Authorized for Grazing in this EA	**Percent previous column represents of the total grazed lands in the watershed**	**Percent first column represents of total acres in the watershed**	**Percent of grazed lands within ¼ mile of the San Pedro River**
Alt. B - No Grazing with IVM alternative	0	0	0	0
Alt. D - No Grazing without IVM alternative	0	0	0	0
Alt. C - No Action alternative	15,929	4	2.4	23.0
Alt. A - Proposed Action and Alternative A.2	15,929	4	2.4	23.0
Alternative A.1	15,793	4	2.3	19.8
Water Quality Adaptive Management Implemented				
Alt. A - Proposed Action	15,797	4	2.3	19.9
Proposed Action with expanded RC Pasture	*15,584*	*3.9*	*2.3*	*16.6*
Alternative A.1	15,575	3.9	2.3	17.2
Alternative A.1 with expanded RC Pasture	*15,362*	*3.9*	*2.3*	*13.9*
Alternative A.2	14,038	3.5	2.1	5.2
Upland Adaptive Management Implemented				
Alt. A – Proposed Action, Alternative A.1	9,018	2.3	1.3	0
Alternative A.2	8,938.3	2.3	1.3	0

Table 24. Babocomari Allotment acres and percent of watershed per alternative.

	BLM Allotment Acres Authorized for Grazing in this EA	**Percent previous column represents of the total grazed lands in the watershed**	**Percent first column represents of total acres in the watershed**	**Percent of grazed lands within ¼ mile of the Babocomari River**
Alt. B - No Grazing with IVM Alternative	0	0	0	0
Alt. D - No Grazing without IVM Alternative	0	0	0	0
Alt. C - No Action alternative	1,905	2	0.9	18.9
Alt. A - Proposed Action, Alternative A.1, and Alternative A.2	1,905	2	0.9	18.9
Water Quality Adaptive Management Implemented				

	BLM Allotment Acres Authorized for Grazing in this EA	Percent previous column represents of the total grazed lands in the watershed	Percent first column represents of total acres in the watershed	Percent of grazed lands within ¼ mile of the Babocomari River
Alt. A - Proposed Action	1,773	1.8	0.9	15.6
Proposed Action with expanded RC Pasture	*1,596*	*1.6*	*0.8*	*12.1*
Alternative A.1	1,773	1.8	0.9	15.6
Alternative A.1 with expanded RC Pasture	*1,596*	*1.6*	*0.8*	*12.1*
Alternative A.2	64	0.1	0.0	0
Upland Adaptive Management Implemented				
Alt. A – Proposed Action and Alternative A.1	148	0.2	0.1	0
Alternative A.2	68	0.1	<0.1	0

Table 23 and 24 describe the percentage of the authorized grazing acres under the various alternatives compared to total grazing acres in the SVS and Babocomari Watershed respectively, total acres for all uses, and grazed acres within ¼ mile of the respective river. The total grazed acres in the SVS and Babocomari Watershed from BLM, USDA Forest Service, and Arizona State Trust Land grazing leases represent 59% of the SVS and 49% of the Babocomari Watershed. Note that grazed acres in Mexico are not included for the SVS, but likely contribute to water quality standard exceedances during flood flow events; as a result, the analysis for the SVS likely overestimates the relative contribution that grazing on BLM, USDA Forest Service, and state land has on *E. coli* levels.

Alternative B (No Grazing with IVM)

Alternative B (No Grazing alternative) would reduce the grazed BLM acres in the four SPRNCA Allotments to zero in the SVS and the Babocomari Watershed and reduce the total number of grazed acres in the watershed and in the near-stream area. This would reduce the overall number of acres from which livestock grazing would contribute to *E. coli* levels in flood flows (by 4% in the SVS, 2% in the Babocomari Watershed, 23% in the San Pedro River near-stream area, and 19% in the Babocomari River near-stream area). Implementation of IVM treatments would result in short-term potential increases in runoff and sediment yields, in the case of prescribed fire (see AIB-6 Soils, Section 3.3.6) that could temporarily increase the transport of *E. coli.* Since this alternative would eliminate grazing, the contribution of source material to the treated acres would not exit and the impacts to *E. coli* levels would not change as a result of the IVM treatments.

Alternative D (No Grazing without IVM)

Similar to Alternative B, Alternative D would reduce the grazed BLM acres in the four SPRNCA Allotments to zero and reduce the total number of grazed acres in both watersheds and the near-stream areas. This would reduce the overall number of acres from which livestock grazing would contribute to *E. coli* levels in flood flows (by 4% in the SVS, 2% in the Babocomari Watershed, 23% in the San Pedro River near-stream area, and 19% in the Babocomari River near-stream area).

Alternative C (No Action)

Under Alternative C (No Action alternative), the BLM acres that are proposed to be authorized for livestock grazing on the four SPRNCA Allotments represent 4% of the grazed acreage and 2.4% of the total acreage in the SVS, and 2% of the grazed acreage and 0.9% of the total acreage in the Babocomari Watershed. For the San Pedro and Babocomari Rivers near-stream areas (¼ mile), the No Action alternative represents the largest area of potential contribution to contamination at 23% for the San Pedro River and 18.9% for the Babocomari River of the area grazed with no changes due to adaptive management.

Alternative A (Proposed Action), Alternative A.1, and Alternative A.2

The action alternatives would have impacts similar to the No Action alternative with respect to the relative contribution these acreages represent to the levels of *E. coli* in flood flows. If implemented, the water quality adaptive management actions associated with *E. coli* levels taken during baseflows would reduce the amount of grazed acres in the Babocomari Allotment. Since the proposed fencing for this varies by alternative, the acreage available to livestock also changes.

The upland adaptive management associated with perennial grass foliar cover and bare ground could temporarily suspend all AUMs on the BLM acres within the SPRNCA. However, these AUMs could be restored at some point in the future if adaptive management objectives are achieved. The rows in Table 23 and below the “Upland Adaptive

Management Implemented" header indicate the potential maximum amount of change in grazed acres that could occur if the upland adaptive management is fully implemented. If full AUM reductions are made, then the proportion of grazed acres the SPRNCA Allotments would represent in the SVS would be reduced from 4% to 2.3% under the Proposed Action, Alternative A.1, and Alternative A.2. In the Babocomari Watershed, if upland adaptive management were fully implemented, the grazed acreage of the Babocomari Allotment would be reduced from 2% to 1.6-1.8% of the watershed area under the Proposed Action and Alternative A.1. Alternative A.2 would change the authorized grazed acreage from 2% to 0.1% of the watershed.

Without implementation of any of the adaptive management triggers, grazing in the near-stream area would be the same under the Proposed Action and Alternative A.2 as it is under the No Action alternative in terms of acres grazed. Alternative A.1 would have a slightly reduced near-stream area grazed compared to the No Action alternative because of the differences in fencing. If the water quality adaptive management is fully implemented such that there is a 100% reduction in AUMs, the percentage of the near-stream lands subject to grazing would be reduced to between 19.9% and 13.9% for the San Pedro River and 15.6% and 12.1% for the Babocomari River under the Proposed Action and Alternative A.1, and to 5% for the San Pedro River and 0% for the Babocomari River under Alternative A.2. If the upland adaptive management is fully implemented such that all AUMs within the SPRNCA would be temporarily suspended, no BLM-authorized grazing would occur within a ¼ mile of the stream.

The Proposed Action, Alternative A. 1, and Alternative A. 2 include implementation of IVM treatments. Successful implementation of these treatments, principally prescribed fire, could result in short-term increases in runoff and sediment yields (see AIB-6 Soils, Section 3.3.6) at hill slope scale in the SVS and Babocomari Watershed. This has the potential to increase the amount of sediment transported to the stream and as a result the amount of *E. Coli* transported. The deferment of grazing of two years post-IVM treatment would limit the potential addition of source material for *E. coli* during this period of higher runoff.

Baseflow Analysis

The baseflow analysis area is the acres of land within the boundary of the Babocomari Allotment. This spatial scale was chosen because analysis for *E. coli* is limited to where there is a direct impact to baseflow *E. coli* levels from the Proposed Action (as discussed above). Only in the Babocomari Allotment is there the proposed authorizing of grazing along a stream corridor where this direct impact would occur. The temporal scale is 10 years as that is the period of the lease renewal.

Analysis Assumptions

- The monitoring dataset is a representative sample of *E. coli* levels in the stream during base and flood flows.
- Fencing out cattle would improve the water quality (as reported in Line 2003, Sunohara et al. 2012, and Bragina et al. 2017).
- If cattle have access to the riparian area, then they would be located in or near the stream and lead to potential exceedances in water quality standards.

Affected Environment

The Babocomari River is approximately 27 miles long, of which roughly 4.6 miles are in the Babocomari Allotment. Of those, 2 miles are on BLM-managed public lands. This reach on public lands is mostly intermittent with smaller segments of perennial flow (TNC 2021, USGS 2020, see Figure 3-3 below). The lowest amount of stream flow and shortest length of water reaches occur in the hottest part of the summer (typically June) before the onset of seasonal monsoon rain. Surveys of the extent of surface water (wet-dry) in the Babocomari Allotment during the June dry season indicate that only 0.24 miles of the channel stays wet year-round (TNC 2021). Baseflows in the river are supported by groundwater inflow from the regional aquifer and from storage of overbank flows (Pool and Coes 1999). Discharge measurements taken at the confluence of the Babocomari and the San Pedro River indicate surface flow into the San Pedro River during the winter months (BLM unpublished data).

While the majority of baseflow samples are below the water quality standard, there was one baseflow exceedance of *E. coli* in May 2020, and this exceedance can largely be attributed to contamination from livestock fecal material along the riparian area inside the Babocomari Allotment (ADEQ 2020, Huth 2020b).

According to a rainfall gage (#405, Goodrich et al. 2008) located on the Babocomari Allotment, only four of the last 10 years were within one inch of or greater than the previous 30-year normal for annual rainfall totals (see also Section 2.2.2 of the Babocomari LHE [BLM 2022a]). Using the National Drought Monitor for the years 2001 to 2021,

half or more of the Upper San Pedro watershed (HUC-8) has been in some form of drought status 79% of that time (NDMC 2022, Figure 3-1).

As a result of climate change, average air temperatures are expected to rise throughout the southwest, increasing evapotranspiration rates and decreasing snowpack, leading to a more arid climate (Gonzalez et al. 2018). Research suggests that the current 20-year drought is the result of natural variations in precipitation that are exacerbated by increased temperatures from climate change and is expected to continue into 2022 and possibly later (Mankin et al. 2021). The length and duration of drought events is expected to increase as a result of these temperature trends (Mankin et al. 2021, Easterling et al. 2017).

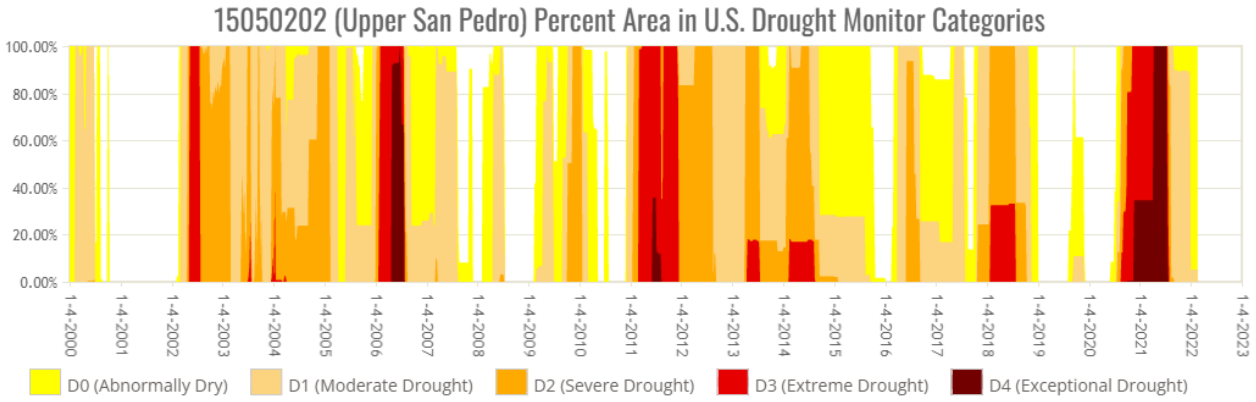

Figure 3-1. US Drought Monitor for Upper San Pedro (HUC-8) 2001 to 2021.

The January 3-day low flow is a simple analysis to indicate flow during a time of year when evapotranspiration is not active, as used in Gungle et al. (2016). It is assumed to represent baseflow. The plot below of January 3-day low flows is similar to Figure 29.C in Gungle et al. (2016) except for the inclusion of more recent years 2013-2021. As found in Gungle et al. (2016), there's a decreasing trend in the January 3-day low flows. A Mandall-Ken statistical analysis indicates a statistically significant ($p < 0.05$) decreasing trend for the 2001 to 2021 period (calculated using the USGS GW Toolbox, see Barlow et al. 2014). Using the Sen median slope and intercept from this trend analysis as a simple linear model, the January 3-day low flow in 2032 (end of the 10-year lease) is predicted to be 0.19 cfs, which is half of the January 3-day low flow in 2021. This assumes that the current trends continue and there are no significant rainfall or runoff events, changes in recharge, or other changes in the water balance.

Groundwater modeling predicts a continued decrease (from 2003) in winter baseflows through 2025 from groundwater withdrawal in the basin (Lacher 2017). Modeling of the effects of climate change on the San Pedro Basin hydrologic cycle has shown that increasing temperature and changes in precipitation patterns will cause reductions in recharge and, as a result, baseflows (Serrat-Capdevilla et al. 2007).

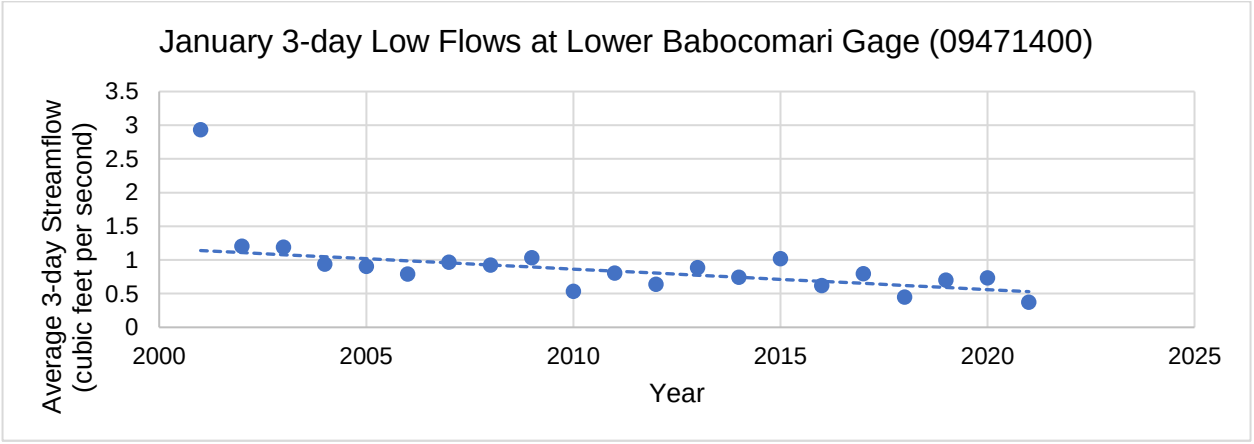

Figure 3-2. January 3-day low flows at the Lower Babocomari Gage.

An annual wet-dry survey is conducted each year in the third week of June, which is assumed to represent the lowest extent of surface water. The results of the survey from 2007 to 2020 show a downward trend in surface

water, although not statistically significant (p > 0.05) (TNC 2021). Results of the survey are shown in the figure below (Figure 3-3). A small section of river (0.1 miles) weaves in and out of the SPRNCA boundary above the shown survey site. Wet-dry data indicates that it is perennial and consistently wet across its entire length in June (TNC 2021). Below this portion of the river, the main segment of the Babocomari River channel in the SPRNCA was dry (according to the wet-dry protocol which does not include pools less than 30 feet in length) in the years 2017 and 2018. As the river continues to dry, it is expected that more years will show a completely dry channel in June and when wet, the sections of water will be split into continually smaller sections due to topographic and geologic variations along the stream (Williams et al. 2019).

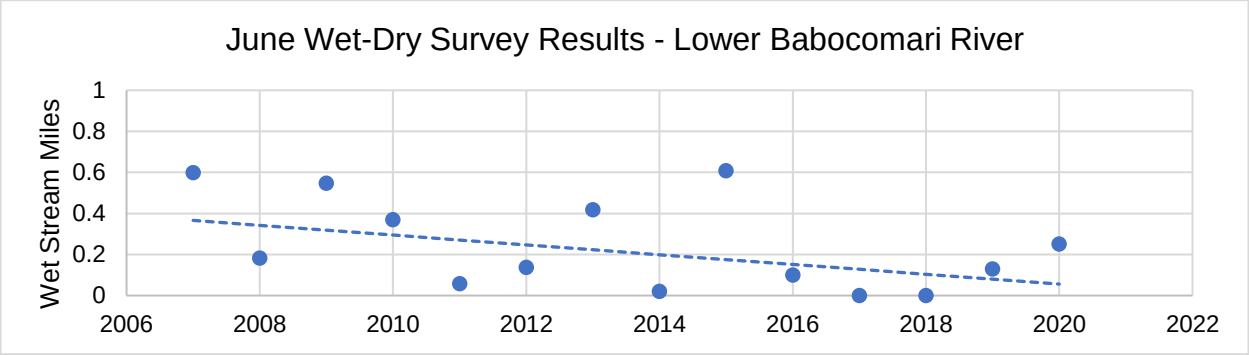

Figure 3-3. Wet-Dry survey results on the Lower Babocomari River.

Decreasing flows will lead to reductions in loading capabilities of the stream – meaning that the amount of fecal matter that can enter the stream before the water quality standard is reached and exceeded is reduced. Roche et al. (2013), in a survey of 155 streams on USDA Forest Service land, found lower stream flows corresponded to stagnant water and had higher occurrences of *E. coli*. It is reasonable to assume then that as baseflows are reduced into the future more exceedances will occur year-round.

Environmental Effects

The indicator used in this analysis to describe the differences in impacts to water quality along the Babocomari River is days of potential water quality standard exceedance. In the warm season, it is assumed that cows would congregate near the stream to drink, eat forage, and to seek shade and cooler temperatures associated with higher moisture near the stream. The general lower streamflow (outside of flooding) provides less dilution and likely higher *E. coli* levels (Roche et al. 2013 and EPA 2010). Note that the current suite of samples has not indicated an exceedance during the months from November to March. The sampling during this period has primarily occurred in February and March and two of those samples were more than half of the current *E. coli* single sample maximum. Considering the above decreasing trends for stream flow and increasing trend for temperatures, it is uncertain how cattle interaction with the stream will impact *E. coli* levels in the stream outside the warm season. Therefore, to better understand the differences between alternatives, this analysis makes the most conservative assumption that if livestock are allowed access to the stream, then there is a high likelihood exceedances in the water quality standard for *E. coli* would occur.

The impact to flood flows from the alternatives is previously analyzed in this section above. However, since the indicator used to assess impacts is number of days per year of potential water quality standard exceedance, the number of annual flood flow days (e.g. days with stream flow above baseflow levels) are added to Table 25 below and considered background condition (since all flood flow samples monitored in the Babocomari River were exceeding the water quality standard). The number of flood flow days is based on the 20% estimate from ADEQ (2013). This estimate is reasonable as it is similar to the percentage of each year that the flow is above the average January 3-day low flow (0.9 cfs) in the flow duration curve for the Lower Babocomari streamgage over its entire period of record.

Table 25. Indicator days per year of potential exceedance per alternative.

	Alt. A - Proposed Action, Alternative A.1, and Alternative A.2	Alt. B - No Grazing with IVM Alternative	Alt. D - No Grazing without IVM Alternative	Alt. C - No Action alternative	Water Quality Adaptive Management Fully Implemented	
					Alt. A - Proposed Action and Alternative A.1	Alternative A.2
Flood flow days[1]	73	73	73	73	73	73
Near-stream Grazing Days[2]	75-117	0	0	292	10	0
Potential Days Exceeding Water Quality Standard for *E. coli*	148-190	73	73	365	83	73
[1] Estimated number of flood days – estimated at 20% of the year (ADEQ 2013)						
[2] The number of days cattle are allowed near the stream and thus where baseflow exceedances may occur. For the No Action alternative this is 365 less the number of flood flow days.						

Alternative A (Proposed Action), Alternative A.1, and Alternative A.2

The Proposed Action is expected to have 73 background days of water quality exceedance, plus potential days in which the adaptive management monitoring is occurring before the cattle are removed from the River Canyon Pasture if an exceedance is found. This is estimated as the total of the days after the last clean sample (30 days) plus the difference between the first and second sample, which is one month. It also includes administrative time to notify the operator and remove cattle (which is approximately 2-14 days), for a total of 64-76 days. The amount of time from removing cattle until the stream *E. coli* level is reduced below the threshold is unknown but estimated here to be between 1 and 31 days. Although most studies report reductions in *E. coli* levels within a few hours to days when the source is removed, cooler temperatures during this cool season use may allow for the continued persistence of *E. coli* in the stream (Wang and Doyle 1998); thus, the additional 31-day range is a conservative estimate. For the Proposed Action and Alternative A.1, cattle would not be allowed in the River Canyon Pasture after 3/31, and for these alternatives it is assumed that there would be no exceedances caused by livestock within the allotment between 3/31 and 11/1 (the first day they are allowed back in). There would remain, however, a potential for exceedance of *E. coli* standards during the 10 days the livestock would be allowed to cross the river. The total days of potential exceedance then is between 75 and 117.

Water quality adaptive management would require the BLM to monitor and reduce stocking rates in the River Canyon Pasture if exceedances are found. Implementation of the water quality adaptive management such that all AUMs are removed from the River Canyon Pasture is expected to eliminate the potential for baseflow exceedances by eliminating the direct contribution of fecal matter and the resuspension of *E. coli* laden sediment (Line, 2003; Sunhara et al., 2012; Bragina et al. 2017). There would remain, however, a potential for exceedance of *E. coli* standards during the 10 days the livestock would be allowed to cross the river, which could occur at any time of the year.

Alternative A.2 is expected to be similar to the Proposed Action and Alternative A.1. The difference between the alternatives is that the River Canyon Pasture fence would not be constructed and AUMs would be removed from the River Pasture altogether if water quality thresholds are exceeded multiple times (see water quality adaptive management under Section 2.2.5.1). At that point, the impacts are expected to be the same as the No Grazing alternative.

Alternative B & D (No Grazing Alternatives)

Under the No Grazing alternatives, it is expected that the only water quality exceedances along the BLM portions of the Babocomari River would occur during flood flow events, from sources other than authorized livestock in this allotment.

Alternative C (No Action)

This alternative would continue the current year-round grazing in the River Pasture. During the warm season, with reduced streamflow and increased temperatures, one can expect higher occurrences of water quality standard

exceedances with livestock grazing near the stream, as ADEQ found in May of 2020 (ADEQ 2020). Considering the projection of reduced streamflow identified above, these conditions could occur year-round in the future. Thus, the analysis shows that the remaining days of the year outside of flood flow days (292) have the potential for water quality standard exceedances directly resulting from the authorized action. Also, no change in grazing management could be enforced by BLM under the terms of the lease in this alternative, if exceedances did occur.

3.4.1.2 What is the potential of herbicide applications to enter streams or impact groundwater quality?

Alternative A (Proposed Action) and Alternative B (No Grazing with IVM) include the use of herbicide (tebuthiuron) to treat ecological sites that have exceeded their shrub cover objectives. Herbicide fate and transport in the environment is a function of the local site characteristics and individual chemical properties. Key landscape characteristics include slope, soil texture, organic matter content, depth to groundwater, and precipitation. Combined together this information can be used to identify areas of potential risk for herbicide transport via runoff or leaching. The analysis below combines the results of the Groundwater Loading Effects of Agricultural Management Systems (GLEAMS) modeling scenarios from the 2007 PEIS for BLM herbicide use (BLM 2007) with local site characteristics to describe potential impacts to water quality from the proposed herbicide treatments.

Tebuthiuron is non-volatile, so reduction in concentration of tebuthiuron from a treatment location occurs through the processes of microbial degradation, plant uptake, transportation in runoff, or leaching into soil/groundwater. Tebuthiuron has a high solubility in water and low soil adsorptivity (ENSR 2005). These characteristics indicate that tebuthiuron readily moves into the soil when wetted and has a low risk for run-off but a high risk for groundwater contamination (BLM 2007, Table 4-9). In arid climates research has found it can have a half-life of approximately 18 months and is predicted to be above detectable levels in the soil for 3 to 7 years (Emmerich et al. 1984).

Affected Environment

The affected environment is the Upper San Pedro and Babocomari Watersheds on which the treatments are being applied and the downstream surface waters and underlying aquifer. The Babocomari and San Pedro River Watersheds are described in the affected environment for Issue 1: Water Quality “How would livestock grazing affect *E. coli* levels in the Babocomari and San Pedro Rivers” (Section 3.4.1.1), including the near-stream area. The groundwater in these basin and fill watersheds are generally composed of unconsolidated material with areas of fine textured restrictive layers and bedrock outcroppings (Pool and Coes 1999). Recharge occurs at the mountain fronts and along ephemeral channels (Coes and Pool 2005). Very little recharge occurs from direct infiltration through the soil surface in the areas between drainages (Coes and Pool 2005 and Anderson et al. 1992).

Data was downloaded from the Water Quality Portal for pesticide sampling in groundwater and surface waters (including the USGS gage on the San Pedro @ Charleston) of Cochise County. There were 108 samples from 75 locations, taken between 1993 and 2015. No samples reported detectable levels of tebuthiuron or its transformation products (when sampled) (NWQMC 2022).

Previous treatments on private and state lands on the allotments involving tebuthiuron have been conducted on approximately 8,000 acres in the Upper San Pedro Watershed, which includes 2,000 acres in the Babocomari Watershed (BLM 2019b).

Environmental Effects

The 2007 PEIS for BLM herbicide use (BLM 2007, 4-26) analyzed the risk of herbicide transport from surface runoff and leaching from tebuthiuron treatments, using typical and maximum application rates, with respect to different resources, including human consumption, wildlife and fish, and terrestrial and aquatic plants. This was done by simulating a variety of potential sites through varying characteristics, such as precipitation amounts, soil type, slope, and treatment acreage using the GLEAMS model (Leonard et al. 1987). The model simulates edge-of-field and bottom-of-root-zone loadings of water, sediment, pesticides, and plant nutrients from climate-soil-management interactions. The results of which indicate that transportation of tebuthiuron poses a risk to aquatic plants in ponds under most scenarios when tebuthiuron is applied at the maximum application rate (4 lb a.i./acre), and under select scenarios (e.g., most sand soils) when applied at the typical application rate (0.5 lb a.i./acre). Aquatic plants in streams are at risk under a few surface runoff scenarios involving the maximum application rate, such as sandy soils with precipitation of 50 inches/year and greater. The modeled acreage is approximately 10 acres and sensitivity analysis on the GLEAMs modeling indicates that larger treatment areas (1000 acres or more) increase this risk. Most risk from registered use of tebuthiuron can be avoided by applying at the typical application rate of 0.5

lb a.i./acre, which is the maximum application rate proposed in this EA, using buffers of more than 100 feet, and avoiding application near special status species (BLM 2007).

Alternative A (Proposed Action), Alternative A.1, Alternative A.2, and Alternative B (No Grazing with IVM)

The Proposed Action, Alternative A.1, Alternative A.2, and Alternative B (No Grazing with IVM alternative) all propose to use herbicide to treat vegetation on 10,062 acres in the four SPRNCA Allotments.

To characterize the site-specific potential for herbicide runoff and leaching, the USDA Web Soil Survey Suitabilities and Limitations ratings are provided below (Table 26). These ratings only consider how the soils may or may not be a limitation in the use of management techniques, such as herbicide. The rating interpretations should be considered an over estimation of the runoff limitation because the ratings assume a complete lack of vegetation and sufficient available water to saturate the soil. The treatment locations have vegetative cover (see Vegetation Section 3.4.2) that reduces intercepts and reduces run-off. The arid condition of these sites indicate that they do not typically have fully saturated soil conditions, except after major rainfall events, so the initial infiltration rates at the sites are higher than can be expected at saturation (Polyakov et al. 2010). Nevertheless, these ratings offer a comparison across the proposed treatment sites and indicate where considerations need to be made during treatment unit development.

The table below (Table 26 USDA Soil Limitation Ratings for Areas of Proposed Herbicide Treatment.) indicates the proposed herbicide treatment acres that are in each USDA Pesticide Runoff and Pesticide Leaching Potential rating. The ratings indicate how limiting the soils are for the proposed activity. “Not limited” means that the soil characteristics of the site are not a limiting factor in implementing the treatment technique. In sites that are labeled “very limited” the opposite is true, and care should be taken as the soil characteristics can limit implementation because of a higher potential for either runoff or leaching.

Table 26 USDA Soil Limitation Ratings for Areas of Proposed Herbicide Treatment.

USDA Soil Limitation Rating	Pesticide Leaching Potential (Acres)	Pesticide Runoff Potential (Acres)
Not limited	6,954.8	952.7
Somewhat limited	0.0	3,569.5
Very limited	3,107.6	5,540.1
Total		**10,062.4**

The data in Table 26 USDA Soil Limitation Ratings for Areas of Proposed Herbicide Treatment. indicate 31% of the treatment acres are “very limited” by their potential for leaching as a result of the sites coarser soils. Considering the GLEAMs modeling in the 2007 PEIS, the rainfall scenarios that are most similar to these site locations (10 inches of precipitation) in the analysis area indicate a risk to aquatic plants from use on sandy soils. The majority of the soils identified as “very limited’ in the treatment areas are on Limy Uplands (12-16 inch precipitation zone) ecological site in the Three Brothers Allotment. The ecological site description for Limy Uplands 12-16 inches indicates that the soils have coarse textured surface but also may have lime cemented layers at shallow depths which limit infiltration. Wells located near this treatment area have a reported depth to water ranging from 33 to 256 feet (USGS 2022, ADWR 2022) below the land surface. The herbicide label and 2007 PEIS identify sandy soils and shallow depths to water as a risk factor for use of tebuthiuron. In general, lack of basin area recharge indicates that even though the surface soil features are indicative of leaching problems, in areas where depth to water is greater than 100 feet there is a low likelihood that leaching of tebuthiuron though the soil surface would reach ground water (BLM 2007, 4-26). Field work during treatment unit development (see Section 2.2.4) would refine the areas proposed for herbicide application such that none of the treatments would occur on sandy soils with shallow groundwater (defined as less than 100 feet depth). The 100-foot buffer around ephemeral washes reduces the likelihood that tebuthiuron would reach the coarser soils. These buffers would be evaluated, as part of the pre-treatment planning process, for vegetation cover and water flow patterns in the soil to determine whether or not the buffer is likely to be effective. Based on this evaluation, if it is determined that the buffer is likely to not be effective, the buffer would be modified (increased in width) or the treatment area would be adjusted, to reduce the potential for impacts.

Table 26 USDA Soil Limitation Ratings for Areas of Proposed Herbicide Treatment. also indicates that roughly 55% of the treatment acres are “very limited” with respect to relatively higher amounts of runoff and another roughly 35% was rated “somewhat limited”. As noted above, the high water solubility and low soil adsorptivity characteristic of tebuthiuron suggest that it readily moves into the soil and has a low risk of transport in runoff. A study in the Lucky Hills Allotment in gravelly sand loam soils measured less than 1% of the amount of applied tebuthiuron (pelleted) left the study site in runoff, using a simulated rainfall rate of between 2.2-2.3 inches/hour (Arias-Rojo 1986). The same study reported tebuthiuron levels at depths of 12 – 16 inches below the ground after rainfall, indicating that it readily moves into the soil profile at that site. The 30-minute rainfall intensity found to most likely induce runoff in the WGEW is approximately 1 inch/hour (Goodrich et al. 2008 citing Simanton and Osburn 1983). Rainfall of this intensity rarely occurs in the winter (Goodrich et al. 2008). The rainfall rates in this study are more similar to the region’s summer storms than the low-intensity winter rainfall. Morton et al. (1989) suggest application outside of summer and fall season rains and after freeze-thaw action has loosened soils such that run off amounts of tebuthiuron are reduced. The Proposed Action restricts tebuthiuron application to the fall through early spring (10/1 – 3/31) which should limit the potential risk of high amounts of tebuthiuron in runoff from these sites. The gentler fall/winter rains help move the pelleted tebuthiuron into the soil before higher intensity rainfall occurs in the late summer months. Also, in the WGEW, Emmerich et al. (1984) found 0.47% of the applied amount of tebuthiuron was transported in runoff from natural storm patterns. The authors attribute the low amount of runoff to February application.

The Proposed Action is to treat up to 10,062.4 acres, potentially in a single year. This acreage is 1% of the SVS watershed and less than 1% of Babocomari river watershed acreage. In addition, the pre-treatment planning process that outlines the individual treatment areas allows for reduction in size or the use of strips to reduce the percentage of treated acres in smaller sub-watersheds, particularly those with substantial amounts of soils identified as “very limited” or “somewhat limited” for runoff potential.

Another way to analyze the risk of herbicide being transported overland to the streams is by distance to the stream. This simple method is also used in the flood flow analysis above (Section 3.4.1.1). It relies on the premise that rainfall closer to the stream is more likely to reach the stream during that event because of its proximity and the lower amount of interception of overland flow or channel transmission losses. Considering this, only 28.4 acres (< 1%) of the proposed herbicide treatment are within 1/4 mile of the San Pedro River. Similarly, 146.5 acres (1.5%) are within the same distance of the Babocomari River. The Proposed Action has built in design features such as buffers to limit the movement of herbicide to water bodies. The 984.3 foot (300 meter) buffers around the Babocomari and San Pedro Rivers reduce the likelihood that high concentrations of tebuthiuron would reach them.

The 2007 PEIS indicates that the highest risk to of contamination from pesticide applications is accidental spills (BLM 2007, 4-27 and 4-251). The BMPs outlined in the 2007 PEIS would be implemented to reduce this risk to water quality and water related resources. These include conducting mixing and loading operations in areas where an accidental spill would not contaminate an aquatic body, and not rinsing spray tanks in or near water bodies. Also, the pelleted version of tebuthiuron can be more easily cleaned up than liquid forms of herbicide.

Alternative D (No Grazing without IVM) and Alternative C (No Action)

Under Alternative D (No Grazing without IVM Alternative) and Alternative C (No Action Alternative) no herbicide treatments are proposed so there would be no potential for impacts from herbicide treatments to water quality or other water dependent resources (e.g. aquatic vegetation) from transport due to runoff or leaching.

3.4.2 Issue 2: Vegetation

How would livestock grazing, range improvements, and IVM treatments on the SPRNCA Allotments affect vegetation?

The analysis area for this issue is the acres of land within the boundaries of the SPRNCA Allotments. This spatial scale was chosen because grazing operations and other actions that affect vegetation are managed and occur within the allotments. The temporal scale is 10 years as that is the period of the lease renewal.

3.4.2.1 Analysis Assumptions

- Perennial vegetation consumed by livestock grows back annually if utilization is less than 40% (Holechek 1988) and there is adequate rainfall for plant growth.

- Cattle concentrate around water developments and salt licks. There would be 2 acres of disturbance around each livestock water from livestock grazing based on observations of existing livestock concentration impacts.
- Cattle concentrate around riparian areas. A 166-foot buffer from the centerline of the Babocomari River was used to estimate cattle concentration acreage based on observations of aerial imagery of where riparian vegetation is located.
- There is no cattle concentration area around the portion of the San Pedro River in the Brunckow Hill Allotment because the cattle do not graze the San Pedro River under any of the alternatives.
- Up to 25 feet of above ground vegetation would be cleared on either side of the proposed fence for fence construction.
- BMPs for IVM treatments would be successful in mitigating and minimizing potential impacts to non-target vegetation.

3.4.2.2 Affected Environment

Acres of each vegetation community and developed land in the SPRNCA Allotments are listed in Table 27 and Table 28 and depicted in Appendix A: Figure A-23. Detailed descriptions of how past, current, and reasonably foreseeable future actions and trends have affected existing vegetation community types is provided below.

Table 27. Vegetation types and impacts within the SPRNCA Allotments.

Acres of Vegetation Communities on SPRNCA and SPRNCA Grazing Allotments, all jurisdictions					
	In SPRNCA				
Vegetation Community	**Babocomari**	**Brunckow Hill**	**Lucky Hills**	**Three Brothers**	**Total Inside SPRNCA**
Agriculture	0	0	0	0	0
Chihuahuan Desertscrub	1,782	1,021	1,599	1,485	5,888
Cienega	0	0	0	0	0
Cottonwood/Willow[1]	19	13	13	11	56
Desert Washes (Xeric Riparian)	0	24	0	182	206
Developed	7	1	0	0	8
Mesquite Bosque	41	28	28	78	174
Other	16	3	0	0	19
Sacaton Grassland	0	4	0	0	4
Semidesert Grassland	56	7	99	523	686
Water	0	1	0	0	1
Wetlands	0	0	0	0	0
Total	**1,921**	**1,104**	**1,739**	**2,279**	**7,043**

Table 28. Vegetation types and impacts within SPRNCA Allotments outside the SPRNCA.

Outside SPRNCA						
Vegetation Community	**Babocomari**	**Brunckow Hill**	**Lucky Hills**	**Three Brothers**	**Total Outside of SPRNCA**	**Allotment Total**
Agriculture	17		44	28	88	88
Chihuahuan Desertscrub	9,059	718	21,530	5,335	36,642	42,530
Cienega	0	0	0	0	0	0
Cottonwood/Willow[1]	75	5	88	56	224	281
Desert Washes (Xeric Riparian)	6	0	15	20	41	247
Developed	159	1	806	66	1,032	1,040
Mesquite Bosque	0	0	0	0	0	19
Other	22	0	279	109	410	428
Sacaton Grassland	0	0	0	0	0	4
Semidesert Grassland	1,919	365	2,893	862	6,039	6,725
Water	0	0	0	0	0	1
Wetlands	0	0	0	0	0	0
Total	**11,256**	**1,089**	**25,656**	**6,475**	**44,475**	**51,519**

[1] The cottonwood/willow vegetation community was identified from remote sensing data and is only found in the Babocomari and Brunckow Hill Allotments. The acreage listed here for the Three Brothers and Lucky Hills Allotments indicates either stray cottonwoods and willows along ephemeral washes, misclassified mesquites or other larger vegetation types.

Upland Vegetation: Chihuahuan desertscrub and Semidesert Grassland

The two dominant upland vegetation communities within the SPRNCA Allotments are Chihuahuan desertscrub and semidesert grassland, which represent over 95% of the SPRNCA Allotments' total acreage (Table 28). Chihuahuan desertscrub covers 42,530 acres, over 82%, of the SPRNCA Allotments (Table 28). Dominant shrub species found in the Chihuahuan desertscrub are creosote bush, whitethorn acacia, and, to a lesser extent, tarbush and mariola.

Common perennial grass species are bush muhly grass and threeawn grasses. Other important plant species are ocotillo, soap tree yucca, and agaves, as they provide nectar for migrating birds and certain bat species (see Section 3.4.4). The Limy Upland ecological site commonly supports Chihuahuan desertscrub.

About 6,725 acres of semidesert grassland is found in patches throughout the SPRNCA Allotments (Table 28 and Appendix A: Figure A-23). Common perennial grass species in this community are several species of grama grasses, curly mesquite grass, tobosa grass, and vine mesquite grass. Common ecological sites that support semidesert grassland are Shallow Upland, Shallow Hills, and Clay Loam Upland. Both upland vegetation communities – Chihuahuan desertscrub and semidesert grassland – respond similarly to disturbance. In addition, Lehmann lovegrass, an introduced invasive perennial grass, occurs in both upland plant communities.

Current Conditions

The current condition of upland vegetation throughout the SPRNCA Allotments is a result of past and present actions and trends. Past ground disturbing activities involving complete removal of upland vegetation, such as housing and road development, railroad infrastructure, past mining activities, and range improvements, have resulted in 1,040 acres of removal of vegetation within the SPRNCA Allotments, represented as “developed” in Table 27 and Table 28. This is approximately 2% of the SPRNCA Allotments; however, the actual percentage is likely slightly higher due to the limitations of the LANDFIRE satellite imagery in picking up smaller features, such as dirt roads, range improvements like corrals and stock tanks, and areas cleared during mining activities. Complete removal of vegetation increases surface run off, soil erosion, and soil compaction and areas often do not recover to pre-disturbance levels without intensive restoration efforts. Upland vegetation communities adjacent to areas cleared of vegetation are impacted from fragmentation of plant communities and increased run off and soil erosion that hinders plant growth, development, and reproduction.

Other past and current actions and trends including historic grazing practices, recent grazing, herbicide treatments, wildland fire suppression, and climate trends have affected upland vegetation communities on the SPRNCA Allotments. Monitoring and assessment data from upland sites in the SPRNCA Allotments were analyzed in the Babocomari, Brunckow Hill, and East SPRNCA Complex Allotments LHEs (BLM 2022a, BLM 2022b, and BLM 2022c). In general, upland vegetation communities on the SPRNCA Allotments are in a shrub-dominated state. In many ecological sites that support semidesert grassland, perennial grasses are sub-dominant to shrubs; and in limy ecological sites that support Chihuahuan desertscrub, perennial grasses are sparse, and shrubs have become dominant (BLM 2022a, BLM 2022b, and BLM 2022c). Increased shrub cover has been a longstanding occurrence on the SPRNCA Allotments with high shrub cover levels documented at the Walnut Gulch Experimental Watershed (near Tombstone and within the San Pedro Watershed) as early as 1967, with little change in cover from 1967 to 2005 (King et al. 2008). Woody plant encroachment limits perennial grass growth and contributes to reduced infiltration and increased soil erosion (Abrahams et al. 1994 and Archer 2011). Historic grazing practices, fire suppression, and climate trends are thought to be the main contributing factors to shrub encroachment in the SPRNCA Allotments (Bahre 1991 and Turner 2003).

Historical grazing practices (prior to BLM acquisition of the SPRNCA) have varied in intensity, type of livestock, season of grazing, and overall distribution of livestock. Widespread livestock grazing began in the San Pedro Valley in the late 1600s with the arrival of Spanish settlers, bringing sheep, horses, and cattle (Bahre 1991 and Turner 2003). Larger scale cattle ranching occurred in the early 1800s, and even larger cattle operations began when Americans began to settle the area, especially in the late 1800s after the railroad was built (Turner 2003). Old photos and accounts indicate grazing practices from roughly 1880 to 1940 involved poorly managed continuous heavy grazing of perennial grasses (Turner 2003). The unmanaged grazing during this time is considered a significant contributing factor to the reduced perennial grass component and heightened shrub component in upland plant communities throughout the San Pedro Valley (Bahre 1991 and Turner 2003). With the passage of the Taylor Grazing Act of 1934, grazing became regulated, and ranchers began stocking cattle much more conservatively. Perennial grasses have been recovering since that time; however, the woody plant encroachment throughout the upland plant communities remains.

Current impacts from cattle grazing include consumption of the leaves of perennial grass and other forage plants. In addition, cattle trample vegetation and soil, reducing the vegetative cover in areas where cattle concentrate. In general, cattle on the SPRNCA Allotments tend to concentrate around water developments and salt licks, increasing the impact to vegetation in these concentration areas. Currently, livestock concentration areas encompass about 194 acres of Chihuahuan desertscrub and 40 acres of semidesert grassland on the SPRNCA Allotments (Table 30, No Action alternative). It is reasonable to assume that cattle grazing would continue on state and private land within the SPRNCA Allotments regardless of alternative. Unauthorized livestock grazing occurs on the SPRNCA and has

the potential to impact vegetation by consuming the leaves of perennial grass and other forage plants as well as trampling vegetation and soil and reducing the vegetative cover in areas where cattle concentrate. Because unauthorized livestock grazing from permitted livestock on the four SPRNCA Allotments has not been documented, it is not considered in the analysis of impacts to vegetation resources within the analysis area for vegetation, which is limited to the SPRNCA Allotments themselves.

Areas of upland vegetation on non-BLM land within the SPRNCA Allotments have been treated with tebuthiuron herbicide to control shrubs and promote perennial grass growth. Past vegetation treatments in the SPRNCA Allotments occurred on private and state land in Chihuahuan desertscrub, including ~500 acres on the Brunckow Hill Allotment, ~2,000 acres on the Babocomari Allotment, ~500 acres on the Three Brothers Allotment, and ~5,000 acres on the Lucky Hills Allotment (BLM 2019b). Data from those treatments and others in neighboring allotments are described in the Environmental Effects section in Table 34. Tebuthiuron treatments have been shown to reduce woody shrub growth in Chihuahuan desert communities (Herbel 1985 and Morton et al. 1990) and promote perennial grass growth if favorable precipitation follows treatment (Morton and Melgoza 1991).. It is reasonable to assume that vegetation treatments would continue on private and state lands in the SPRNCA Allotments.

There has been very little wildland fire activity on the SPRNCA Allotments for the past 30 years. From 1991-2021, there have been eight small fires in the allotments, ranging from 0.1 to 5 acres (Table 29). Overall, fire is beneficial for the upland plant communities on the allotments because it helps maintain a balance of woody and herbaceous cover (Ahlstrand 1982). Shrub encroachment, along with fire suppression policies and land practices have altered fire regimes in the San Pedro Valley. The reduced perennial grass component in the upland communities has decreased the potential for natural fire ignition and spread, due to lack of fine fuels.

Table 29. Fire history from 1991-2021 on the SPRNCA Allotments.

Babocomari	Brunckow Hill	Lucky Hills
• Fairbanks, 1997, 2 acres • Kella, 1997, 0.1 acres • Bowers, 2016, 5 acres	• Last Nights, 2006, 0.1 acres • Post, 2007, 0.1 acres • Charleston, 2008, 0.3 acres	• Single Tree, 1992, 2 acres • Roost, 2014, 0.1 Acres

Climate affects the current and will affect the future condition of upland vegetation on the SPRNCA. About half of the rainfall on the SPRNCA Allotments occurs July through September during monsoon storms and most upland plant growth, including warm season perennial grasses, occurs during this period. Perennial grass production in Chihuahuan Desert plant communities has been shown to be positively associated with December through September precipitation and negatively associated with spring and summer (May-September) maximum average ambient temperature (McIntosh et al. 2019).

Past and future climate trends show that the Southwest has been and is expected to continue experiencing higher temperatures, more frequent droughts (periods of low precipitation that can span months to years), and more erratic precipitation events (Garfin et al. 2013). The effects of higher temperatures and decreased precipitation are currently and are likely going to continue adversely impacting Chihuahuan Desert rangelands due to decreased soil moisture, shortened growing seasons, suppressed recruitment and growth, and shifts in plant composition (Polley et al. 2013, Gremer et al. 2015, Kidron and Gutschick 2017, and McIntosh et al. 2019). These impacts collectively reduce amount and availability of livestock forage (Briske et al. 2015) and are more favorable for woody plant growth than herbaceous vegetation (Archer et al. 2011).

Riparian Vegetation: Cottonwood/Willow Forest, Mesquite Bosque, and Sacaton Grassland

Riparian vegetation communities in the SPRNCA Allotments are cottonwood/willow forest, mesquite bosque, and sacaton grassland. These three vegetation communities combined comprise about 0.6% of the SPRNCA Allotments total acreage. Cottonwood/willow forests are primarily comprised of Fremont cottonwood and Goodding's willow, but the community is also composed of a variety of mesic tree species including Arizona ash, netleaf hackberry, and velvet mesquite. The understory is dominated by herbaceous grasses and grass such as deer grass, Bermuda grass, equisetum, bulrush, spike rush, and Johnson grass. The Babocomari Allotment encompasses the Babocomari River which accounts for 94 acres of cottonwood/willow riparian forest (Table 28). The Brunckow Hill Allotment encompasses a small segment of the San Pedro River which accounts for about 18 acres of cottonwood/willow forest.

Mesquite bosque and sacaton grassland vegetation communities grow in loamy soils in the lowlands, upper benches, and floodplains of the Babocomari and San Pedro River portions on the SPRNCA Allotments. Mesquite bosques, or small forests, are characterized as dense stands of velvet mesquite trees. There are approximately 19 acres of mesquite bosque in the SPRNCA Allotments (Table 28). There is only about 4 acres of sacaton grassland within the SPRNCA Allotments, specifically on the Brunckow Hill Allotment. Sacaton grasslands are comprised primarily of big sacaton grass. Big sacaton grasslands generally require the depth to the water table to be less than 20 feet (Tiller et al. 2013), while mesquite bosques may be present when the water table is deeper (approximately less than 50 feet).

The historic grazing practices that began in the 1880s (described above) affected riparian vegetation on the SPRNCA Allotments. During this period, loss of perennial grasses in the uplands and heavy grazing of riparian vegetation along with above average rainfall contributed to arroyo cutting, channel incision, and increased sedimentation of the San Pedro and Babocomari Rivers (Hereford 1993). Prior to this, these rivers were marshy braided systems dominated with herbaceous vegetation (Hendrickson and Minckley 1985). The new incised channels of these rivers are now dominated by cottonwood/willow forests and an herbaceous understory with sacaton grassland and mesquite bosque communities occurring on the upper benches and outer floodplains.

Annual observations indicate that the Babocomari River is drying up, and, if current climate trends persist, larger sections of the stream would move from perennial to intermittent. The vegetation community is shifting from cottonwood/willow dominated to ash and mesquite dominated as surface water decreases and the water table lowers. If the water table lowers more than about 20 feet where sacaton grasslands are present, these communities may shift to a mesquite bosque (Tiller 2012).

Desert Wash (Xeric Riparian)

Approximately 243 acres of desert wash (xeric riparian) communities are distributed throughout the SPRNCA Allotments (Table 28). They are found in the form of tributary washes originating in the surrounding higher elevations in the Mule, Dragoon, Whetstone, Mustang, and Huachuca Mountains. This habitat type normally does not have standing or flowing water except for periods during and immediately after rainfall. Due to the increased water availability, desert washes can support larger woody trees compared to the adjacent uplands, including desert willow, mesquite, littleleaf sumac, and netleaf hackberry. Herbaceous vegetation, such as alkali sacaton and other perennial and annual grasses and forbs can be found along the edges of the desert washes.

3.4.2.3 Environmental Effects

The proposed actions – cattle grazing, fence and range improvements construction, and IVM treatments – would impact vegetation in various ways. Grazing would cause the removal of vegetation through herbivory, and cattle would trample vegetation through hoof action (Platts 1991, Trimble and Mendell 1995). The preferred forage for cattle is grass, though cattle are also known to eat forbs and the young shoots of woody plants such as cottonwood, willow, and mesquite. Ground disturbance caused by hoof action would impact vegetation through the trampling of plants and soil disturbance. Due to these effects, livestock grazing has been shown to alter species composition of plant communities and ecosystem function (Fleischner 1994 and Kelt and Valone 1995). Impacts to vegetation from cattle grazing would be concentrated around water developments (tanks and troughs) and the Babocomari River, depending on alternative. Table 30 below shows the different acres impacted in each vegetation community from cattle concentration areas among alternatives. Under the Proposed Action, non-use of the River Canyon Pasture (Proposed Action and Alternative A.1) or River Pasture (Alternative A.2) due to adaptive management triggers would eliminate cattle access to the Babocomari River Canyon, excluding acres of Chihuahuan desertscrub, cottonwood/willow, mesquite bosque, and semidesert grassland depending on alternative (Table 31). Proposed fence construction under each alternative requires vegetation to be cut back to ground level at up to 25 feet on either side of the fence line, temporarily reducing vegetation cover (acres of affected vegetation communities are shown in Table 32).

The acres and descriptions of proposed herbicide, prescribed fire, seeding, and erosion control treatments are found in Section 2.2.4. Acres of each treatment by vegetation community are described in Table 33. These acres are not cumulative, as herbicide followed by prescribed fire could occur in the same treatment unit. As explained in the Table 33 footnote, herbicide treatments would only occur in Chihuahuan desertscrub and semidesert grassland. Prescribed fire would also occur in Chihuahuan desertscrub and semidesert grassland with desert washes being avoided to the extent possible.

Table** 30. **Acres of vegetation communities in livestock concentration areas by alternative (all surface management jurisdictions).

Alternative	Agriculture	Chihuahuan Desertscrub	Cottonwood/ Willow	Desert Washes (Xeric Riparian)	Developed	Mesquite Bosque	Semidesert Grassland	Other	Total
Alt. A -Proposed Action	0.5	148.8	24.6	2.4	2.8	2.4	41.3	2.9	225.6
Proposed Action with expanded RC Pasture	*0.5*	148.8	*24.6*	*2.4*	*2.8*	*2.4*	*41.3*	*2.9*	225.6
Alternative A.1	0.5	148.8	24.6	2.4	2.8	2.4	41.3	2.9	225.6
Alternative A.1 with expanded RC Pasture	*0.5*	148.8	*24.6*	*2.4*	*2.8*	*2.4*	*41.3*	*2.9*	225.6
Alternative A.2	0.5	132.4	23.4	2.4	2.8	1.4	41.3	2.9	207.1
Alt. B and D – No Grazing with and without IVM Alternatives	0.5	108.5	23.4	2.4	2.3	0.9	36.6	2.9	177.5*
Alt. C – No Action Alternative	0.5	194.1	29.9	2.4	2.8	31.2	40.2	2.9	304.1

*solely state and private lands

Table** 31. **Acres of vegetation communities in the River Canyon Pasture that could be excluded from grazing if water quality adaptive management is triggered under each alternative.

Alternative	Chihuahuan Desertscrub	Cottonwood/Willow	Mesquite Bosque	Semidesert Grassland	Total
Alt. A - Proposed Action	96.9	5.2	29.1	0.0	132
Proposed Action with expanded RC Pasture	*256.4*	*5.2*	*29.1*	*53.5*	*344.2*
Alternative A.1	96.9	5.2	29.1	0.0	132
Alternative A.1 with expanded RC Pasture	*256.4*	*5.2*	*29.1*	*53.5*	*344.2*
Alternative A.2	1,776.7	8.4	36.7	67.9	1,889.8

Table** 32. **Acres of vegetation communities in proposed fence 25-foot buffers by alternative on all surface management types.

Alternative	Agriculture	Chihuahuan Desertscrub	Cottonwood/ Willow	Desert Washes (Xeric Riparian)	Developed	Mesquite Bosque	Sacaton Grassland	Semidesert Grassland	Other	Total
Alt. A - Proposed Action	0.2	75.4	3.1	0.6	0.2	4.6	0.7	7.6	0.8	93.2
Proposed Action with expanded RC Pasture	*0.2*	*69.6*	*3.1*	*0.6*	*0.2*	*4.6*	*0.7*	*8.0*	*0.8*	*87.8*
Alternative A.1	0.2	64.1	2.9	0.3	0.2	1.1	0.0	7.5	0.8	77.6
Alternative A.1 with expanded RC Pasture	*0.2*	*58.9*	*2.9*	*0.3*	*0.2*	*1.1*	*0.0*	*8.0*	*0.8*	*72.2*
Alternative A.2	0.2	53.6	3.1	0.6	0.2	3.9	0.7	7.6	0.8	70.7
Alts. B and D – No Grazing with and without IVM alternative	0.2	42.9	2.9	0.3	0.2	0.5	0.0	7.5	0.8	55.1

Alternative	Agriculture	Chihuahuan Desertscrub	Cottonwood/ Willow	Desert Washes (Xeric Riparian)	Developed	Mesquite Bosque	Sacaton Grassland	Semidesert Grassland	Other	Total
Alt. C – No Action alternative	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

***Table 33. Acres of potential IVM treatment by vegetation community under Alternatives A, A Expanded, A.1, A.1 Expanded, A.2, and B.*[1,2]**

Potential Treatment Method	Agriculture[1]	Chihuahuan Desertscrub	Cottonwood/Willow[1]	Desert Washes (Xeric Riparian)	Developed[1]	Mesquite Bosque	Other[1]	Semidesert Grassland	Total
Herbicide	7.9	**9,347.7**	6.9	31.2	49.0	0.0	22.4	**597.3**	10,062.4
Prescribed Fire	9.5	**12,481.2**	18.5	**51.8**	58.5	0.0	149.0	**1,030.0**	13,798.6
Seeding/ Erosion Control	0.0	**0.0**	0.0	0.0	0.0	0.0	0.0	**406.4**	406.4

[1]Vegetation communities were derived from multiple sources including remote sensing data. Different data sources and input scales may cause some misalignment of data layers causing some misclassification of vegetation communities. Treatment acres showing in agriculture, cottonwood/willow, developed, or other vegetation communities are misclassified and IVM treatments would not occur in these communities. Herbicide treatments would only occur in Chihuahuan desertscrub and semidesert grassland. Prescribed fire would occur in semidesert grassland and Chihuahuan desertscrub with desert washes being avoided to the extent possible.
[2]These acres are not cumulative. For example, a unit treated with herbicide could eventually be treated with prescribed fire.

Proposed Action, Alternative A.1, and Alternative A.2

Range Improvements and Fencing

The Proposed Action, Alternative A.1, and Alternative A.2 include new livestock watering locations in the Babocomari, Lucky Hills, and Brunckow Hill Allotments. These proposed watering locations would impact about nine new acres of vegetation, mostly (64-66%), in Chihuahuan desertscrub (Table 30). If the water quality adaptive management were implemented, about 80 (under the Proposed Action and Alternative A.1) to 97 (under Alternative A.2) fewer acres of vegetation in the Babocomari Allotment would occur in a livestock concentration area, with most of those acres being in Chihuahuan desertscrub and mesquite bosque vegetation communities (Table 30). Where perennial grass or bare ground adaptive management thresholds are exceeded, AUMs would either be reduced by 50% or to zero for the SPRNCA portion of the allotments, reducing and/or eliminating impacts to vegetation from cattle grazing in these vegetation communities (Table 27).

Under the Proposed Action and Alternative A.1, the proposed Babocomari River Canyon Pasture or the expanded Babocomari River Canyon Pasture fence would be constructed. If the water quality adaptive management is triggered, the acres of vegetation communities shown in Table 31 would no longer be impacted by livestock as those areas would no longer be accessible to livestock. The Proposed Action and Alternative A.1 include the narrow Babocomari River Canyon Pasture, 132 acres, along the railroad grade to the north and contoured in the uplands to the south. The 132 acres that would be excluded is comprised of 73% Chihuahuan desertscrub, 4% cottonwood/willow, and 22% mesquite bosque (Table 31). Under the Proposed Action with expanded River Canyon Pasture and Alternative A.1 with expanded River Canyon Pasture, the expanded Babocomari River Canyon Pasture would encompass 344 acres, comprised of 74% Chihuahuan desertscrub, 1.5% cottonwood/willow, 8.5% mesquite bosque, and 15.5% semidesert grassland (Table 31) that could be excluded from grazing if the water quality adaptive management is implemented. The expanded River Canyon Pasture fence would be implemented if resource concerns prevented the narrow Babocomari River Canyon Pasture fence from being built. Under Alternative A.2, if the water quality adaptive management threshold is exceeded multiple times, cattle would be excluded from the BLM land within the entire Babocomari River Pasture. Thus, under Alternative A.2, 1,890 acres would be excluded from livestock grazing if the water quality adaptive management was fully implemented. The 5.2 and 8.4 acres of cottonwood/willow in the Babocomari River Canyon Pasture under the Proposed Action, Alternative A.1, and Alternative A.2, respectively (Table 31), is less than the 19 cottonwood/willow acres in the Babocomari Allotment within SPRNCA (Table 27). This is mostly because of limitations in the remote sensing data in classifying the cottonwood/willow community, but also because some acres of cottonwood/willow to the west of the River Canyon Pasture would not be excluded from grazing. Within the Babocomari River Canyon Pasture, the dominant

riparian vegetation community is mesquite bosque with only a narrow “string” or line of cottonwood/willow at the base of the canyon that isn’t detected by remote sensing along most of the BLM portion of the river that would be excluded.

Fence construction would require 55-93 acres (<1% of total SPRNCA Allotments acreage) of vegetation, depending on alternative (

Table 32), to be cut back to ground level once (as described in Section 2.2.3) to install the fence. This would result in a temporary reduction of vegetative cover in these areas. After construction, vegetation would resprout and revegetate in the construction area naturally. The use of a 50-foot buffer (25-feet on each side of the proposed fence) captures the total maximum area that could be impacted during construction as a conservative estimate, but as little vegetation as possible would be cut back. Most of the fence would be built through Chihuahuan desertscrub (77-83%), with smaller acreages in cottonwood/willow, mesquite bosque, and semidesert grassland depending on alternative (Table 32).

IVM Treatments

The proposed IVM treatments would affect vegetation on the SPRNCA Allotments in various ways. Effects would be similar in both upland communities, semidesert grassland and Chihuahuan desertscrub, where treatments would occur. About 1,436 acres of semidesert grassland (~21% of the semidesert grassland in the allotments) and 12,480 acres of Chihuahuan desertscrub (~30% of the Chihuahuan desertscrub in the allotments); about 14,204 acres total (Table 33) of upland vegetation (28% of the SPRNCA Allotment total) would potentially be treated by herbicide, prescribed fire, seeding, erosion control, or a combination of treatments (Table 33). As described in the affected environment, upland vegetation communities are in a shrub dominated state, which is departed from ecological site potential. In general, the proposed IVM treatments would decrease shrub cover and/or increase herbaceous plant cover – especially perennial grasses – in upland vegetation communities.

Herbicide treatment units would potentially occur in 9,348 acres of Chihuahuan desertscrub and 597 acres of semidesert grassland (Table 33), about 20% of the SPRNCA Allotments. Pelletized tebuthiuron herbicide, as described in the Proposed Action, would be applied to the soil surface, dissolve with rain, and move into soil column. Spike® 20P, a brand of tebuthiuron, pellets breakdown within 2 minutes of simulated rainfall and disappear by 12 minutes (Morton et al. 1989), indicating that the first rain after application would move the herbicide into the root zone of the soil. Tebuthiuron would be applied in fall through early spring (10/1-3/31), be absorbed by the roots of target shrub species (primarily whitethorn acacia and creosote) in the spring, and damage or kill shrub species by inhibiting photosynthesis. As described in the affected environment section 3.4.2.2 above, tebuthiuron treatments have been shown to reduce shrub cover and increase perennial grass cover in Chihuahuan Desert communities, which is a long-term benefit. Gibbens et al. 1987, found that an area in the Chihuahuan Desert in Southern New Mexico that was treated with low rates of tebuthiuron had over 10 times the perennial grass production compared to untreated adjacent areas and that shrub canopy cover declined from 20.8% to 2.8%.

The treated and untreated areas had similar percent composition of forb species (Table 34). On the SPRNCA Allotments, upland plant communities would be expected to show similar results following tebuthiuron treatments with a reduction in shrub cover and an increase in perennial grass cover if there is enough perennial grass seed source prior to treatment (Brock et al. 2014). In addition, the minimum two years of deferred grazing after a tebuthiuron treatment would also aid in perennial grass growth and production.

Table 34. Percent composition of woody, grass, and forb species on areas treated with tebuthiuron compared to areas untreated on ranches in the San Pedro Valley.

Ranch	Treated			# Sites	Untreated			# Sites
	Woody Species	Grass Species	Forb Species		Woody Species	Grass Species	Forb Species	
Sands	17%	79%	4%	20	65%	30%	5%	12
Brookline	11%	74%	15%	4	78%	16%	6%	3
Dancing Y	11%	88%	2%	2	62%	37%	1%	2

Tebuthiuron treatments could have herbicidal effects to non-target upland plant species within a treatment unit. Potential impacts include mortality, reduced productivity, and abnormal growth (BLM 2007, 4-47). For example, when applied at rates of 1.8 and 3.6 lb a.i./acre (2 and 4 kg a.i./ha) to treat juniper in sagebrush-bunchgrass

community in Oregon, tebuthiuron appeared to damage non-target forbs and perennial grasses (Britton and Sneva 1981). However, the application rate in that study is over five times that proposed in this EA. In addition, the Gibbens et al. 1987 study mentioned in the paragraph above found decreases in perennial forb density but increases in annual forb density after a treatment of 0.36 lb a.i./acre (0.4 kg a.i./ha) of tebuthiuron pellets.

Herbicide treatments could impact offsite non-target plants through drift, runoff, or accidental spills (BLM 2007, 4-47). Treatments would use solid pelletized product, which has less risk of drift compared to liquid herbicide. Risk to off-site plants from surface runoff is influenced by precipitation rate, soil type, and application area (BLM 2007, 4-55). Fall through early spring application timing, BMPs (Appendix G), SOPs (Appendix H), BLM herbicide handling guidelines, and low application rates proposed in this EA (maximum application rate of Spike® 20P in areas with less than 20 inches of precipitation is 5 lb a.i./acre verses 0.33 to 0.5 lb a.i./acre proposed in this EA) would greatly reduce the risk of drift, runoff, accidental spills, and damage to offsite non-target plants.

Riparian vegetation communities – cottonwood/willow, sacaton grassland, and mesquite bosque – would not be treated with tebuthiuron. The 2007 PEIS for BLM herbicide use notes that aquatic plants are not at risk for adverse effects under scenarios involving off-site drift of tebuthiuron (BLM 2007, 4-41). Surface runoff could pose a risk to riparian vegetation near the Babocomari and San Pedro Rivers in the SPRNCA Allotments due to herbicide movement with surface runoff shortly after application at the maximum application rate of 4 lb a.i./acre per acre (BLM 2007, Chapter 4-41). However, this risk would be mitigated by applying the typical application rate of 0.5 lb a.i./acre or less and the 300-meter (984 ft) buffers (ephemeral tributaries would be buffered by 50.5 m (100 feet)). In addition, the application timing mitigates the risk of run off because winter storms in the region are frontal and gentle in nature, producing very little runoff compared to monsoon storms. Finally, actual treatment unit development (Section 2.2.4) would consider these and other BMPs (Appendix G) to mitigate impacts.

Sandy wash ecological sites are not proposed for tebuthiuron treatment and desert wash vegetation communities would be buffered from tebuthiuron application by a minimum of 30.5 m (100 feet). Risks to non-target desert wash vegetation would be similar to non-target upland plants described above but would be mitigated by buffers, application timing, low application rates, and through ID team treatment unit development (Section 2.2.4).

Prescribed fire is proposed in 12,481 acres of Chihuahuan desertscrub (about 30% of Chihuahuan desertscrub in the SPRNCA Allotments) and 1,030 acres of semidesert grassland (15% of semidesert grassland in the SPRNCA Allotments). Currently, areas on the SPRNCA Allotments that have enough of a fine fuel component to carry fire are limited. However, if proposed herbicide and/or seeding treatments are successful in increasing perennial grass cover, prescribed fire would be more feasible. Prescribed fire would directly remove vegetation by burning and over time vegetation would recover. Upland vegetation communities on the SPRNCA Allotments are adapted to fire. Presettlement fire frequency of semidesert grassland in southeastern Arizona could have been around 4-9 years (Kaib et al. 1996). Ahlstrand 1982, found that perennial grasses in Chihuahuan desertscrub took 6-7 years to increase in cover and fully recover after burning, and hypothesizes that burning every 10-15 years would maintain reduced shrub cover in this community. Upland plant communities may experience a decrease in perennial grass cover and an increase in forb cover for several years after burning as perennial grasses recover (Kaib et al. 1996, Ladwig et al. 2014) with potential for a long-term negative impact on black gramma grass (Killgore et al. 2009, Ladwig et al 2014).

Prescribed fire would require small areas of vegetation to be cleared for firebreaks; however, anthropogenic and natural barriers (e.g., roads and sparsely vegetated ridgetops) would be used as firebreaks to the extent possible. Though upland vegetation communities would incur short-term (1-6 years) impacts of vegetation loss, perennial grasses would only experience top kill and resprout from the root crown (Ahlstrand 1982, Kaib et al. 1996, Killgore et al. 2009, Ladwig et al 2014). In addition, the required minimum two years of deferred grazing in prescribed burn units, or until DPC objectives are met, would aid in perennial grass regeneration.

While prescribed fire treatment units would be only be planned in upland vegetation communities, desert wash vegetation communities – especially in small drainages – could burn. This would result in a temporary removal of vegetation through burning. About 52 acres of desert wash vegetation community could be burned (20% of desert wash community on the SPRNCA allotment). This could result in mortality of desert wash plant species, however, most desert wash species, including desert willow, mesquite, and hackberry can resprout after fire (Tirmenstein 1990, Bock and Bock 2014).

Seeding, along with erosion control, is proposed on 406 acres of semidesert grassland (6% of semidesert grassland in the SPRNCA Allotments). The proposed area is a Clay Loam Upland ecological site in a departed state with low perennial grass cover, high shrub cover, and erosional features (BLM 2022c). Seeding could also be used prior to or after implementation of herbicide or prescribed fire treatments as part of BMP application during the treatment unit

development process (Section 2.2.4). The application of native seed via aerial broadcast, hand seeding, hydroseeding, and seed balls would not cause ground disturbance and would have entirely beneficial effects to the upland vegetation communities in the SPRNCA Allotments. If seeds successfully germinate and establish, the increase in perennial grass cover would help vegetation communities achieve DPC objectives and move upland vegetation communities towards their reference state potential.

Erosion control is the primary treatment proposed on 406 acres of semidesert grassland (same location as proposed seeding treatment area). Erosion control structures would be planned in areas with erosional features, such as gullies and sheet erosion. The erosion control structures would aid in seeding treatment success and reduce soil erosion by trapping water and sediment. Impacts to upland vegetation include crushing, trampling, or direct removal of plants due to temporary access routes and use of heavy equipment. However, these effects would occur once, be short-lived, and be mitigated by BMPs (Appendix G) and post-treatment remediation (i.e., mulching, reseeding) described in the Proposed Action (Section 2.2.4).

In summary, while there could be some effects to non-target and offsite vegetation as described above, upland vegetation communities would benefit from the proposed IVM treatments. The main benefit to upland communities from the IVM treatments would be an increase in perennial grass cover and a decrease in shrub cover to achieve DPC objectives and move plant communities toward climax plant community. There could also be indirect long-term benefits, such as reduced sediment yield from the uplands into the Babocomari and San Pedro (Section 3.3.6). In addition, grazing would be deferred during the growing season for at least two years after the treatment, or longer until DPC objectives are met, reducing impacts from grazing during those times. Ultimately, most impacts to vegetation would be mitigated by the ID team treatment unit development process which would follow guidelines described in the Proposed Action (section 2.2.4) and other applicable BMPs (Appendix G) and SOPs (Appendix H).

Alternative B (No Grazing with IVM Alternative)

Under Alternative B (No Grazing with IVM alternative), livestock concentration areas would occur around existing water developments on 177.5 acres of private and state land, mostly in Chihuahuan desertscrub, representing about 58% of acres that currently fall in a livestock concentration area (Table 30). Current concentration areas on BLM land, about 127 acres, would no longer sustain impacts from cattle grazing (Table 30). Perennial grass diversity would likely increase while woody species cover may increase or stay relatively stable in upland plant communities, similar to what's been documented on portions of the SPRNCA where grazing was removed (Radke, 2022).

There would be no adaptive management under the No Grazing with IVM alternative, so the proposed River Canyon Pasture fencing in the Babocomari Allotment would not be built. The SPRNCA boundary fence would be built under this alternative to exclude livestock on private and state land in the remainder of the allotment from the SPRNCA. SPRNCA boundary fence construction would require up to 67 acres of vegetation to be cut back, mostly in Chihuahuan desertscrub (Table 32).

Short-term negative and long-term positive impacts to vegetation communities from the IVM treatments would be the same as described in the Proposed Action analysis. In addition, none of the impacts from grazing would occur on the SPRNCA Allotments.

Alternative C (No Action Alternative)

Under Alternative C (No Action alternative), livestock concentration areas would continue to occur on 304 acres of vegetation, mostly in Chihuahuan desertscrub (Table 30). This alternative would not include a 50% reduction of AUMs through temporary suspension, adaptive management, or new fencing, including the SPRNCA boundary fence; thus, zero acres would be impacted by fence construction. Perennial grass cover would continue to be removed annually by livestock and impacts from grazing would continue at the current extent.

The IVM treatments would not occur in the acres of vegetation communities described in Table 33. Short-term impacts to vegetation communities from implementing treatments described above would not occur. However, long-term benefits from treating target shrubs would also not occur. Upland vegetation communities would remain relatively the same and not move towards ecological site potential. The upland communities would continue to be dominated by shrubs with a low perennial grass component. Continued livestock grazing under Alternative C (No Action Alternative) would keep the perennial grass component in upland plant communities relatively low compared to all other alternatives.

Alternative D (No Grazing without IVM)

Under Alternative D (No Grazing without IVM alternative), livestock concentration areas would occur around existing water developments on 177.5 acres of private and state land, mostly in Chihuahuan desertscrub, representing about

58% of acres that currently fall in a livestock concentration area (Table 30). Current concentration areas on BLM land, about 127 acres, would no longer sustain impacts from cattle grazing (Table 30).

Because grazing would not be authorized at all, the proposed River Canyon Pasture fencing in the Babocomari Allotment would not be built. The SPRNCA boundary fence would be built under this alternative to exclude livestock on private and state land in the remainder of the allotment from the SPRNCA. SPRNCA boundary fence construction would require up to 67 acres of vegetation to be cut back, mostly in Chihuahuan desertscrub (Table 32).

IVM treatments would not occur, thus upland vegetation communities would not incur short-term impacts from implementing the treatments. However, long-term beneficial impacts to upland vegetation communities described in the Proposed Action analysis above would also not occur. Livestock grazing would no longer remove perennial grass cover on BLM lands and upland communities would likely increase slightly in perennial grass cover. In addition, perennial grass diversity would likely increase while woody species cover may increase or stay relatively stable in upland plant communities, similar to what's been documented on portions of the SPRNCA where grazing was removed (Radke, 2022).

3.4.3 Issue 3: Riparian

How would the presence of livestock and grazing affect riparian ecology and function on the Babocomari Allotment?

The analysis area for this issue is the acres of land within the boundary of the Babocomari Allotment. This spatial scale was chosen because the Babocomari Allotment is the only allotment that contains a riparian area that would be directly affected by livestock grazing. There are riparian areas along the San Pedro River in the Brunckow Hill Allotment, but all alternatives exclude that area from livestock grazing on BLM managed land, so it is not analyzed here. The temporal scale is 10 years as that is the period of the lease renewal.

3.4.3.1 Affected Environment

Current Conditions

Riparian areas are dynamic systems controlled by the unique interplay of hydrology, geomorphology, and biotic communities. The potential of a certain area is dependent on the influence of these three factors. A description of the hydrology including streamflow and wet-dry data is found in Section 3.4.1. The following section provides an overview of the geomorphic and biotic influences on the riparian area in the allotment.

Geomorphically, the Babocomari River inside the SPRNCA can be split into two reaches starting just downstream of the USGS gage (see Appendix A: Figure A-22) due to the emergence of bedrock controlling the stream's floodplain access and ability to meander (Cook et al. 2009). The reach from the SPRNCA boundary to the USGS gage (and slightly below) is confined by the bedrock with no floodplain. The lower reach is less controlled by bedrock and has floodplain pockets and even larger floodplain access moving downstream towards the confluence with the San Pedro River. The original construction of the railroad bed along the Babocomari in 1882 constrained the river floodplain, including at the confluences of large washes, changing dynamic storage during flood events, potentially increasing scour along the mainstem. The sinuosity, as interpreted from imagery, for the upper reach is 1.25 and the sinuosity of the lower reach is 1.45 (BLM 2018). As noted above, the lower part of the reach is slightly more sinuous due to the lesser amount of geologic confinement.

The 2013 and 2018 Proper Functioning Condition assessments on the Lower Babocomari reach (below gage) indicated an excess sediment supply from the watershed. However, the Babocomari LHE did not indicate that excessive erosion in the form of rills or gullies was common on the BLM uplands. Non-federal lands near the stream and SPRNCA boundary do have evidence of excessive rill and gully erosion in Limy upland ecological sites (Sommers 2019), which could be sources of excess sediment.

Documentation of the historic riparian community along the Babocomari River is limited and assumed to be similar to that of the San Pedro River. Downcutting of the mainstem of the San Pedro River likely changed the channel type from a braided channel or marshy system to an incised single channel thread (Hereford 1993 and Hendrickson and Minckley 1984). Such a change facilitated the recruitment of successional riparian plant species, such as cottonwoods, and the establishment of the current riparian gallery (Stromberg 1998 and Turner et al. 2003). It is likely that such down cutting moved upgradient into the Babocomari tributary.

The riparian community within the Babocomari River corridor has an overstory dominated by Fremont cottonwood, Arizona ash, and Goodding's willow. Unlike the San Pedro River, few studies document riparian plant species composition along the Babocomari River. The relatively higher abundance of velvet ash along the Babocomari River, as noted in BLM (2018), compared to the San Pedro River, indicates a potential community type more similar to cottonwood/ash (as defined in Szaro 1989). To a lesser degree, hackberry and mesquite exist along its entire length in the Babocomari Allotment. Of these, Goodding's willow and Fremont cottonwood have wetland indicators status (Reed 1996) of obligate wetland species requiring access to shallow groundwater (Stromberg et al. 1996). Arizona ash and mesquite are facultative plants that can utilize both groundwater and rainfall when advantageous (Stromberg et al. 1996). The understory typically is dominated by herbaceous grasses and aquatic plants such as deer grass, Bermuda grass, equisetum, spike rush, and Johnson grass. Sacaton and mesquite occur throughout but usually on the upper bench of the floodplains. With adequate groundwater levels and fire these will sustain sacaton grasslands, with transitions to mesquite dominated bosques as groundwater levels are lowered.

As described in the vegetation Section 3.4.2, there are 19 acres of deciduous riparian (cottonwood, willow, ash, etc.) and 41 acres of mesquite bosque in the Babocomari Allotment. These acreages represent 16% of the deciduous riparian, and 35% of mesquite bosque in the Babocomari Watershed. Of this, only 8.3 acres of deciduous riparian and 36.7 acres of mesquite bosque are on BLM-managed land, 45 acres in total. While the source of this data indicates that mesquite forest is the dominant vegetation community in this acreage, aerial imagery and field visits, indicate that along this acreage a thin line of deciduous riparian is apparent. The analysis below therefore includes both the mesquite forest and deciduous riparian in the assessment of impacts.

The 2013 and 2018 Proper Functioning Condition assessments on the Lower Babocomari reach (below gage) indicated an excess sediment supply from the watershed. However, the Babocomari LHE did not indicate that excessive erosion in the form of rills or gullies was common on the BLM uplands. Non-federal lands near the stream and SPRNCA boundary do have evidence of excessive rill and gully erosion in Limy upland ecological sites (Sommers 2019), which could be sources of excess sediment.

The aquatic resources of the Babocomari River include the biota and physical habitat associated with the in-stream area around the Babocomari River. This includes aquatic plants, fisheries, macroinvertebrates, and the channel characteristics they depend on, such as substrate, stream depth, and pool frequency. Five native fish species, the longfin dace, the desert sucker, the Sonora sucker, the Gila topminnow, and the Gila chub, occur in small numbers in the upper Babocomari River. Fish surveys were conducted 1990-2013 on the Babocomari River downstream of the allotment. The only native fish species captured during these surveys were longfin dace. Longfin dace are highly adaptable and can withstand a large range of water temperatures and low dissolved oxygen levels. Dace have the ability to disperse into various aquatic habitats following flooding events. Typically, dace inhabit shallow runs and pools with fine substrates. This permanent fish sampling site is currently abandoned due to its surface water intermittency. The habitat components that directly impact fish and other aquatic communities are the stream geomorphology (physical structure), riparian corridor, substrate composition, water permeance, and water quality. A study of the benthic macroinvertebrates along the San Pedro River, indicated that higher diversity of macroinvertebrates was found in the tributaries (such as the Babocomari River) than on the main stem of the San Pedro River (ADEQ 2004). It also indicated that these sites were most susceptible to disturbance associated with increased sedimentation.

Unauthorized livestock grazing occurs on the SPRNCA and has the potential to impact riparian areas by reducing vegetation cover and stream bank stability. Because unauthorized livestock grazing from permitted livestock on the four SPRNCA Allotments has not been documented, it is not considered in the analysis of impacts to riparian areas within the analysis area for riparian resources, which is limited to the Babocomari Allotment.

Reasonably Foreseeable Future Trends

Hydrologic and climatic trends for the Babocomari River are described in Section 3.4.1. These trends indicate declining winter baseflows and declining surface water extent in June. The climatic trends indicate increased temperatures and increased duration and severity of droughts (NOAA 2021). If these current trends continue, larger sections of the Babocomari River will transition from perennial to intermittent streamflow regimes. Drought intolerant species such as cottonwood and willow will be stressed by reduced groundwater levels, affecting both mature tree vigor and recruitment (Stromberg et al. 1996, Scott et al. 1999, Shafroth et al. 2000, Stromberg et al. 2010). This will lead to the eventual replacement of these trees with xeric drought-tolerant species including mesquite and non-native tamarisk (Lite and Stromberg 2005). Streamflow permanence has been found to be a key indicator of species dominance, with cottonwood/willow communities present at higher stream permanence sites and tamarisk/mesquite at lower stream permanence sites (Lite and Stromberg 2005). If it is assumed that the wet-dry survey trends are a

proxy for changes in stream flow permanence, then this also indicates a potential future change in the species composition of the stream reach from cottonwood/willow communities to tamarisk/mesquite.

Herbaceous communities that rely on near-surface water will also be stressed, as losses in stream flow permanence cause hydric species to be reduced or replaced with annuals (Stromberg et al. 2005, Stromberg et al. 2010). Stream function can suffer if these hydric perennial grasses with greater rooting capacity and stability are replaced with less stable annuals, resulting in less protected streambanks and potential vertical and lateral erosion and reductions in stream bank storage (Stromberg et al. 2005). These effects are expected to occur along the entire length of the stream channel, but most severely in the lower 1.6 miles inside the allotment, where a drying trend is evident spatially by the wet-dry data (Figure 3-2, TNC 2021).

The exact rate of change of the riparian community along the Babocomari River is unknown. Froend & Sommer (2010) suggest that when a riparian system faces both climatic factors and groundwater withdrawals, then a threshold response will occur resulting in a much quicker change in the community composition and structure.. This will limit the amount of time for instituting mitigating measures that will allow the plant community to adapt to the water stress.

3.4.3.2 Environmental Effects

The alternatives are analyzed below by comparing both the impacted acreage and the number of days that the livestock have access to the riparian area on BLM-administered lands in the Babocomari Allotment. The below analysis focuses on the near-stream deciduous forest (cottonwood/willow) that are the most susceptible to impacts from livestock grazing. When cattle have access to a riparian area they have the potential to reduce vegetation cover and stream bank stability. These effects vary by location, stocking rate, and season of use. In general, livestock impact streamside vegetation by foraging directly on stabilizing vegetation which can alter not only the amount of vegetation but also the structure and composition (Kauffman and Kruger 1984, Platts 1991, and Clary and Kinney 2002). Reduction in stream shading can lead to increased stream temperature and reduced dissolved oxygen levels necessary for aquatic species. Hoof action from cattle on steep stream banks can add excess sediment to the stream channel, which can reduce vegetation cover on those banks, increase stream turbidity levels, and change channel morphology (Kaufman and Kruger 1984, Trimble and Mendel 1995, Belsky et al. 1999, Beard 2004). On flat, moist soils hoof action can cause compaction and reduce water holding capacity and plant growth (Fleischner 1994, Trimble and Mendel 1995). Bank erosion and sedimentation associated with livestock grazing have a negative effect on fish and macro invertebrate assemblages (Bryan & Rutherford 1993, Herbst et al 2012).

The stresses on the riparian and aquatic systems from grazing would have a cumulative effect with the stresses from groundwater withdrawals and climate change. Riparian tree species recruitment is impacted by both lower groundwater levels and utilization from cattle, if grazed during the warm season. Near-stream herbaceous grasses are stressed as streamflow permanence declines and by trampling and utilization of livestock.

Table 35. Total acres and days annually which livestock have access to riparian areas in the Babocomari Allotment.

Indicator: Total acres and days annually which livestock have access to riparian areas in the Babocomari Allotment per alternative						
	Alt. A - Proposed Action, Alt. A.1, and Alt. A.2	**Alt. B - No Grazing with IVM alternative**	**Alt. D. - No Grazing without IVM alternative**	**Alt. C - No Action alternative**	**Water Quality Adaptive Management Fully Implemented**	
					Alt. A - Proposed Action and Alt. A.1	**Alt. A.2**
Acres	45*	0	0	45	10.7	0
Days per Year	120*	0	0	365.25	120	120
**If Upland Adaptive Management is triggered the acres and number of days could be reduced to 0*						

Impacts from the proposed IVM treatments to riparian resources are analyzed in other sections of the EA, including water quality (Section 3.4.1.2), vegetation (Section 3.4.3), and fisheries AIB-12 (Section 3.3.12).

Alternative A (Proposed Action), Alternative A.1, and Alternative A.2

Concerning the Babocomari riparian area, the Proposed Action and Alternative A.1 are essentially identical, as the difference in the alternatives is only related to the Brunckow Hill Allotment, for which there are no impacts to riparian

areas. Under these alternatives, the livestock would have access to the riparian area from 11/1-3/31 of each year (considered the cool season). Cool season grazing is outside of the main growing season for most riparian plants, so the impacts to plant species would be limited to browsing of still green (potentially in early November) and dormant herbaceous plants near the stream (Elmore and Kauffman 1994). Since the temperatures are cooler, cattle congregation due to seeking shade for temperature regulation, would be less, and cattle would be more likely to access the nearby uplands for forage than during the summer. The streambanks along the Babocomari River infrequently freeze, for short durations, and are subjected to trampling and stream bank alterations from livestock for the majority of the cool season. Herbst and others (2012) found that aquatic invertebrate assemblages were still impacted by disturbance in the reach above the site, even with local fencing. This impact would occur regardless of alternative because the upstream reach is on private and state lands which is outside of BLM's authority to determine whether or not livestock graze that area.

If water quality adaptive management measures are triggered, then the stocking rate of the cattle would be reduced and impacts to the riparian area would be lessened. If AUMs are completely reduced, then cattle would have access to 10.7 acres of the riparian corridor under the Proposed Action and Alternative A.1. These acres likely represent mesquite bosques that are located within the River Pasture but outside the River Canyon Pasture. Under these alternatives the cattle would be allowed to cross over a section within the River Canyon Pasture for a duration of 10 days during the cool season.

Under Alternative A.2, the River Canyon Pasture and fencing would not be implemented, thus if water quality thresholds are exceeded multiple times (see water quality adaptive management under Section 2.2.51) livestock would be removed from the BLM-managed land within the River Pasture for the remainder of the grazing lease and no riparian acres on BLM-managed lands in this allotment would be available for livestock.

Alternative B and D (No Grazing Alternatives)

Under Alternative B and D (No Grazing alternatives), livestock would not have access to the riparian corridor along the Babocomari River. The impacts associated with livestock grazing as discussed above, would not occur along the Babocomari River in the Babocomari Allotment.

Alternative C (No Action Alternative)

This alternative keeps the current authorization for year-round grazing in the River Pasture. Impacts associated with cattle grazing as described above would occur throughout the year, including during the summer growing season when impacts are greater. The impacted acreage under Alternative C (No Action alternative) represents 25% of the riparian area along the Babocomari River.

3.4.4 Issue 4: Migratory Birds, Priority Species, and Habitats

How would livestock grazing, range improvements, and IVM treatments impact migratory birds and priority species listed in the SPRNCA RMP?

The analysis area for this issue is the acres of land within the boundaries of the SPRNCA Allotments, as well as the entire SPRNCA (see Appendix A: Figure A-23). This spatial scale was chosen because migratory birds and priority species use and occupy a wide variety of habitats throughout the allotments and the SPRNCA. The temporal scale is 10 years as that is the period of the lease renewal.

3.4.4.1 Analysis Assumptions

The analysis assumptions for Issue 4: Migratory Birds, Priority Species, and Habitats would be the same as the analysis assumptions under Issue 2: Vegetation (see Section 3.4.2.1).

3.4.4.2 Affected Environment

Vegetation communities in the SPRNCA provide habitat for numerous wildlife species. Within the allotments, these habitats are represented in varying proportions. Due to the complex mosaic of vegetative communities, BLM will use the priority habitats as described in the SPRNCA RMP (BLM 2019b) to classify the different types of wildlife habitat throughout the analysis area.

The habitats listed below represent all of the priority habitats from the SPRNCA RMP; while not every species of wildlife will be mentioned below and not all are listed as priority species, the species that are mentioned are representative of the species that use these habitats. A complete list of priority species listed in the RMP is available in Appendix E.

Riparian Areas and Wetlands Priority Habitats

Cottonwood/willow riparian forest

- Reptiles and amphibians such as desert toads, kingsnakes, rattlesnakes, and whiptail lizards
- Raptors such as gray hawk, zone tailed hawk, and great horned owl
- Passerine birds such as yellow warbler, northern flicker, summer tanager, and vermillion flycatcher
- Mammals such as small rodents, skunks, raccoons, and white-tailed deer

Mesquite forest (bosque)

- Reptiles and amphibians such as desert toads, kingsnakes, rattlesnakes, Gila monsters, and whiptail lizards
- Raptors such as red-tailed hawk and western screech owl
- Passerine birds such as Arizona Bell's vireo, verdin, yellow-breasted chat, and Wilson's warbler
- Mammals such as rodents, skunks, and white-tailed deer

Big sacaton grassland

- Reptiles and amphibians such as desert toads, snakes, lizards, and ornate box turtle
- Raptors such as American kestrel and Swainson's hawk
- Passerine birds such as Arizona Botteri's sparrow, white-crowned sparrow, grasshopper sparrow, and loggerhead shrike
- Mammals such as rodents, hooded skunk, and American badger

Wetlands (interior marshland cienega, wetlands other than cienega, aquatic open water)

- Birds such as common yellowthroat, red-winged blackbird, mallard duck, and Wilson's snipe
- Plants such as Arizona eryngo, bulrush, and sedges
- Reptiles and amphibians such as garter snakes, toads, lowland leopard frogs, and salamanders
- Fishes such as desert pupfish, Gila topminnow, desert sucker, and longfin dace

Desert Washes Priority Habitats

Sandy Wash (Xeric-riparian)

- Birds such as Gambel's quail, vermillion flycatcher, hummingbirds, and curve-billed thrasher
- Reptiles such as western diamondback rattlesnake, gopher snake, whiptail lizard, and zebra-tailed lizard
- Mammals such as javelina, white-tailed and mule deer, bats, and kangaroo rats

Uplands Priority Habitats

Semidesert grassland

- Birds such as Botteri's sparrow, Cassin's kingbird, scaled quail, greater roadrunner, and merlin
- Reptiles such as ornate box turtle, whiptail lizards, and gopher snake
- Mammals such as mule deer, lesser long nosed bats, and deer mice

Chihuahuan desertscrub

- Birds such as cactus wren, mourning dove, Gambel's quail, and turkey vulture
- Mammals such as mule deer, lesser long-nosed bats, American badger, and rodents

Table 36. Acres of priority habitat in the analysis area.*

Priority Habitat	Acres in the Analysis Area	Acres in the Allotments	Percent of Habitat Type within the Grazing Allotments compared to the Analysis Area
Riparian Areas and Wetlands (total)	12,643	479	3.7%
Cottonwood/willow riparian forest	1805	300	16.6%
Mesquite Forest (Bosque)	7,542	175	2.3%
Big Sacaton Grassland	3,255	4	>1%
Wetlands	41	0	0%
Desert Washes (total)	2,146	247	11.5%
Sandy Wash	2,146	247	11.5%
Uplands (total)	83,097	49,253	59.2%
Semidesert grassland	13,285	6,724	50.7%
Chihuahuan desertscrub	69,812	42,529	60.9%

*Detailed descriptions of the habitat types listed in Table 36-Table 40 are available in the SPRNCA RMP EIS, Section 3.2.4 (BLM 2019b).

Reasonably Foreseeable Future Actions and Trends

The SPRNCA has been used for a variety of purposes throughout the past. Livestock grazing was prevalent throughout the entire SPRNCA beginning in the late 1800s and continuing until livestock were removed from the riparian area and most of the SPRNCA when the area was designated a RNCA in 1988. The portions of the SPRNCA that overlap with the Babocomari, Brunckow Hill, Three Brothers, and Lucky Hills allotments are the only areas of the SPRNCA authorized for grazing (BLM 2019a). Unauthorized livestock grazing occurs on the SPRNCA and has the potential to impact upland habitat by consuming the leaves of perennial grass and other forage plants thereby reducing the vegetative cover. The BLM has not documented any unauthorized livestock grazing from permitted livestock on the four SPRNCA Allotments. Ocular utilization estimates are low in upland habitat where unauthorized livestock grazing can occur. Unauthorized livestock grazing has the potential to impact riparian habitat by reducing vegetation cover and streambank stability. Unauthorized livestock can concentrate in riparian habitat. Additional historic land use included other agricultural use, such as farming for human use and livestock feed production. Historically, the San Pedro River was used as a water source for many surrounding communities. However, ground water withdrawals continue to occur, and persistent drought has further impacted the region with less water available to recharge the aquifer that supplies the river. Decreases in available surface and ground water reduce the vigor and reproduction of the plant species that make up the various habitats found within the allotments and the analysis area (see Section 3.4.3.1 for additional detail). While habitats such as Chihuahuan desertscrub, semidesert grassland, and desert washes can be resistant to decreases in available water, habitats such as cottonwood/willow forests, mesquite bosque, sacaton grasslands, and wetlands are more prone to drought stress. These reductions in vigor and reproduction in vegetative species will reduce the quality of wildlife habitat over prolonged periods of time.

Reasonably foreseeable future actions on the SPRNCA include vegetation treatments such as tamarisk removal and prescribed fire. Tamarisk removal has been an ongoing project (authorized under Environmental Assessment #AZ-420-2008-011 EA) that focuses on cutting of individual trees, or small groups of trees, and treating the stumps with an herbicide to prevent regrowth. Tamarisk occurs in very low density on the SPRNCA, south of Charleston Road; the primary area for treatment would be north of the bridge crossing. Tamarisk is a species that can outcompete native vegetation and creates monocultural stands; removal of tamarisk improves native habitat for a wide variety of species including birds, reptiles, and mammals. Prescribed fire treatments have been proposed for areas both within and outside of the analysis area described in this EA. Those proposed prescribed fire treatments outside of the analysis in this EA are being withheld until further analysis is completed. Both tamarisk and prescribed fire treatments will have short-term impacts that may negatively impact localities where treatment occur however, long-term impacts of the treatments will increase the quality of habitats by returning the treated areas to a more native state and providing a mosaic of varying vegetative communities for species to utilize as resource needs change throughout the life cycles of the wildlife in the area.

The Charleston Bridge area contains powerline rights-of-way with small roads for access. The right-of-way holders will continue to maintain these rights-of-way with occasional trimming of trees for road access, and to prevent uncontrolled wildfire and remain in compliance with code requirements. Maintenance of these rights-of-way will have the effect of localized disturbance to the areas affected in both additional noise and potential fragmentation of habitat.

Across the analysis area, reductions in water availability will continue to diminish the riparian habitat that sensitive species rely on for resource needs. The vegetation management actions will help to alleviate this change, as the change in land cover will help to retain more of the water that is being lost to runoff; more precipitation will infiltrate into the sub-surface soils. Right-of-way maintenance will have minimal impact to the analysis area on whole as the areas impacted by this action account for less than 1% of the available habitat in the region. Unauthorized livestock grazing is expected to decrease in the SPRNCA as additional resources are allocated to maintaining fences on allotments that border the SPRNCA.

3.4.4.3 Environmental Effects

Table 37. Livestock grazing acres by alternative without the adaptive management implemented (all surface management jurisdictions).

Priority Habitat	Alt. A - Proposed Action	*Alt. A with Expanded RC Pasture*	Alt. A.1	*Alt. A.1 with Expanded RC Pasture*	Alt. A.2	Alt. B and D - No Grazing with and without IVM Alternatives	Alt. C - No Action Alternative
Riparian Areas and Wetlands							
Cottonwood-willow riparian forest	246.7	*246.7*	233.6	*233.6*	246.7	177.5	246.7
Mesquite Forest (Bosque)	174.2	*174.2*	148.4	*148.4*	174.2	4.3	174.2
Big Sacaton Grassland	4.5	*4.5*	0	*0*	4.5	0	4.5
Wetlands	0	*0*	0	*0*	0	0	0
Desert Washes							
Sandy Wash	247.1	*247.1*	238.8	*238.8*	247.1	34.3	247.1
Uplands							
Semidesert grassland	6660	*6660*	6652.8	*6652.8*	6660	4854.3	6660
Chihuahuan desertscrub	42400.1	*42400.1*	42240.7	*42240.7*	42400.1	28925.9	42400.1

Table 38. Livestock grazing acres by alternative with the water quality adaptive management fully implemented (all surface management jurisdictions).

Priority Habitat	Alt. A - Proposed Action	*Alt. A with Expanded RC Pasture*	Alt. A.1	*Alt. A.1 with Expanded RC Pasture*	Alt. A.2	Alt. B and D- No Grazing with and without IVM Alternatives	Alt. C - No Action Alternative
Riparian Areas and Wetlands							
Cottonwood/willow riparian forest	241.4	*241.4*	228.2	*228.2*	238.3	177.6	246.7
Mesquite Forest (Bosque)	145	*145*	119.2	*119.2*	137.5	4.3	174.2
Big Sacaton Grassland	4.5	*4.5*	0	*0*	4.5	0	4.5
Wetlands	0	*0*	0	*0*	0	0	0
Desert Washes							
Sandy Wash	247.1	*247.1*	238.8	*238.8*	247	34.4	247.1
Uplands							
Semidesert grassland	6660	*6606.5*	6652.8	*6599.3*	6592.1	4854.4	6660
Chihuahuan desertscrub	42303	*42143.5*	42143.7	*41,984.2*	40621.9	28926.4	42400.1

Table 39. Livestock concentration areas by alternative (acres) (all surface management jurisdictions) with the water quality adaptive management fully implemented.

Priority Habitat	Alt. A - Proposed Action	*Alt. A with Expanded RC Pasture*	Alt. A.1	*Alt. A.1 with Expanded RC Pasture*	Alt. A.2	Alt. B and D - No Grazing with and without IVM Alternatives	Alt. C - No Action Alternative
Riparian Areas and Wetlands							
Cottonwood/willow riparian forest	24.6	*24.6*	24.6	*24.6*	23.4	23.4	29.9
Mesquite Forest (Bosque)	2.4	*2.4*	2.4	*2.4*	1.4	0.9	31.2
Big Sacaton Grassland	41.3	*41.3*	41.3	*41.3*	41.3	36.6	40.2
Wetlands	0	*0*	0	*0*	0	0	0
Desert Washes							
Sandy Wash	2.4	*2.4*	2.4	*2.4*	2.4	2.4	2.4
Uplands							
Semidesert grassland	4.7	*4.7*	4.7	*4.7*	4.7	0	4.7

Priority Habitat	Alt. A - Proposed Action	*Alt. A with Expanded RC Pasture*	Alt. A.1	*Alt. A.1 with Expanded RC Pasture*	Alt. A.2	Alt. B and D - No Grazing with and without IVM Alternatives	Alt. C - No Action Alternative
Chihuahuan desertscrub	147.	*147.4*	147.4	*147.4*	132.4	108.5	194.1

Table 40. Proposed fence 25-foot buffers by alternative (acres).

Priority Habitat	Alt. A - Proposed Action	*Alt. A with Expanded RC Pasture*	Alt. A.1	*Alt. A.1 with Expanded RC Pasture*	Alt. A.2	Alt. B and D- No Grazing with and without IVM Alternative	Alt. C - No Action Alternative
Riparian Areas and Wetlands							
Cottonwood/willow riparian forest	3.1	*3.1*	2.9	*2.9*	3.1	2.9	0
Mesquite Forest (Bosque)	4.6	*4.6*	1.1	*1.1*	3.9	0.5	0
Big Sacaton Grassland	0.7	*0.7*	0	*0*	0.7	0	0
Wetlands	0	*0*	0	*0*	0	0	0
Desert Washes							
Sandy Wash	0.6	*0.6*	0.3	*0.3*	0.6	0.3	0
Uplands							
Semidesert grassland	7.6	*8*	7.5	*8*	7.6	7.5	0
Chihuahuan desertscrub	75.4	*69.6*	64.7	*58.9*	53.6	42.9	0

Alternative A (Proposed Action)

The Proposed Action would renew the four SPRNCA allotment grazing leases for a period of 10 years, with new terms and conditions and range improvements such as water developments and fences. Under the Proposed Action, there is a period of use requirement for riparian grazing on the River Canyon Pasture in the Babocomari Allotment (11/1-3/31) and 50% of all AUMs, on all four allotments, would be placed in temporary suspension until DPC objectives are met. The Proposed Action also includes upland adaptive management triggers in which livestock numbers would be subsequently reduced by an additional 50% or completely removed from the portion of the allotments within the SPRNCA boundary where adaptive management objectives are not being met (see Section 2.2.2). In addition, the Proposed Action includes water quality adaptive management for the Babocomari Allotment that would reduce AUMs in the River Canyon Pasture and may exclude cattle from the Babocomari River and riparian area if water quality objectives are not being met.

IVM treatments would occur on the BLM land in the SPRNCA Allotments as described in Chapter 2 (section 2.2.4). Proposed treatments include herbicide applications, prescribed fire, erosion control structures, and seeding of native plants. Impacts and acres of vegetation communities proposed for IVM treatments are described in section 3.4.2 and in Table 33. These acres of vegetation communities that could be treated correspond to habitat for migratory birds and priority wildlife species. In general, IVM treatments are intended to shift upland vegetation communities and priority wildlife species habitats from a shrub dominant state to a perennial grass dominant or codominant state.

Riparian Areas

Impacts to riparian habitats may include the potential to reduce vegetation cover. These effects vary by location, stocking rate, and season of use. Livestock impact riparian vegetation by foraging directly on vegetation which can alter not only the amount of vegetation but also the structure and composition (Kauffman and Kruger 1984, Clary and Kinney 2002, Fleischner 1994, and Platts 1991). The impacts may reduce the quality of riparian habitat where livestock use occurs. Within the analysis area there are 12,643 acres of riparian habitat. Of this area, 425 acres are within allotment boundaries, which represents 3.4% of the total analysis area. Except for the Babocomari Allotment, grazing would take place outside of riparian areas. Up to 135 (1% of acres in analysis area) acres of riparian habitat on the Babocomari Allotment would potentially be impacted by grazing (Table 27 and Table 28). The Brunckow Hill Allotment also includes riparian habitat but livestock do not use this area along the San Pedro River. If cattle are excluded from the Babocomari River because water quality thresholds are exceeded (see Section 2.2.5.1), the

impacts to riparian habitat would be reduced to 101 acres (Table 31). Additionally, the temporary suspension of 50% AUMs across the SPRNCA Allotments (Section 2.2.1) and any reductions in AUMs associated with the adaptive management would further reduce impacts to species that use riparian habitat.

IVM treatments would not occur in riparian habitats. Indirect impacts from these treatments may occur as runoff herbicide occurrence in low concentrations may reach these habitats. With the implementation of BMPs (WR-01, WR-02, SO-01), buffers will be incorporated to all riparian habitats, and application will not occur when heavy precipitation events are expected to transport herbicide away from the treatment area. With the use of these BMPs effects are expected to be negligible and likely inconsequential to the habitats as a whole as herbicides will not reach these habitats.

Desert Washes

Under the Proposed Action, there would be no changes in grazing compared to current conditions in desert washes, except for the 50% temporary suspension of AUMs across all four SPRNCA Allotments. The total number of acres potentially impacted by grazing in desert washes is 274.1 (11.5 % of the total in analysis area) (Table 37 and Table 38). Desert washes tend to contain higher availability of forage; therefore, livestock use of desert washes is likely to be greater than adjacent uplands. Additionally, the washes tend to have higher density of trees that provide thermal protection for both livestock and wildlife. This additional use of the desert washes by livestock is likely to result in diminished habitat conditions for ground dwelling species such as reptiles, mammals, and ground nesting birds. Reductions in habitat may lead to displacement of some ground-based species of wildlife due to disturbance, reduced forage availability, and reduction in protective cover. Some less-mobile species such as ornate box turtle and ground nesting bird nestlings may be directly impacted through trampling. Tree nesting birds are likely to be less impacted by the presence of livestock. Other mammals such as burrowing rodents may have impacts to their habitat through trampling of burrows and soil compaction. Adaptive management triggers would reduce AUMs where adaptive management objectives are not being met, which would reduce additional impacts to species as livestock are removed from the landscape.

Herbicide treatments would not occur in desert washes and desert washes would be buffered from herbicide application by a minimum of 30.5 m (100 feet). However, there may be some occurrences of prescribed fire that would partially burn through desert wash habitat. Approximately 52 acres of desert washes are included in the proposed area for prescribed fire, out of 453 acres of desert washes available throughout the SPRNCA and the SPRNCA Allotments (i.e., 11% of desert wash acres are in the area proposed for prescribed fire). Effects from prescribed fire would include temporary reduction of ground cover used for nesting, foraging, and cover for ground dwelling species such as birds, small mammals, and reptiles. Prescribed fire treatments may also cause a temporary reduction of potential nesting, foraging, and perching habitat for those species that use the higher stature shrubs and trees found in this habitat such as passerine birds and raptors. These reductions would be temporary and patchy, leaving a mosaic of treated and untreated areas available for use by all species found in the area. In addition, many plant species found in desert washes resprout after fire (Section 3.4.2.3).

Uplands

Compared to riparian areas and desert washes, the upland habitats on the SPRNCA Allotments have less available forage for livestock. Thus, livestock grazing pressure may be dispersed over a wider area, lessening the impacts to wildlife habitat. The reduction of grass and forbs because of grazing in this habitat may impact wildlife (such as rodents and ground nesting birds) that rely on these species for forage and protection. In addition, reptiles may be impacted as cover habitat used for thermal regulation is reduced. Impacts to larger mammals such as deer and javelina are unlikely, and any impacts would be minimal, because those species are highly mobile and would forage in areas less affected by grazing pressure and are likely to return as grazing intensity lessens (Austin and Urness 1986, Finch 2005).

Adaptive management would reduce AUMs where adaptive management objectives are not being met, which would reduce impacts to species as livestock are removed from the landscape.

In the Babocomari River Canyon Pasture, 166 acres of desert washes and upland habitat would not be available to livestock grazing (Table 38) if water quality thresholds are exceeded (see Section 2.2.5.1).

IVM treatments in the upland areas would reduce the cover and density of woody species (Section 3.4.2.2). The analysis area contains 83,097 acres of upland habitat (69,812 acres of Chihuahuan desertscrub and 13,285 acres semidesert grassland), of which 14,204 acres (17% of upland habitat in the analysis area) are proposed for IVM treatments. In general, the IVM treatments may reduce nesting, foraging, and perching upland habitat used by some migratory birds. Long-term effects to this habitat would include increased perennial grasses, which would enhance habitat by creating additional protective cover, breeding, and foraging opportunities for reptiles, small mammals, and ground nesting birds in the areas that are treated.

The IVM treatments would have short- and long-term impacts to upland habitat depending on treatment type. Short-term impacts from herbicide treatment may include loss of both target and non-target plant species, increased bare ground, and possible downstream impacts due to runoff from extreme precipitation events. These impacts would displace wildlife species that use the lost vegetation, such as ground nesting birds, small mammals, and reptiles, until the ground cover grows back. Long-term impacts from herbicide treatments would include increased cover of perennial grasses, reduction of shrub cover, and decreases in bare ground. The changes to habitat would benefit species such as small mammals, ground nesting birds, reptiles, mule deer, and those species that might use the smaller species as prey.

Prescribed fire may have short-term impacts including direct mortality of lesser mobile species such as small mammals and reptiles that are unable to escape a prescribed fire. Longer term impacts from prescribed fire would include reduction of woody species used by a variety of wildlife for nesting, perching, and cover. This reduction would only occur in those areas that are burned, and the adjacent unburned habitat would remain available as burned areas recover. The reduction in woody species is intended to increase the occurrence of perennial grasses in those areas that are burned.

Erosion control structure construction may also result in slight modification of habitat conditions directly around those locations where the structures are placed. Long-term impacts from construction of erosion control features would include reduced topsoil erosion and increased opportunity for perennial grasses to colonize and expand due to the structures trapping water and sediment.

Seeding would have minimal impacts to wildlife species; the increase of perennial grasses resulting from the seeding would be beneficial to species that use grassland habitats such as Botteri's sparrow, Cassin's kingbird, ornate box turtle, whiptail lizards, mule deer, and deer mice.

Range Improvements

Range improvement projects proposed on the allotments are described in detail in Section 2.2.3 of this EA. Allotment-specific projects are further detailed in Sections 2.2.5-8, using standards as described in Section 2.2.3. These range improvement projects include new fencing for improved livestock management and additional watering locations. New fence construction under the Proposed Action would modify habitat. This construction would typically require clearing and brushing vegetation within an area that is no more than 25 feet wide along the fence line. Fence construction (including clearing and brushing) would be accomplished with the minimum amount of soil disturbance, and only as needed for safe operation of construction crews and equipment. After construction, vegetation would be allowed to resprout and revegetate in the construction area naturally. Implementation of livestock waters would create areas of higher livestock concentration, which would diminish the vegetative cover in areas directly surrounding the water source.

Alternative A.1

Alternative A.1 would have the same impacts across all habitats as the Proposed Action except the 136 acres of priority species habitat that would not be authorized for grazing on the Brunckow Hill Allotment (Table 37). The lack of livestock grazing in this area would benefit all species that use those habitats.

Alternative A.2

Under Alternative A.2, the Babocomari River Canyon Pasture and fence would not be built. AUMs would be reduced or removed from the River Pasture altogether if adaptive management were implemented. Alternative A.2 would have the same impacts as the Proposed Action except 1861 acres of upland habitat and 78 acres of riparian and xeric riparian habitat would be excluded from livestock grazing and would not be impacted (Table 37).

Alternative B (No Grazing with IVM Alternative)

Under this alternative, the impacts from grazing to riparian habitats, wetlands, desert washes, and uplands would be eliminated from BLM lands on the SPRNCA. The SPRNCA boundary fence construction would impact about 65 acres of habitat (Table 40) used by reptiles, small mammals, ground nesting birds, and wildlife forage and cover in a similar manner as the Proposed Action.

IVM treatments would have impacts similar to the impacts described in the Proposed Action. Under Alternative B (No Grazing with IVM Alternative), the perennial grass cover that would be removed by livestock under the Proposed Action would not be removed. Herbaceous plant cover would be sustained year-round due to the lack of grazing, which may allow for a wide variety of priority species to increase productivity and cause some wildlife species, such as mule deer and ground nesting birds, to increase abundance in areas they are currently less frequent as perennial grasses become more widespread and habitat conditions move towards a state that supports those species. Increases in perennial grasses would increase cover for breeding habitat, thermal protection, and evasion of predators. Additionally, species that utilize seeds produced by perennial grasses would benefit from the additional forage. Increases in perennial grasses would also increase the number of insects in those areas which would benefit species that prey on insects. These factors may increase species richness in those areas where IVM has been implemented. The increase of perennial grasses would also increase the fine fuel load in upland communities which may increase the chances of uncontrolled wildfire, which may negatively impact priority species temporarily until the habitat in a burned area recovers.

Alternative C (No Action Alternative)

Under the No Action alternative, the BLM would renew the four allotment grazing leases for a period of 10 years without the other terms and conditions or range improvements such as water developments and fences as described in the Proposed Action. The No Action Alternative does not include adaptive management proposed under the Proposed Action and Alternatives A.1 and A.2. Livestock grazing would continue to take place primarily outside of riparian areas, except for within the Babocomari Allotment (Table 37). The No Action alternative would not have a season of use requirement in the River Pasture in the Babocomari Allotment, which contains riparian habitat. Year round grazing of the riparian area would likely result in more impacts when compared to the Proposed Action.

Impacts to desert washes and upland habitats would be similar to those under the Proposed Action. However, the No Action alternative does not include adaptive management; thus, there is no chance of reducing AUMs through adaptive management and related impacts to habitat, as there would be under the Proposed Action. The range improvements included in the Proposed Action would not be installed (absent a separate, future decision supported by further NEPA analysis), so there would be no impacts to species from range infrastructure projects.

Under this alternative IVM treatments would not take place. Therefore, there would be no short-term impacts to habitat associated with treatment implementation but also none of the long-term benefits to habitat described above.

Alternative D (No Grazing without IVM Alternative)

Under this alternative, impacts from both grazing and IVM treatments would be eliminated. While the short-term negative impacts from prescribed fire, herbicide application, seeding, and erosion control feature construction would not occur, the long-term positive impacts of shifting the vegetation communities toward the desired resource condition would also not occur. Removal of livestock grazing from the allotments would allow for perennial grasses to better complete their life cycles; allowing for seed production and re-establishing a more robust seed bank from which new grasses may become established. However, without the benefit of IVM treatments, these communities would likely remain shrub dominated (Section 3.4.2) and the habitats would remain static in the condition they are currently in, providing only minimal benefit to the wildlife that prefers the more grass dominated habitat such as mule deer, grassland birds, and ornate box turtle.

3.4.5 Issue 5: Threatened and Endangered Species

How would livestock grazing and IVM treatments impact threatened and endangered species and associated habitat (Huachuca water umbel, western yellow-billed cuckoo, southwestern willow flycatcher, and the northern Mexican gartersnake)?

The analysis area for this issue is the entire SPRNCA, and those areas outside of the SPRNCA within the allotment boundaries. This spatial scale was chosen because of the unique vegetative communities and their continuous extent throughout the region including the SPRNCA Allotments. While direct impacts would be restricted to the allotments with permitted use, the indirect impacts may reach beyond the allotment boundaries. Additionally, some species considered are highly mobile and may occupy regions both inside and outside of the allotments at differing times of years, or as resource needs and availability change. The temporal scale is 10 years as that is the period of the lease renewal.

3.4.5.1 Analysis Assumptions

The analysis assumptions for Issue 5: Threatened and Endangered Species would be the same as the analysis assumptions under Issue 2: Vegetation (see Section 3.4.2.1).

3.4.5.2 Affected Environment

The SPRNCA Allotments contain habitat for four species listed under the Endangered Species Act (Huachuca water umbel, northern Mexican gartersnake, western yellow-billed cuckoo, and southwestern willow flycatcher (Table 42). For this analysis, habitats are defined as either suitable or designated critical habitat. Suitable habitat is defined as areas that contain the physical and biological features necessary to support the species but that have not been officially designated by the USFWS as critical habitat. Suitable habitats are analyzed in three basic categories: upland, desert washes (xeric-riparian), and riparian. Critical habitat is those areas that have been officially designated by USFWS. There is designated critical habitat for Huachuca water umbel, northern Mexican gartersnake, and western yellow-billed cuckoo within the analysis area (Table 41).

Upland habitats within the SPRNCA include Chihuahuan desertscrub and semidesert grassland. These habitats vary in their vegetative composition with each providing different resources to wildlife. The upland habitats are characterized by varying compositions of trees, shrubs, perennial and annual grasses, forbs, and soil composition, see Section 3.4.2 for details regarding plant composition. Desert washes occur in upland areas where precipitation collects and flows to the riparian area. Desert washes generally include perennial grasses, and a variety of larger shrubs and trees than the adjacent uplands, see section 3.4.2 for details regarding plant composition. Due to more available ground water, the plants in these areas tend to be larger, denser, and more diverse than the upland region, and provide more habitat for a broader diversity of wildlife species when compared to upland areas.

Riparian habitat occurs along the river corridor, in the floodplain, and in areas where natural springs occur. These areas have either surface or subsurface water that is available to support riparian plant species. Species such as Fremont cottonwood, Gooding's willow, seep willow, rushes, sedges, and a variety of grasses and forbs characterize riparian habitat, see Section 3.4.2 for details regarding plant composition. The interface between the riparian and upland areas is generally comprised of mesquite, which often occurs in dense stands known as bosques, and often line the edges of tributary washes for miles away from the river. The analysis area, including the allotments, is impacted through groundwater withdrawal from private well owners, Fort Huachuca, the city of Sierra Vista, agriculture use, the Cananea Mine in Sonora, and changing climate conditions, including persistent drought. Modeling of the effects of climate change on the San Pedro Basin hydrologic cycle has shown that increasing temperature and changes in precipitation patterns will cause reductions in recharge (Serrat-Capdevilla et al. 2007). This reduction in water availability over time will likely reduce the extent and composition of the riparian and xeric-riparian vegetative communities.

Table 41. Acres of designated critical habitat within the allotments and analysis area.

Critical Habitat	Babocomari	Brunckow Hill	Three Brothers	Lucky Hills	Total Acres within Analysis Area
Huachuca water umbel	0	9	0	0	498
Western yellow-billed cuckoo	144	81	471	561	17,070
Northern Mexican gartersnake	77	63	0	0	5,233

There have been multiple surveys for federally listed species since the SPRNCA was established in 1988. Appendix F lists all federally listed species that are known to occur, or have the potential to occur, within the analysis area, as

determined by the official list provided by USFWS. For this analysis, species that are both known to occur and thought to be potentially impacted by the Proposed Action or alternatives were brought forward for analysis. Table 42 below lists the species that are analyzed in detail and the acres of their suitable habitat.

Table 42. Acres of suitable habitat for species analyzed in detail.*

Species	Acres of Habitat Type [6] Within the Grazing Allotments	Acres of Suitable Habitat within the Analysis Area	Percent of Suitable Habitat Within the Grazing Allotment compared to Analysis Area
Huachuca Water Umbel	16	254	6%
Northern Mexican Gartersnake	296	2059	14%
Western Yellow-billed Cuckoo	702	11,493	6%
Southwestern Willow Flycatcher	702	11,493	6%

*Suitable habitat is defined as habitat that is not designated as critical habitat yet contains the physical and biological features that may support the species.

Huachuca Water Umbel

Huachuca water umbel is a riparian obligate species that is restricted to ciénegas, rivers, streams, and springs in permanently wet, muddy, or silty substrates with organic matter. The species is generally found in shallow and slow-flowing waters that are relatively stable, or in active stream channels containing refugial sites where plants are not subjected to scouring floods. In upper watersheds that generally do not experience scouring floods, Huachuca water umbel occurs in microsites where interspecific plant competition is low. At these sites, Huachuca water umbel occurs on wetted soils interspersed with other plants at low density, along the periphery of the wetted channel, or in small openings in the understory. In stream and river habitats, Huachuca water umbel can occur in backwaters, side channels, and nearby springs (USFWS 2017).

Huachuca water umbel habitat condition along the San Pedro River appears to be declining mainly due to a decrease in surface water permanence (Xcel Engineering 2016). The area of occupied and formerly occupied Huachuca water umbel habitat along the San Pedro River, Babocomari River, and tributaries represents about 50% of the total range of the species (USFWS 2017). Within the analysis area, there are 498 acres of critical habitat, with 9 acres critical habitat within the SPRNCA Allotments, specifically on Brunckow Hill (less than 2% of critical habitat in analysis area) (Table 41). The Huachuca water umbel occurs in perennial portions of the San Pedro River along the toe of riverbanks, where it can survive in wet soil throughout the year. The SPRNCA has 33.7 river miles of Huachuca water umbel designated critical habitat. The latest Huachuca water umbel inventory (2015) of this portion of designated critical habitat covered 31 miles of the 33.7 and documented 45 populations of Huachuca water umbel (Xcel Engineering 2016). Metapopulations ranged from no more than 1 plant to patches 49.95 m long by 7 m wide in extent. Leaf length varied from 2.0 cm to 17.8 cm. One hundred percent of the metapopulations were documented within moist to saturated micro-habitats. Fifty-eight percent of the metapopulations were distributed in a scattered-patchy manner. Seventy-one percent were documented with a sparse density. Fifty-eight percent of the metapopulations were documented in sections with no flow/standing water. The highest density of populations is found south of Highway 90, and monitoring personnel observed that populations with higher density of individual plants remained high from one monitoring period to the next (Xcel Engineering 2016). More recently, several populations have been lost to desiccation near Hereford and the Highway 90 bridge (BLM 2019b). Unauthorized livestock grazing has occurred on the SPRNCA and has the potential to impact Huachuca water umbel and its suitable habitat by trampling vegetation and reducing streambank stability. The BLM has not documented any unauthorized livestock grazing from permitted livestock on the four SPRNCA Allotments. In the Babocomari River, the species is present on private land within the SPRNCA but has not been observed on BLM-administered lands, nor on the Babocomari Allotment.

Huachuca water umbel has been grown offsite and transplanted to four locations to aid in recovery efforts: Little Joe Wetland, Murray Spring, Frog Spring, and Horsethief Draw (ENRD 2017). The transplanted populations have not expanded but are sustainable at three locations except for Frog Spring at which the population failed (BLM field observations 2021).

[6] Habitat type definitions: Huachuca water umbel- water, cienega, wetlands; northern Mexican gartersnake- water, ciénegas, wetlands, cottonwood/willow; western yellow-billed cuckoo-cottonwood/willow, mesquite bosque, desert washes; southwestern will flycatcher-cottonwood/willow, mesquite bosque, desert washes. These habitat types are developed from the vegetation communities that are used in the vegetation section and include all acres both in and outside of the SPRNCA, within allotment boundaries, compared to all acres available in the analysis area.

Northern Mexican Gartersnake

The northern Mexican gartersnake is considered a terrestrial-aquatic generalist. The northern Mexican gartersnake is often found in riparian habitats and has been found hiding under cover in grassland habitat up to a mile away from any surface water (Cogan 2015). The northern Mexican gartersnake has historically been associated with three general habitat types: 1) source-area wetlands (e.g., ciénegas or stock tanks); 2) large river riparian woodlands and forests; and 3) streamside gallery forests (USFWS 2014). Northern Mexican gartersnakes forage along vegetated stream banks, searching for prey in water and on land (USFWS 2014). Their diet consists of amphibians and fishes, such as adult and larval (tadpoles) native leopard frogs, as well as juvenile and adult native fish (USFWS 2014). In situations where native prey species are rare or absent, this snake's diet may include non-native species, including larval and juvenile bullfrogs, western mosquitofish, or other non-native fishes (USFWS 2014). This prey base may be affected by changes in water quality (USFWS 2014).

There are 5,233 acres of northern Mexican gartersnake critical habitat within the analysis area, including 140 acres in the SPRNCA Allotments (less than 3% of critical habitat in the analysis area) (Table 41). Suitable habitat exists throughout all aquatic habitats, extending into all riparian communities. Persistent drought and ground water withdraw impact suitable riparian habitat for the species. Unauthorized livestock has occurred on the SPRNCA and has the potential to impact northern Mexican gartersnake and its suitable habitat by creating changes in the vegetation structure. The BLM has not documented any unauthorized livestock grazing from permitted livestock on the four SPRNCA Allotments. Northern Mexican gartersnake have been documented along the San Pedro River at various locations, including Lewis Spring, at the Highway 90 crossing, near Charleston, at the St. David Cienega, and along the San Pedro River near the San Pedro House and near the Babocomari River confluence (USFWS 2010). The known survey history in this area strictly involves the use of visual encounter techniques. The surveys took place in 1996, 1998, and 2000 at the Highway 90 crossing; in 1998 at Lewis Springs; and in 1996 at Curtis Flat. Aquatic snakes are very difficult to detect, and Northern Mexican gartersnakes may be more abundant and widespread on the SPRNCA than the survey data suggest.

Western Yellow-billed Cuckoo

The western yellow-billed cuckoo is primarily a riparian species that can be found in low- to moderate-elevation native forests lining the rivers and streams in the western U.S. It has also been found in xeric-riparian woodlands, Madrean evergreen woodland drainages, and mesquite woodlands in the Southwest. The available information suggests the western yellow-billed cuckoo requires large tracts of cottonwood/willow, mesquite forest, or Madrean evergreen woodland for their nesting season habitat. There is no Madrean evergreen woodland in the analysis area. Habitat can be relatively dense, contiguous stands, mosaics, linear, or savannah. The association of breeding with large tracts of suitable riparian habitat is likely related to home range size.

The San Pedro River has the largest population of western yellow-billed cuckoos in Arizona and one of the largest in the western Distinct Population Segment (USFWS 2014a). USFWS has designated 17,070 acres of critical habitat within the analysis area; 1,257 acres are within the SPRNCA Allotments (7.4% of critical habitat in the analysis area) (Table 41). This includes riparian woodlands that extend continuously for many miles and have the spatial extent, canopy closure (80%), and structural development of cuckoo breeding and foraging habitat. The northernmost reach of the SPRNCA is dominated by tamarisk, although Fremont cottonwood and Gooding's willow are present in this area. Foraging habitat within the action area extends into the uplands adjacent to currently suitable breeding habitat. The majority of designated critical habitat in the SPRNCA allotments is in this upland foraging habitat and not in the riparian areas used for foraging and breeding. Unauthorized livestock grazing has occurred on the SPRNCA and has the potential to impact western yellow-billed cuckoo and its suitable habitat by creating changes in vegetation structure and affecting streambank stability. The BLM has not documented any unauthorized livestock grazing from permitted livestock on the four SPRNCA Allotments .

Southwestern Willow Flycatcher

Southwestern willow flycatcher is a neotropical migrant that breeds in the southwestern U.S. and migrates to Mexico, Central America, and northern South America during the non-breeding season. The riparian patches used by breeding flycatchers vary in size and shape. They may be dense, linear, contiguous stands or mosaics of dense vegetation with open areas. According to the Southwestern Willow Flycatcher Recovery Plan (USFWS 2002), southwestern willow flycatchers nest in patches as small as 0.25 acre along the Rio Grande, and as large as 175 acres in the upper Gila River in New Mexico. Flycatchers are generally not found nesting in confined floodplains where only a single narrow strip of riparian vegetation exists, although they may use such vegetation if it extends out from larger patches, and during migration. While detections of southwestern willow flycatcher do occur within the SPRNCA, there is no designated critical habitat within the analysis area.

These birds occupy patches of cottonwood/willow gallery forest along the rivers' edges. The Arizona Breeding Bird Atlas confirmed southwestern willow flycatcher breeding along the upper San Pedro River (Corman and Wise-Gervais 2005). The BLM-operated Monitoring Avian Productivity and Survivorship (MAPS) bird banding studies have recorded a few observations of southwestern willow flycatcher during the breeding season along the San Pedro River between the international border and the community of St. David over the last 20 years. The analysis area is in the migratory path of southwestern willow flycatcher and is likely used as stopover habitat as the birds move between breeding grounds to the north and wintering grounds to the south. Unauthorized livestock grazing has occurred on the SPRNCA and has the potential to impact southwestern willow flycatcher and its suitable habitat by creating changes in vegetation structure and affecting streambank stability. The BLM has not documented any unauthorized livestock grazing from permitted livestock on the four SPRNCA Allotment..

3.4.5.3 Environmental Effects

Table 43. Acres of suitable habitat potentially impacted by livestock grazing without implementation of the water quality adaptive management across all land jurisdictions.

Species	Acres of Habitat Type Within the Grazing Allotments	Alt. A - Proposed Action	*Alt. A with Expanded RC Pasture*	Alt. A.1	*Alt. A.1 with Expanded RC Pasture*	Alt. A.2	Alt. B - No Grazing with IVM Alternative	Alt. D - No Grazing without IVM Alternative	Alt. C - No Action Alternative
Huachuca Water Umbel	16	1.4	*1.4*	0	*0*	1.4	0	0	1.4
Northern Mexican Gartersnake	269	248.1	*248.1*	233.6	*233.6*	248.1	177.6*	177.6*	248.1
Western Yellow-billed Cuckoo	702	668	*668*	620.8	*620.8*	668	216.1*	216.1*	668
Southwestern Willow Flycatcher	702	668	*668*	620.8	*620.8*	668	216.1*	216.1*	668

*solely state and private lands

Table 44. Acres of suitable habitat potentially impacted by livestock grazing with the implementation of the water quality adaptive management across all land jurisdictions.

Species	Acres of Habitat Type Within the Grazing Allotments	Alt. A - Proposed Action	*Alt. A with Expanded RC Pasture*	Alt. A.1	*Alt. A.1 with Expanded RC Pasture*	Alt. A.2	Alt. B - No Grazing with IVM Alternative	Alt. D - No Grazing without IVM Alternative	Alt. C - No Action Alternative
Huachuca Water Umbel	16	1.4	1.4	0	*0*	1.4	0	0	1.4
Northern Mexican Gartersnake	269	242.8	242.8	229.6	*229.6*	239.7	177.6*	177.6*	248.1
Western Yellow-billed Cuckoo	702	633.5	633.5	586.2	*586.2*	622.8	216.3*	216.3*	668
Southwestern Willow Flycatcher	702	633.5	633.5	586.2	*586.2*	622.8	216.3*	216.3*	668

*solely state and private lands

Table 45. Acres of suitable habitat potentially impacted by livestock concentration areas by alternative across all land jurisdictions.

Species	Acres of Habitat Type Within the Grazing Allotments	Alt. A - Proposed Action	*Alt. A with Expanded RC Pasture*	Alt. A.1	*Alt. A.1 with Expanded RC Pasture*	Alt. A.2	Alt. B - No Grazing with IVM Alternative	Alt. D - No Grazing without IVM Alternative	Alt. C - No Action Alternative
Huachuca Water Umbel	16	0	*0*	0	*0*	0	0	0	0
Northern Mexican Gartersnake	269	24.6	*24.6*	24.6	*24.6*	23.4	23.4*	23.4*	29.9
Western Yellow-billed Cuckoo	702	29.4	*29.4*	29.4	*29.4*	27.2	26.7*	26.7*	63.5
Southwestern Willow Flycatcher	702	29.4	*29.4*	29.4	*29.4*	27.2	26.7*	26.7*	63.5

*solely state and private lands

Table 46. Acres of suitable habitat potentially impacted by the proposed fence 25-foot buffers by alternative.

Species	Acres of Habitat Type Within the Grazing Allotments	Alt. A - Proposed Action	*Alt. A with Expanded RC Pasture*	Alt. A.1	*Alt. A.1 with Expanded RC Pasture*	Alt. A.2	Alt. B - No Grazing with IVM Alternative	Alt. D - No Grazing without IVM Alternative	Alt. C - No Action Alternative
Huachuca Water Umbel	16	0	0	0	*0*	0	0	0	0
Northern Mexican Gartersnake	269	10.8	10.8	12.2	*12.2*	8.8	10.2	10.2	0
Western Yellow-billed Cuckoo	702	8.3	8.3	8.5	*8.5*	7.6	7.8	7.8	0
Southwestern Willow Flycatcher	702	8.3	8.3	8.5	*8.5*	7.6	7.8	7.8	0

Table 47. Acres of proposed IVM treatments that overlap with designated critical habitat.

Critical Habitat	Proposed IVM treatment acres that overlap with critical habitat	Total critical habitat acres within analysis area
Huachuca water umbel	0	498
Western yellow-billed cuckoo	1,446.5	17,070
Northern Mexican gartersnake	3.3	5,233

The Proposed Action

Grazing is proposed to take place on 15,922 acres of BLM administered lands, primarily outside of any riparian area, except for the Babocomari Allotment. On the Babocomari Allotment, 12 AUMs (6 with the 50% temporary suspension of AUMs) would be authorized for the River Canyon Pasture from 11/1-3/31. This would restrict livestock access to the Babocomari riparian area during the breeding and migration season for the western yellow-billed cuckoo and southwester willow flycatcher, and growing season for Huachuca water umbel. The total number of acres impacted by overlap in riparian and xeroriparian area on the Babocomari Allotment is approximately 141, which represents approximately 0.9% of the total acreage of riparian and xeroriparian habitat available in the analysis area.

The total number of acres impacted by grazing in the riparian and xeroriparian area on the Brunckow Hill Allotment is approximately 70 acres. This represents approximately 0.5% of the total acreage of riparian and xeroriparian

habitat available in the SPRNCA. Under the Proposed Action, the total number of acres impacted by grazing in the riparian and xeroriparian area on the Brunckow Hill Allotment is approximately 51.7 acres. This represents approximately 0.4% of the total acreage of riparian and xeroriparian habitat available in the SPRNCA. The exclusion of the San Pedro River riparian area on the Brunckow Hill Allotment would largely protect the listed threatened and endangered species in the analysis area, as they primarily use riparian habitat.

Western yellow-billed cuckoo and southwestern willow flycatcher are known to leave riparian areas to forage and for migration. Forage habitat for these species may be impacted due to loss of vegetation cover from livestock grazing. If cattle are excluded from the River Canyon Pasture because water quality thresholds are exceeded (see Section 2.2.5.1), the impacts within riparian areas would be reduced compared to the No Action alternative and the Proposed Action without implementation of the water quality adaptive management as the primary habitats for all listed species would be excluded from grazing (Table 31).

If the expanded River Canyon Pasture is implemented due to the presence of cultural resources or other resource concerns, there would be an additional 344.2 acres of protected suitable habitat. This would decrease the amount of habitat impacted by grazing. Fence line construction would disturb vegetation; however, impacts would be short-lived, light in intensity, and would likely have no direct impact to any listed species.

IVM treatments are not proposed for designated critical habitats for the ESA listed species described in the affected environment, with the exception of yellow-billed cuckoo (Table 47). The IVM treatments are intended to shift vegetative communities towards reference state potential described in the ESDs (BLM 2022a, BLM 2022b, BLM 2022c). Generally, the proposed IVM treatments would reduce woody vegetation and increase perennial grass cover.

Huachuca Water Umbel

Impacts to Huachuca water umbel, if any, are expected to be minimal. There are no known populations in areas that are authorized for grazing under the Proposed Action. Analysis from the SPRNCA Proposed RMP and Final EIS identified that livestock grazing could degrade riparian areas and affect streambank stability, which would move habitat conditions away from those suitable for Huachuca water umbel (BLM 2019b). Livestock grazing can affect Huachuca water umbel and its designated critical habitat through trampling, grazing, degradation of bank stability, and alterations to stream hydrology (BLM 2019b). Cattle generally do not eat water umbel because the leaves are too close to the ground, but they can trample plants (BLM 2019b). However, Huachuca water umbel is capable of rapidly expanding in disturbed sites and could recover quickly from light trampling by extending undisturbed rhizomes (Warren et. al. 1991, BLM 2019b, 3-65).

On the Babocomari Allotment, there is no designated critical habitat and no known populations of Huachuca water umbel. Livestock grazing within the period of use in the Babocomari River riparian area may result in loss of suitable habitat due to soil compaction and changes in water quality that may alter the natural content of nutrients such as nitrogen, potassium, and phosphorus (BLM 2019b, 3-65).

On the Brunckow Hill Allotment, there are 9 acres of designated critical habitat along the portion of the allotment that cuts across the San Pedro River (1.8% of critical habitat in the analysis area) (Table 41), however there are no known populations of Huachuca water umbel on this portion of the river.

On the Three Brothers and Lucky Hills Allotments there are no riparian areas and thus no suitable habitat or populations of Huachuca water umbel.

Range improvement projects would have minimal impact on Huachuca water umbel habitat as they would be located away from any area suitable for the species. Impacts that may occur would be along those areas of habitat where fences are constructed across wetted soils along the banks of the Babocomari and San Pedro Rivers. This disturbance would be temporary and no long-term impacts would occur.

Proposed IVM treatments would not occur in Huachuca water umbel designated critical habitat or riparian habitat (Table 47 and Table 33). Therefore, direct effects such as reductions in woody cover and increases in perennial grass cover from treatments are not expected to occur. Indirect impacts from these treatments may occur from runoff after herbicide application which may result in low concentrations of herbicide reaching Huachuca water umbel habitat. Effects from herbicide runoff are expected to be negligible and likely inconsequential to the species as herbicide concentrations would be extremely low due to the low application rate (see section 3.4.1 for additional

detail on runoff potential into off-site riparian vegetation). In addition, Huachuca water umbel designated critical habitat and known occupied habitat would be buffered by a minimum of 300 meters (984 ft), and with the application of appropriate BMPs (WR-01, WR-02, SO-01 in Appendix G), herbicide application would not affect Huachuca water umbel. Prescribed fire is not proposed in Huachuca water umbel suitable or critical habitat, so there would be no direct impacts. Indirect impacts may include sediment deposition in suitable habitat due to excessive run off in burned areas after heavy precipitation. This could also cause scouring of occupied or suitable sites downstream of a prescribed burn. These impacts would lessen over time as ground cover in the upland areas that are burned recovers. Seeding and installation of erosion control features would not negatively impact Huachuca water umbel habitat as those activities are highly localized and would not occur in areas occupied by Huachuca water umbel. Indirect positive benefits to water umbel would include soil stabilization in the upland areas, reducing the occurrence of sedimentation in areas that water umbel may be present.

Northern Mexican Gartersnake

The Northern Mexican gartersnake is largely a riparian species. All known occurrences of northern Mexican gartersnakes on the SPRNCA have occurred at or very near natural surface water. These areas are mostly not authorized for grazing. Analysis from the SPRNCA Proposed RMP and Final EIS in Section 3.2.6 pages 3-65 and 3-66 (BLM 2019b) identified that livestock grazing could affect northern Mexican gartersnake habitat by causing changes in vegetation structure.

On the Babocomari Allotment, there are 77 acres of designated critical habitat (Table 41) and one documented occurrence (Rosen and Schwalbe 1988). The Babocomari Allotment contains an additional 19 acres of northern Mexican gartersnake suitable habitat that may be impacted by livestock grazing during the period of use, which represents 1% of the total acres of suitable northern Mexican gartersnake habitat available in the analysis area (Table 42). Impacts to northern Mexican gartersnake habitat that may occur on the Babocomari Allotment include trampling by livestock, loss of vegetative cover, and loss of vegetative cover used for thermal protection.

On the Brunckow Hill Allotment, there are 63 acres of designated critical habitat and no documented occurrences (Table 41). In addition to the 63 acres of designated critical habitat, the Brunckow Hill Allotment contains an additional 14 acres of suitable northern Mexican gartersnake habitat that may be impacted by livestock grazing, which represents less than 1% of the total acres of suitable northern Mexican gartersnake habitat available in the analysis area (Table 42). In the area that livestock have access to (not the riparian area along the San Pedro River), impacts to northern Mexican gartersnake would include trampling by livestock and loss of vegetative cover used for foraging, thermal protection, and evading predators (Rosen and Schwalbe 1988).

On the Three Brothers and Lucky Hills Allotments there are 168 acres of cottonwood/willow riparian habitat. While these acres are inside the allotment boundaries, they will be fenced out and are not proposed for grazing. Therefore, there will be no grazing impacts to northern Mexican gartersnake or its designated critical habitat on these allotments.

Range improvements would have minimal impact on northern Mexican gartersnake habitat as they would be located away from any area suitable for the species. The exception to this may occur where fences cross wetted channels of the Babocomari. Impacts in these areas would be clearing of vegetation used for thermal and predatory protective cover; these impacts would be temporary until the vegetation recover naturally.

IVM treatments are not planned for areas that are commonly used by northern Mexican gartersnake. GIS analyses determined that 3.3 acres of northern Mexican gartersnake designated critical habitat overlap with the proposed IVM treatments (Table 47); however, these acres would be excluded from IVM treatment during the treatment unit planning process. Northern Mexican gartersnake is a mobile species but is primarily an aquatic/riparian species that is rarely found in upland areas where IVM treatments would occur. Indirect impacts to this species from IVM treatments would be similar to those described for Huachuca water umbel. Impact would be a temporary reduction in upland ground cover which may influence river flows in a way that scours vegetation in the riparian areas and reductions in ground cover used by gartersnakes for thermal and predatory protection (See section 3.4.1 for additional details about runoff potential).

Western Yellow-billed Cuckoo

Western yellow-billed cuckoo habitat in the analysis area consists of nesting, foraging, and migration habitat. The analysis area for western yellow-billed cuckoo is expanded to include all of the upper San Pedro critical habitat unit,

in addition to the SPRNCA and SPRNCA Allotments. Western yellow-billed cuckoo primarily nest in riparian areas which occur on the Babocomari and Brunckow Hill Allotments. Analysis from the SPRNCA Proposed RMP and Final EIS (BLM 2019b) identified that livestock grazing could affect western yellow-billed cuckoo habitat by causing changes in vegetation structure. In addition, livestock may degrade riparian areas and affect streambank stability, which would move habitat conditions away from those that are suitable for western yellow-billed cuckoo (BLM 2019b, 3-65).

Western yellow-billed cuckoo foraging and migration habitat occurs on all four allotments. Foraging habitat occurs in the riparian, xeric riparian areas, and in the adjacent uplands. Livestock grazing may cause reductions in upland and riparian vegetation which could impact ground foraging opportunities and reduce protective cover from predators. Western yellow-billed cuckoo migration habitat is located throughout the analysis area. While livestock grazing is likely to cause reductions in vegetative cover, impacts to western yellow-billed cuckoo migration habitat is expected to be minimal as the areas are visited briefly for stopover.

On the Babocomari Allotment, there are 467 acres of designated western yellow-billed cuckoo critical habitat, 60 additional acres of suitable habitat, and numerous known occurrences of western yellow-billed cuckoo. The Babocomari Allotment contains 527 acres of western yellow-billed cuckoo suitable habitat that may be impacted by livestock grazing during the cool season period of use, which represents 2% of the total acres of western yellow-billed cuckoo habitat available in the analysis area. Western yellow-billed cuckoo nesting habitat and designated critical habitat may be impacted by livestock grazing in riparian areas through the loss of vegetative cover needed for successful nest placement. While the trees used for nesting are likely not to be grazed as larger trees such as Fremont cottonwood, Goodding's willow, and tamarisk are most commonly selected (McNeil et al. 2013), the recruitment of new trees is likely to be reduced through livestock grazing on saplings. This loss of new trees may reduce the total number of available nesting trees over time. Additionally, the livestock may use the trees as scratching posts which could knock nests down or knock nestlings out of nests. Livestock are known to attract cowbirds, which parasitize western yellow-billed cuckoo nests and may displace additional nestlings, further reducing nest survival; due to the continued use of adjacent private and state lands for livestock grazing, this impact is present throughout all alternatives.

On the Brunckow Hill Allotment, there are 81 acres of designated critical habitat, 65 additional acres of suitable habitat, and numerous known occurrences of western yellow-billed cuckoo. The Brunckow Hill Allotment contains 146 acres of western yellow-billed cuckoo suitable habitat that may be impacted by livestock grazing, which represents less than 1% of the total acres of western yellow-billed cuckoo habitat available in the analysis area. Of the 146 acres, 18.3 acres of riparian habitat along the San Pedro River will be fenced out and not available for grazing. The remaining areas of suitable habitat not excluded would experience impacts similar to those described for the Babocomari Allotment.

Fence construction would clear some vegetation in areas of suitable riparian habitat and upland foraging habitat. The installation of fences may displace some individuals due to temporary disturbance as fences are constructed, however fences would be constructed outside of breeding season in critical habitat along the Babocomari and San Pedro Rivers. The fence construction would result in a temporary reduction in vegetative cover, but vegetation would grow back naturally over time, resulting in no long-term negative effects. No livestock water installations would occur in riparian habitat suitable for the species. In upland habitat, implementation of livestock waters would create areas of higher livestock concentration, which would diminish the vegetative cover in areas directly surrounding the water source.

IVM treatments are proposed on 1,446 acres of western yellow-billed cuckoo designated critical habitat. This represents 8% of the total acres of western yellow-billed cuckoo designated critical habitat in the analysis area. The areas of western yellow-billed cuckoo habitat that are proposed for treatment are comprised of desert washes and upland areas that are used by the species periodically for foraging and migration; no treatments are planned for riparian areas used for nesting and foraging. Treatments that occur in upland areas may include herbicide treatments, prescribed fire, and seeding, as described in the Proposed Action. Impacts from these treatments may include reductions in upland foraging and perching opportunities due to losses in woody vegetative cover that may be used by cuckoos. Due to the limited scope of the treatments in areas that cuckoos may use, direct impacts from IVM treatments are expected to be minimal.

Southwestern Willow Flycatcher

Under the Proposed Action, southwestern willow flycatcher is expected to be minimally impacted due to the infrequent occurrence and lack of suitable occupied habitat in the analysis area. Analysis from the SPRNCA Proposed RMP and Final EIS (BLM 2019b) identified that livestock grazing could affect southwestern willow flycatcher habitat by causing changes in vegetation structure. Livestock grazing in potential southwestern willow flycatcher habitat can affect southwestern willow flycatcher recovery by preventing the growth and development of woody riparian plant species and/or slowing progression toward suitable habitat (BLM 2019b).

There is no designated critical habitat within the analysis area and no suitable breeding habitat. There are 702 acres (6% of acres in analysis area) of suitable habitat within the allotment boundaries, primarily used as migration and stopover habitat. Impacts that may occur from grazing to the southwestern willow flycatcher are limited to the potential loss of foraging opportunities in those areas that experience loss of vegetation that supports the insects southwestern willow flycatchers prey upon. Impacts from range infrastructure include clearing of vegetation from fence line construction and potential for increases in cowbird activity around watering sites. These impacts will be negligible as the area is only periodically occupied by southwestern willow flycatcher and not normally used for nesting. Impacts to the species from range infrastructure projects would be similar to those described for yellow-billed cuckoo.

IVM treatments will have similar impacts to habitats used by southwest willow flycatcher as yellow-billed cuckoo. These effects are likely to have a minimal impact on southwest willow flycatcher as they are only in the region temporarily during times of migration and stopover.

Alternative A.1

Impacts to listed species on the Babocomari, Three Brothers, and Lucky Hills Allotments would be the same as under the Proposed Action.

Under Alternative A.1, the Brunckow Hill Allotment boundary would be modified to exclude 136 acres of BLM land west of the railroad grade. As a result, the impacts described to listed species under the Proposed Action would be eliminated within the 136 acres of BLM land where livestock would be excluded.

Alternative A.2

Impacts to listed species on the Brunckow Hill, Three Brothers, and Lucky Hills Allotments would be the same as under the Proposed Action.

Under Alternative A.2, the Babocomari River Canyon Pasture fence would not be built and AUMs would be reduced or removed from the River Pasture altogether if the water quality adaptive management is fully implemented. Alternative A.2 would have the same impacts as under the Proposed Action except the impacts described to listed species under the Proposed Action would be eliminated within the 1,891 acres of BLM land within the Babocomari Allotment where livestock would be excluded if the water quality adaptive management is fully implemented.

Alternative B (No Grazing with IVM Alternative)

Under this alternative, the impacts to listed species would be less than those described under the Proposed Action as 15,922 combined acres of all habitats would be excluded from livestock grazing compared to the Proposed Action.

Impacts from range improvements would be limited to the fence construction to exclude the SPRNCA from livestock grazing. The impacts in those areas would be similar to those described in the Proposed Action, with the difference being the number of acres affected. The construction of the SPRNCA boundary fence would occur primarily in upland areas, except at the boundary lines crossing the Babocomari and San Pedro Rivers.

Impacts from IVM treatments would be similar to those described in the Proposed Action. The removal of livestock grazing from the allotments would eliminate those impacts described in the Proposed Action and would allow for increases in ground cover that would enhance the habitat available for all species.

Alternative C (No Action Alternative)

Under the No Action alternative, the BLM would renew the four allotment grazing leases for a period of 10 years under the current terms and conditions. This would not include range improvements (water developments and fences); 50% temporary suspension of AUMs; adaptive management as described in the Proposed Action, and Alternatives A.1 and A.2; and IVM treatments. Livestock grazing would continue to take place primarily outside of

riparian areas, with the exception of the Babocomari Allotment. The No Action alternative would not restrict the period of use in the Babocomari Allotment riparian area, therefore year-round use of the riparian area in the Babocomari Allotment would impact the listed threatened and endangered species as they all rely on riparian areas. Impacts from range improvements would be eliminated as no range improvement projects would be implemented. Impacts from IVM would not occur under this alternative, neither negative impacts from the treatments themselves, nor the beneficial impacts of increasing perennial grasses in upland habitat.

Huachuca Water Umbel

Under the No Action alternative, Huachuca water umbel is expected to be minimally impacted due to the lack of occurrence of the species in areas that would continue to be authorized for grazing however, the habitat that could be potentially colonized may be negatively impacted through soil compaction, degradation of bank stability, and alterations to stream hydrology (BLM 2019b).

On the Babocomari Allotment, there is no designated critical habitat and currently no populations of Huachuca water umbel. There would be no restriction on the period of use, nor would there be adaptive management. Year-round livestock grazing in the Babocomari River riparian area may result in loss of suitable habitat due to soil compaction and changes in water quality.

On the Brunckow Hill, grazing may occur along the 9 acres (Table 41) of designated critical habitat. There are no know populations of Huachuca water umbel along that portion however livestock grazing may impact the habitat as described above.

Three Bothers and Lucky Hills allotments have no designated critical habitat, no suitable habitat, and no known occurrences of Huachuca water umbel. This alternative would not impact the species.

Northern Mexican Gartersnake

On the Babocomari and Brunckow Hill Allotments, 77 and 63 acres, respectively, of northern Mexican gartersnake designated critical habitat would continue to be available for livestock grazing. The impacts to northern Mexican gartersnake habitat that may occur on the Babocomari Allotment include trampling by livestock, loss of vegetative cover and thermal protection, and changes in water quality that may reduce forage opportunities and negatively impact the gartersnake itself.

The Three Brothers and Lucky Hills do not contain suitable habitat for northern Mexican gartersnake.

Western Yellow-billed Cuckoo

On the Babocomari Allotment, 668 acres of western yellow-billed cuckoo designated critical habitat would be available to year-round livestock grazing under the No Action alternative. Year-round livestock grazing in the Babocomari Allotment riparian areas would impact western yellow-billed cuckoo nesting habitat through the loss of vegetative cover needed for successful nest placement. Recruitment of new trees is likely to be reduced through livestock grazing on new saplings. This loss of new trees may reduce the total number of available nesting trees over time. Additionally, livestock may use the trees as scratching posts which could knock nests down or knock nestlings out of nests. Livestock are known to attract cowbirds, which parasitize western yellow-billed cuckoo nests and may displace additional nestlings, further reducing nest survival. These impacts would not be mitigated by the adaptive management not included in the No Action alternative and would continue through the duration of the lease.

On the Brunckow Hill Allotment, livestock grazing would continue to not occur on the San Pedro River. In the area where livestock grazing would continue on the Brunckow Hill Allotment and the impacts to western yellow-billed cuckoo habitat would be similar to the impacts described under the Proposed Action.

Impacts common to both allotments include the potential loss of foraging opportunities in those areas that experience loss of vegetation that supports prey insects. Without additional range infrastructure installations, the impacts caused by the clearing of vegetation would not occur.

Under the No Action alternative, impacts from livestock grazing to the western yellow-billed cuckoo on the Lucky Hills and Three Brothers Allotments would be similar to those described in the Proposed Action.

Southwestern Willow Flycatcher

Under the No Action alternative, the impacts to southwestern willow flycatcher are expected to be minimal due to the infrequent occurrence of the species and the lack of suitable occupied habitat in the area currently available for livestock grazing. There is no designated critical habitat within the analysis area. Southwestern willow flycatchers use the analysis area for migration and stopover habitat and are found opportunistically using the habitat during those journeys. Impacts that may occur under the No Action alternative are limited to the potential loss of foraging opportunities in those areas that experience loss of vegetation that supports prey insects. Without additional range infrastructure installations, the impacts caused by the clearing of vegetation would not occur.

Alternative D (No Grazing without IVM Alternative)

Under this alternative, impacts to the four federally listed species analyzed in detail from both grazing and IVM treatments would be eliminated. While the short-term negative impacts from prescribed fire, herbicide application, and erosion control feature construction would not occur, the long-term positive impacts of shifting the vegetation communities toward the desired resource condition would also not occur. Upland environments that surround the habitats used by the ESA species would remain in similar condition. The lack of grazing would benefit species as those direct impacts would be eliminated however the lack of IVM treatment would likely result in the surrounding environment remaining in a static state, with no net benefit. The benefits provided by increases in perennial grasses such as additional wildlife foraging, breeding, and cover habitat, armoring of soils from erosion, and reductions of sedimentary deposition in the river would not occur. These factors would contribute to the potential for degradation of habitats that currently support the federally listed species referenced in this section.

3.4.6 Issue 6: Cultural Resources

How would livestock grazing impact cultural resources in areas where cattle are most likely to concentrate?

The analysis area for this issue is the land within the River and River Canyon Pasture of the Babocomari Allotment, potential livestock congregation areas on all SPRNCA allotments, and locations where new or replacement range infrastructure and fencing are proposed. This spatial scale was chosen because grazing operations and other actions that affect cultural resources are managed and occur within the allotments. The temporal scale is 10 years as that is the period of the lease renewal.

3.4.6.1 Analysis Assumptions

- Livestock concentration areas are defined as a 166-foot area around any BLM-administered livestock waters, salt licks, feed locations, corrals, and chutes (i.e., existing and proposed range infrastructure on public lands) as well as a 166-foot area around major waterways such as the San Pedro and Babocomari Rivers (BLM 2018).
- Based on an interpolation of existing SPRNCA grazing allotment inventory data, this analysis identifies the number of currently documented cultural sites within the proposed areas of potential effect (APEs), of which a *maximum* of 60% could be considered historic properties (rounded to the nearest whole number).
- Because cultural resources are nonrenewable, potential impacts are considered long-term, likely permanent, and irretrievable; however, some impacts—such as those related to setting or caused by access during a construction or maintenance project—can be short-term and temporary.

3.4.6.2 Affected Environment

Regulatory Context

In addition to NEPA analysis, the BLM's authorization of grazing leases and range improvements are considered undertakings subject to compliance with Section 106 of the National Historic Preservation Act (NHPA; 54 United States Code [U.S.C.] 306108 *et seq*.) and its implementing regulations found at 36 CFR 800, wherein the BLM has the legal responsibility to consider the effects of its actions on historic properties.[7] The BLM Manual 8100 Series (BLM 2004) and the BLM's Arizona Vegetation and Range Management Programmatic Agreement (Range PA;

[7] As defined in 36 CFR 800.16(l)(1), a historic property is any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the NRHP.

Appendix D) provide applicable Section 106 compliance procedures to meet appropriate cultural resources management standards for all action alternatives.

The Range PA allows the BLM to deploy a phased approach in its Section 106 review and compliance for each of the potential undertakings outlined in the action alternatives. Notably, Section 106 does not require a federal agency to conduct 100% survey of an undertaking's APE. Rather, the identification efforts are conditioned by where effects are likely to occur and the likelihood that an adverse effect[8] could occur to unevaluated, National Register of Historic Places (NRHP)-eligible, or NRHP-listed properties (i.e., historic properties). Federal agencies are also not required to preserve historic properties—the regulatory review and compliance process is followed to ensure that decisions regarding the treatment of such places are derived through well-informed consideration of potential cultural and historic values while weighing available options for the protection of historic properties.

It is important to note that an adverse effect to a historic property does not necessarily translate to a significant impact under NEPA definitions (40 CFR 1508.27). Impacts to cultural resources may be considered significant if historic properties were projected to become damaged, destroyed, or removed from federal protections without appropriate consideration or mitigation. In conducting NEPA analyses—and in accordance with Section 106 of the NHPA—potential impacts may be resolved through a variety of measures including avoidance; minimization; or data recovery via intensive research, detailed documentation, or excavation (BLM 2019a: Appendix A). The BLM may implement data capture and recovery methods when other options are not feasible. Such mitigation strategies can be used to resolve adverse effects; however, archaeological excavation is inherently destructive.

Cultural and Historical Context

Cultural resources are expressions of human culture and history in the physical environment. The term "cultural resource" can refer to archaeological and architectural sites, structures, or places with public and potential scientific value, including locations of traditional, cultural, or religious importance to a specified social or cultural group. As defined by the BLM, cultural resources are contained within a definite location of human activity, occupation, or use that are identifiable through field inventories (i.e., surveys), historical documentation, or oral histories (BLM 2004).

Archaeological resources may refer to the remains of prehistoric or historic-age materials, structures, and items used or modified by people. Historic resources may include sites, buildings and structures, and landscape alterations that have occurred since the arrival of Euro-Americans; those associated with Native Americans during this era are referred to as "ethnohistoric" (alternatively, "protohistoric"). Sites that demonstrate use by more than one cultural group or multiple, distinct periods of use or occupation are referred to as "multicomponent."

The San Pedro River Valley has been occupied with varying levels of intensity for more than 12,000 years, with the complexity and variety of cultural resources evidenced by the unique qualities and multiple uses of the river itself. Successive episodes of human confluence and conflict have existed here through time. The Upper San Pedro River exists at the "periphery" of multiple, distinct prehistoric "culture areas" referred to by archaeologists as the Hohokam, Salado, Mogollon, Casas Grandes, Rio Sonora, and Trincheras traditions. Cultural conflict and convergence later occurred among the Spanish and local indigenous groups such as the Sobaípuri (O'odham) and Apache. Subsequent Euro-American settlement and land uses were driven by the Spanish Entrada; and later U.S. westward expansion initiatives involving ranching, the installation of the U.S. military at Fort Huachuca, and mining operations in the nearby Dragoon Mountains and surrounding hills.

Documented archaeological and historical evidence indicates the most intensive periods of human occupation and land-use along the SPRNCA occurred during the prehistoric Formative (A.D. 1 – A.D. 1450) and the subsequent, historic-age Euro-American (e.g., Spanish and U.S.; A.D. 1450 – A.D. 1960) eras. The following sections provide a brief summary of the historic ranching context of the SPRNCA.

The Babocomari and Little Boquillas Ranches[9]

The Babocomari Allotment is a federal lease-component of the adjacent San Ignacio del Babocomari ranch—a former Spanish land grant that was originally issued to the families of Rafael Elias Gonzales and Ignacio Elias Gonzales (a.k.a., the Elias brothers) in 1832, under the provisions of the 1824 Law of Colonization. Two adjacent land grants owned and occupied by the same families—the San Juan de las Boquillas y Nogales and San Rafael

[8] As defined in 36 CFR 800.5(a), an adverse effect is found when an action may alter the characteristics of a historic property…in a manner that would diminish the integrity of the property's location, design, setting, workmanship, feeling, or association.

[9] Summarized from Brophy (1966), Wagoner (1975), and Stewart (2013).

del Valle—comprise most of what is now the BLM-administered SPRNCA, along with portions of the Brunckow Hill, Lucky Hills, and Three Brothers Allotments (see Figure 3-4).

Although its boundaries were somewhat indefinite, the Babocomari grant encompassed eight leagues (*sitios*), roughly 130,000 acres. The Elias family built between the Santa Rita Mountains and San Pedro River. The Elias brothers were subsequently murdered and, after two decades of successful ranching operations, the remaining family returned to Arizpe, Sonora, leaving their cattle behind to roam the open range. After several decades of turnover, the Brophy family acquired the Babocomari Ranch in 1935; they are the third family to own the ranch since the King of Spain first took "possession" of the area 400 years earlier.

San Francisco businessman George Hearst and his partner, George Hill Howard, purchased the Boquillas land grant from the Elias family in 1880. Hearst, who eventually became the sole owner of the property, began selling off parcels for townsites, mills, ranches, farms, and a railroad. In 1891, the U.S. government established the Court of Private Land Claims to validate land grant claims and resolve claims disputes. George Hearst died the same year and his son, William Randolph Hearst, and his widow, Phoebe Hearst, filed for exclusive claim to the Boquillas land grant. The Land Claim Court ruled in favor of the Hearst family in 1899. A group of 30 residents filed suit to dispute the ruling, but the Supreme Court ultimately affirmed the lower court's decision in 1906.

In 1901, while their case was still pending in the Supreme Court, the Hearst family sold the Boquillas land grant to the Kern County Land and Cattle Company. Kern then formed the Boquillas Land and Cattle Company and began raising cattle from a new headquarters established two miles south of Fairbank at the Little Boquillas Ranch. The Boquillas Land and Cattle Company subsequently evicted "squatting" homesteaders from the area, allowing only a handful of favored families and their businesses to remain.

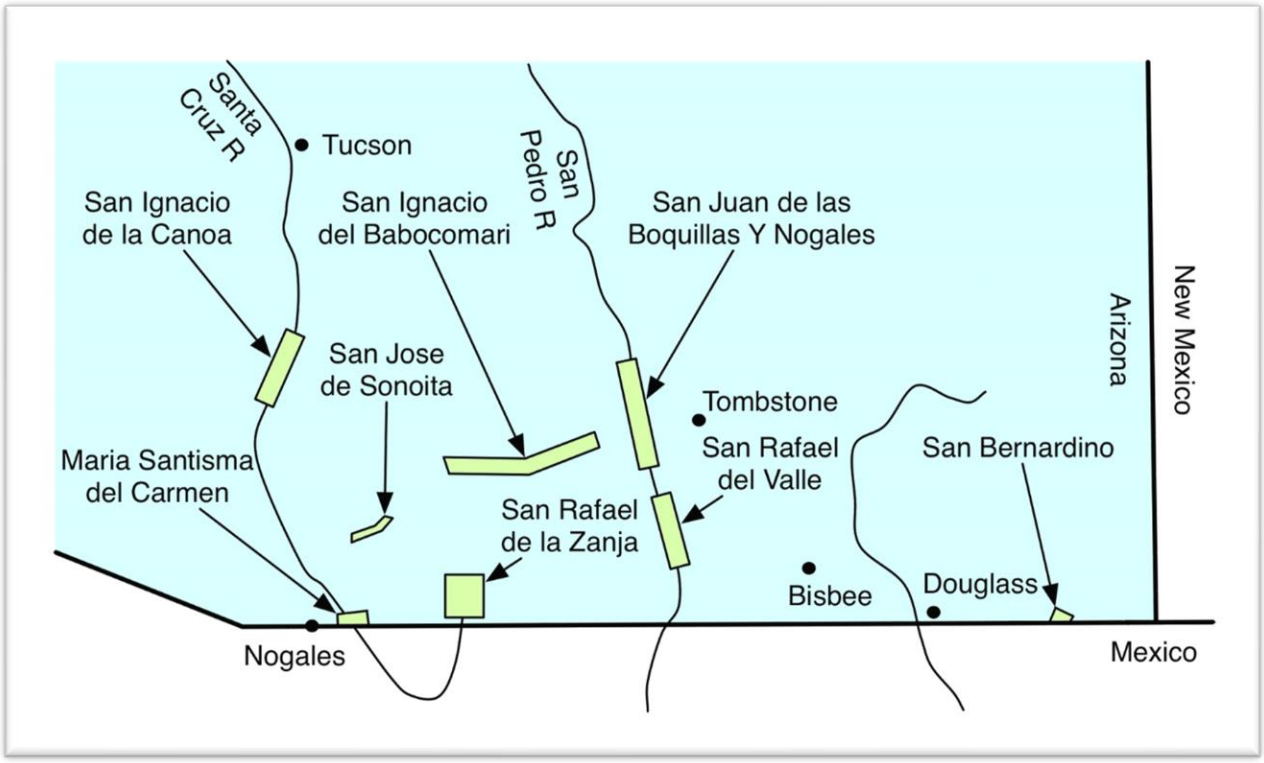

Figure 3-4. Map of Historic Spanish Land Grants in Southeastern Arizona (adapted from Walker and Bufkin 1986).

The Little Boquillas Ranch continued operations until 1971 when the Tenneco Oil Company obtained title to the Boquillas and Del Valle land grants through acquisition of the ranch's parent company. The grants were then offered to the U.S. government in a 1986 land exchange that subsequently resulted in the Congressional designation of the BLM-administered SPRNCA.

Existing Inventory Data and Resource Conditions

A BLM cultural resources specialist completed a comprehensive Class 1 (existing information) assessment of the SPRNCA Allotments between February 20 and March 16, 2020. Data utilized in this review was obtained from BLM cultural program project files, site reports, and atlases, in addition to BLM-maintained General Land Office plats and patent records. Electronic files were also reviewed using online cultural resource databases including *AZSite* (2020)—Arizona's statewide cultural resource inventory system—and the *National Register of Historic Places NPGallery Digital Asset Search* (2020). The results of archival research are summarized as follows; data provided are applicable to BLM-administered lands within the subject allotments and based on currently available information from the aforementioned sources.

Background research identified 43 prior cultural resources investigations that, collectively, have inventoried approximately 2,223 acres of BLM-administered lands for an average, aggregated survey coverage of 14% of public lands within the SPRNCA Allotments (see Table 48). Prior inventories have documented 53 cultural resource sites on or immediately adjacent to public lands within the allotments, with 32 of these sites being considered historic properties (i.e., NRHP-listed or -eligible, and unevaluated sites) while the remaining 11 are not eligible for NRHP listing.

Table 48. Acres of prior cultural resources inventory per SPRNCA Grazing Allotment.

Allotment	Total BLM Acreage	BLM Acres Inventoried	Percent of BLM Acreage Inventoried
Babocomari	2,030	170	8.4
Brunckow Hill	1,228	1,128	91.9
Lucky Hills	2,619	765	29.2
Three Brothers	10,045	160	1.6
Total	***15,922***	***2,223***	***14***

Review of existing background data for the SPRNCA grazing allotments provides for a projected cultural site density of 0.023 sites per acre, of which approximately 60% may be considered historic properties. This calculated density and the ratio of cultural sites to historic properties is notably higher than the SPRNCA-wide averages (i.e., 0.011 sites per acre with 40% historic properties; see BLM 2018, 3-75); however, more intensive human use—with increased cultural site density and complexity—is expected near the confluences of major waterways such as with the SPRNCA grazing allotments' locations in the vicinity of the confluence of the Babocomari and San Pedro rivers.

Of the 53 documented sites, 18 are prehistoric or ethnohistoric, 34 are historical-age, and 1 site contains both prehistoric and historical-age components (i.e., multicomponent). Site types include prehistoric resource procurement and processing locales, seasonal camps, agricultural features, rock art, and habitation sites, as well as historic-age habitations and camps, mining and prospecting sites, roads, dumps, and railroad alignments. Prominent historic properties of particular interest within or adjacent to the SPRNCA Allotments include Brunckow Cabin (in the Brunckow Hill Allotment) and the NRHP-listed Tombstone Townsite (a.k.a., the Tombstone Historic District),which is comprised of private and municipal lands that abut BLM lands within the Lucky Hills Allotment).

Historic-age General Land Office plat maps depict numerous constructed features throughout the SPRNCA allotments. Several of these features correspond with range improvements and potential livestock concentration areas on BLM-administered lands; however, these historic land-use features—in particular, those related to ranching and mining—also serve as evidence of the long-term history and continuity of such activities, much of which predates the mid-to-late 1800s. As such, many of these features have likely been removed, repurposed, or substantially modified as a result of their uses over time.

The region has been historically grazed (i.e., for more than 50 years) with the intensity of livestock generally decreasing over time. Any extant historic property within the SPRNCA Allotments—and where potential for impacts exist—is likely to have sustained impacts as a result of prior livestock activities or other historic land-uses such as agricultural, mining, and related transport activities or residential construction (e.g., homestead, ranching, and townsite developments). Although continued livestock use may not pose additional impacts in areas where prior grazing was intensive, secondary effects such as increased erosion could cause long-term, irreversible impacts to historic properties, where present. Livestock use also has increased ground visibility over time as a result of decreased ground cover, increased erosion, and the installation or removal of range improvements such as livestock waters, corrals, and pipelines. These factors may expose, or have previously exposed, cultural deposits that would have otherwise remained obscured or buried.

Cultural resources are, however, constantly subject to site formation processes or events after their creation (Binford 1981; Schiffer 1987). These processes can be both cultural and natural; they may occur instantly or over thousands of years. Cultural formation processes may include activities directly or indirectly caused by humans. Natural processes can include chemical, physical, and biological processes of the environment that may impinge upon or modify cultural materials. Thus, all cultural resources have been formed by and are subject to a variety of impact-causing factors throughout time.

Within and around the SPRNCA, there are prior, actively occurring, and anticipated future impacts to cultural resources caused by erosion and weathering, use and maintenance of roads and trails, railroads, homesteading and ranching, mining, military use, recreation, vandalism and illegal collection, and isolated development or construction projects. BLM-authorized actions that could affect cultural resources within the SPRNCA Allotments would be subject to individual project review and compliance procedures to avoid, minimize, or mitigate potential impacts to cultural resources. Other activities within and adjacent to the analysis area—such as road construction, real estate development, and maintenance of utility infrastructure—may be reviewed and approved by other federal, state, or local agencies, as necessitated by applicable law.

3.4.6.3 Environmental Effects

For the purposes of NEPA impact analysis, BLM cultural resources specialists utilize the APE (from the concurrent process identified under Section 106) to determine the potential for significant impacts within the proposed project area being analyzed. For individual range improvement projects—i.e., construction-related activities such as the operation and maintenance of existing infrastructure, fence installation or replacement, and above-ground pipeline installations—APEs are generally defined as the construction footprint plus any temporary and project-related use- or access-areas; however, individual construction projects may also qualify as exempted or screened undertakings in accordance with criteria and thresholds specified in the aforementioned Range PA. Activities such as dispersed grazing generally result in only minor surface disturbances with limited potential to impact cultural resources. Past studies and analyses have demonstrated that grazing impacts on cultural resources are primarily of concern in areas of concentrated livestock use, such as around water sources and corrals (c.f., Roney 1977; Van Vuren 1982; Osborn et al. 1987; Osborn and Hartley 1991; Broadhead 2001). Thus, for grazing lease authorizations, the BLM defines the APE as the area(s) on BLM-administered lands (i.e., under the BLM's jurisdictional authority) where livestock are most likely to concentrate.

Based on the issues identified for analysis and the APEs identified for the action alternatives, the specific analysis areas considered here are focused on the River and River Canyon Pastures of the Babocomari Allotment, potential livestock congregation areas on all SPRNCA Allotments, and locations where new or replacement range infrastructure and fencing are proposed. Archival data were compared against livestock grazing and range improvement data to determine the potential for impacts to cultural resources or historic properties, particularly in defined livestock concentration areas.

Impacts where livestock concentrate may include trampling, chiseling, and churning of site soils, cultural features, and artifacts; and impacts from standing, leaning, or rubbing against historic structures or other aboveground cultural features such as rock art. Impacts may also include accelerated erosion and gullying, exposure of buried deposits, and increased potential for illegal artifact collection or vandalism, especially in areas accessible to the public. Ground disturbances—including construction-related activities and off-road vehicular use and access—can impact cultural resources by damaging or destroying artifacts or features; and by altering the integrity of a particular resource, including its setting.

The primary method for determining effects on cultural resources is by qualitatively applying the criteria of adverse effects on historic properties; however, that will be accomplished through phased compliance with the Range PA. This analysis will quantify and disclose the estimated, total potential impacts to cultural resources based on a recent Class 1 (existing information) assessment and projected impacts to historic properties based on the maximum potential ratio of sites to historic properties. This method is used to account for gaps in cultural resources inventory data or where existing data may not meet current professional standards. It also serves to identify locations within the analysis areas that may warrant further assessment.

For this analysis, impact indicators to quantify the impacts to estimated and known quantities of cultural resources and/or potential historic properties include the following:

- The extent (in acres) of proposed construction-related, ground-disturbing activities, including temporary access routes and material laydown areas, and their potential to impact cultural resources and/or historic properties.

- The extent to which a proposed construction activity alters the setting (including visual and audible factors) where such factors are relevant to certain types of historic properties, most commonly those considered NRHP-eligible under Criteria A, B, or C (NPS 1995). Two such historic properties, Brunckow Cabin and the National Register-listed Tombstone Townsite, are not within the potential APEs for this project and will not be further analyzed. Further, existing inventory data show that railroad and highway alignments are the only other historic properties present for which setting may be a contributing factor of NRHP eligibility. These features were specifically developed (and later altered via maintenance or realignment) to transport livestock and mineral products to commercial markets beyond the San Pedro River valley. Thus, impacts to the setting(s) of such historic properties are not likely nor anticipated.

Impacts from the proposed IVM treatments under Alternatives A (Proposed Action), A.1, A.2, and B were not analyzed in detail here, but rather analyzed in brief in Section 3.3.11.

Cultural Resources Impacts Analysis

This section provides the results of the comparative alternatives analysis for potential impacts to cultural resources within the BLM-administered APEs for the Babocomari Allotment River and River Canyon Pastures, livestock congregation areas, and proposed new and/or replacement fencing locations.

Babocomari Allotment River and River Canyon Pastures

Fourteen documented cultural sites, that cover roughly 62 acres collectively, are located within the BLM-administered lands of the Babocomari Allotment River and River Canyon Pastures (1,889 acres). Alternatives that authorize continued livestock grazing, along with use and/or maintenance of range infrastructure within the River and River Canyon Pastures, have the potential to impact an estimated 10 to 14 cultural sites, of which 6 to 8 could be considered historic properties (Table 49).

Table 49. Potential impacts to cultural resources and historic properties within the River Pasture.

Alternative	Number of Known Cultural Sites in APE	Max. Potential Historic Properties Affected
Alt. A - Proposed Action	13	8
Alt. A with Expanded RC Pasture	*10*	*6*
Alt. A.1	13	8
Alt. A.1 with Expanded RC Pasture	*10*	*6*
Alt. A.2	0	0
Alt. B - No Grazing with IVM alternative	0	0
Alt. D - No Grazing without IVM alternative	0	0
Alt. C - No Action alternative	14	8

Livestock Congregation Areas

Current conditions under the No Action alternative (Alternative C) estimate potential livestock congregation across 125.3 acres of BLM-administered lands within the SPRNCA Allotments. Eight cultural resource sites intersect the existing livestock congregation APE, of which 5 may be historic properties (see Table 50). Implementation of any of the action alternatives would reduce the potential APE acreage for livestock congregation by at least 37% and, subsequently, decrease the number of potentially impacted cultural sites to between 0 and 4, of which 0 to 2 may be considered historic properties.

Table 50. Potential impacts to cultural resources and historic properties within livestock congregation areas on the SPRNCA Grazing Allotments.

Alternative	Total BLM APE Acres	APE Acres of Known Cultural Resources	Number of Known Cultural Sites in APE	Max. Potential Historic Properties Affected
Alt. A - Proposed Action	45.8	2.6	4	2
Alt. A with Expanded RC Pasture	*45.8*	*2.6*	*4*	*2*
Alt. A.1	45.8	2.6	4	2
Alt. A.1 with Expanded RC Pasture	*45.8*	*2.6*	*4*	*2*
Alt. A.2	29.6	1.3	1	1
Alt. B - No Grazing with IVM alternative	0.5	0.0	0	0
Alt. D - No Grazing without IVM alternative	0.5	0.0	0	0
Alt. C - No Action alternative	125.3	17.6	8	5

Proposed New or Replacement Fencing

The No Action alternative (Alternative C) presents existing conditions wherein no new or replacement fencing would be constructed and, as such, would not pose any new impacts to cultural resources or historic properties (see Table 51). Implementation of the action alternatives presents a 30-57% increase in the proposed fencing APEs, thereby posing potential impacts to 4 to 8 cultural sites, of which 2 to 5 may be historic properties.

Table 51. Potential impacts to cultural resources and historic properties in areas proposed for new or replacement range fencing.

Alternative	Total BLM APE Acres	APE Acres of Known Cultural Resources	Number of Known Cultural Sites in APE	Max. Potential Historic Properties Affected
Alt. A - Proposed Action	58.6	4.9	8	5
Alt. A with Expanded RC Pasture	*53.3*	*3.4*	*6*	*4*
Alt. A.1	52.8	4.6	7	4
Alt. A.1 with Expanded RC Pasture	*47.5*	*3.1*	*5*	*3*
Alt. A.2	36.1	1.5	5	3
Alt. B - No Grazing with IVM alternative	30.3	1.2	4	2
Alt. D - No Grazing without IVM alternative	30.3	1.2	4	2
Alt. C - No Action alternative	0.0	0.0	0	0

Aggregate Potential Impacts

In aggregate, this analysis shows that a continuation of existing grazing conditions on the SPRNCA allotments with no new and/or replacement fencing construction (Alternative C—No Action) poses an estimated potential to impact 22 cultural resources, of which 13 may be considered historic properties (see Table 52). The Proposed Action (Alternative A) presents potential impacts to 25 cultural sites, of which 15 may be considered historic properties; however, implementation of adaptive management strategies would pose a slight reduction of potential livestock congregation and construction impacts. Alternative A.2, under which livestock would be removed from the River Pasture, and the No Grazing alternatives (Alternative B and D) pose the least potential to impact cultural resources

and historic properties; impacts under these alternatives would be primarily related to new and/or replacement fence construction.

Table 52. Summary of aggregate potential impacts to cultural resources and historic properties by alternative.

Alternative	Number of Known Cultural Sites in APE	Max. Potential Historic Properties Affected
Alt. A - Proposed Action	25	15
Alt. A with Expanded RC Pasture	*20*	*12*
Alt. A.1	24	14
Alt. A.1 with Expanded RC Pasture	*19*	*11*
Alt. A.2	6	4
Alt. B - No Grazing with IVM alternative	4	2
Alt. D - No Grazing without IVM alternative	4	2
Alt. C - No Action alternative	22	13

Required Inventory and Assessment

Additional inventory and cultural resources assessment would be necessary under all alternatives analyzed as existing records were primarily generated prior to 2011 (see Table 53).

Table 53. Summary of Existing Cultural Resources Inventory for the SPRNCA Grazing APEs by Alternative

Alternative	Acres Surveyed 2011-Present	Acres Surveyed Prior to 2011	Unsurveyed APE Acres	Total APE Acres
Babocomari River and River Canyon Pasture				
All Alts.	0.0	148.0	1,741.2	1,889.2
Livestock Congregation Areas				
Alt. A - Proposed Action	0.9	13.7	31.2	45.8
A.1 alternatives	0.9	13.7	31.2	45.8
Alt. A.2	0.9	6.3	22.4	29.6
Alt. B & D - No Grazing alternatives	0.0	0.1	0.4	0.5
Alt. C - No Action alternative	0.9	15.9	108.4	125.3
New or Replacement Fencing Areas				
Alt. A - Proposed Action	3.6	12.7	42.3	58.6
A.1 alternatives	3.6	10.3	38.9	52.8
Alt. A.2	3.6	12.2	20.3	36.1
Alt. B & D - No Grazing alternatives	3.6	9.8	16.9	30.3
Alt. C - No Action alternative	0.0	0.0	0.0	0.0

Under the terms of the Range PA (and other local agreements), data older than 10 years would be re-evaluated for its adequacy. APEs lacking adequate inventory data—or where known cultural sites and/or historic properties exist—would be subject to project-specific inventory and assessment. Where historic properties may be affected, the BLM would apply BMPs to avoid, minimize, and/or mitigate potential impacts as outlined in BLM policy and the Range PA.

3.4.7 Issue 7: Visual Resources

How would the uses and activities authorized under the lease affect visual resources and visual quality?

The analysis area for this issue is the acres of land within the boundaries of the SPRNCA Allotments. This spatial scale was chosen because grazing operations and other actions that affect visual resources are managed and occur within the allotments. The temporal scale is 10 years as that is the period of the lease renewal.

3.4.7.1 Affected Environment

Public lands in the SPRNCA Allotments are part of a landscape that is highly viewed from state and county highways, populated areas, and recreation sites. Sightseeing traffic on the public highways and use at BLM recreation sites are expected to increase, increasing viewing volume and sensitivity towards visual changes. Recreational use in low use areas is expected to increase in the Babocomari Canyon as public awareness increases. Increased recreational use is also expected along the Three Brothers-Lucky Hills Road and in the Brunckow Hill Allotment as BLM implements SPRNCA RMP recreation management decisions.

A unique characteristic of the allotments and connected SPRNCA lands is the presence of visual remnants from the area's pre-historic, Spanish, and Arizona Territorial times which attract public interested in viewing features of the area's human history, historic mining, railroad, and ghost towns.

Visual Resource Inventory and Management Classes

Visual Resource Inventory

Visual resource values on federal lands administered by the BLM, and adjacent non-federal land, were identified in the 2017 Tucson Field Office (TFO) Visual Resource Inventory (VRI). VRI Classes were delineated based on the landscape's scenic quality (landform, vegetation, developments, special features), viewing distance (foreground and background), and public sensitivity towards visual change in the landscape. Scenic quality is based on the character of the landscape's line, form, and texture that is seen in the landforms, vegetation cover, and existing modifications or developments. Viewing distances range from the area viewed in the immediate foreground and middle ground (up to 5 miles) to background areas (viewed 5 to 15 miles away). The VRI Classes reflect the relative importance of different parts of the landscape, but do not establish visual resource management objectives.

The map in Appendix A: Figure A-25 shows the VRI Classes for the allotments and the San Pedro Basin landscape for context. The San Pedro River Valley and surrounding hills were identified as the highest visual resource values.

Table 54. VRI Classes and Visual Resource Management (VRM) Classes in the SPRNCA Allotments.

Allotment	Class	VRI Class Acres	VRM Class Acres	Key Observation Platform views potentially affected
Babocomari	Class II	0	476	State Route 82 Babocomari Trail Lucky Hills-Three Brothers Road
	Class III	4,430	1,404	
	Class IV	8,742	0	
Three Brothers	Class II	45	142	State Route 82 Lucky Hills-Three Brothers Road
	Class III	4,996	2,736	
	Class IV	4,895	0	
Lucky Hills	Class II	0	2	Charleston Road Lucky Hills-Three Brothers Road
	Class III	8,601	9,783	
	Class IV	17,622	0	
Brunckow Hill	Class II	227	336	Charleston Road Millville Recreation site and trails
	Class III	817	1,015	
	Class IV	1,282	0	

Definition for the VRI Classes found in the allotments:

- VRI Class II: These areas are of high importance because of high scenic quality, many outstanding features, and high visual sensitivity towards change.
- VRI Class III: These areas are not as important as VRI Class II areas but include some outstanding features defining the landscape.

- VRI Class IV: These areas have the least important visual resource values because of low scenic quality, few outstanding features, and low visual sensitivity towards change. Most of the flat bajadas are rated under this Class.

Visual Resource Management

Visual Resource Management (VRM) Classes were established for the public lands in the allotments in the SPRNCA in the SPRNCA RMP (BLM 2019b). VRM Classes for public lands outside the SPRNCA were established in the Safford District RMP. VRM Classes were established with consideration of the potential allowable uses and their potential visual impacts. The VRM Classes describe the visual quality objectives for impacts from management activities authorized on public lands and are depicted on the map in Appendix A: Figure A-25 and summarized in Table 54 above.

Definitions for the VRM Classes found in the allotments:

- VRM Class II: The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
- VRM Class III: The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
- VRM Class IV: The objective of this class is to provide for management activities which require major modifications of the existing character of the landscape. 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 the basic elements.

3.4.7.2 Environmental Effects

Visual impacts from the actions that are proposed under the Proposed Action and alternatives would include construction of new range improvements, maintenance of existing improvements, and IVM treatments to reduce dense shrub cover and increase grass cover.

Range Improvements

New fence construction would require clearing vegetation and installing barbed wire-steel post structures on straight property boundaries, creating linear strips of bare ground with noticeable color contrast across the different vegetation types. Construction of water storage tanks, pipelines, and drinkers would introduce above-ground structures and could create cattle concentration areas and bare ground patches. The visual contrast of these activities would depend on their type, location, and BMPs included in the Proposed Action to minimize visual impacts. The visual contrast of the new range improvements would determine their conformance with visual quality objectives depending on the VRM Class where the projects are located. Typically, the vegetation clearing needed for fence construction would exhibit strong contrast across dense vegetation cover, exposing underlying light soil surface colors. Visual contrast would continue with lighter grass/forb regrowth color especially across dense scrub cover until regrowth reduces the gap. The proposed range improvements with potential visual impacts under the Proposed Action and alternatives are listed in Table 55, with the associated VRM Class.

IVM Treatments

In general, the proposed IVM treatments would reduce shrub cover and increase perennial grass in the treatment areas. The treatment area boundaries would be largely defined by natural features (drainage corridors, steep slopes), giving them naturalized shapes with irregular boundaries blended into the landforms, except where the treatment boundary is limited by straight property boundaries. Treated areas would turn into predominantly green/straw colored grassland, with strips of dense desert scrub remaining along the gulches and drainages. Seeding would shift the sparsely vegetated, bare ground area from predominantly landform surface colors to grass cover green/straw colors. Erosion control structures would be too small in scale to be noticeable in the landscape. They would only be noticeable from their immediate vicinity, and the use of natural materials would reduce their local visual contrast. The proposed vegetation treatments under the Proposed Action are listed in

Table 56, with the associated VRM Class. Most of the treatment areas are in VRM Class III areas, with a small acreage in VRM Class II areas.

Table 55. Proposed range improvements under the Proposed Action and alternatives and VRM Class.

New Range Improvement Projects	VRM Class	Alt. A - Proposed Action	*Alt. A with Expanded RC Pasture*	Alt. A.1	*Alt. A.1 with Expanded RC Pasture*	Alt. A.2	Alt. B & D - No Grazing with and without IVM alternatives	Alt. C - No Action alternative
1. Babocomari SPRNCA Boundary Fence (*feet*)	II	6388	*6388*	6388	*6388*	6388	6388	0
	III	15640	15640	15640	15640	15640	15640	0
2. Babocomari River Canyon Pasture Fence (*acres*)	II	18082	*11968*	18082	*11968*	550	550	0
	III	2,198	*3,574*	2,198	*3,574*	0	0	0
3. Babocomari BLM Boundary Fence	II	1624	*1624*	1624	*1624*	1624	1624	0
4. Babocomari Livestock Water Sites *(# of sites*)	II	0	*0*	0	*0*	0	0	0
	III	2	*2*	2	*2*	0	0	0
5. Brunckow Hill SPRNCA Boundary Fence (*feet*)	II	604	*604*	604	*604*	604	604	0
	III	308	308	308	308	308	308	0
6. Brunckow Hill Riparian Fence (*feet*)	II	7074	*7074*	0	*0*	7074	0	0
	III	4547	*4547*	0	*0*	4547	0	0
	Non-BLM	1913	*1913*	0	*0*	1913	0	0
7. Brunckow Hill Water Sites *(# of sites*)	II	0	*0*	0	*0*	0	0	0
	III	2	*2*	2	*2*	2	0	0
8. Three Broths SPRNCA Boundary Fence (*feet*)	II	0	*0*	0	*0*	0	0	0
	III	11,953	*11,953*	11,953	*11,953*	11,953	11,953	0
9. Lucky Hills SPRNCA Boundary Fence (*feet*)	II	0	*0*	0	*0*	0	0	0
	III	10,545	*10,545*	10,545	*10,545*	10,545	10,545	0
10. Lucky Hills Livestock Water Site *(# of sites*)	II	0	*0*	0	*0*	0	0	0
	III	1	*1*	1	*1*	1	0	0

Table 56. Proposed vegetation treatments under the Proposed Action and alternatives and VRM Class.

Treatment Method	Class II Acres	Class III Acres
Herbicide or RX Fire	336	9,727
RX Fire	53	3,681
Seeding and Erosion Control	0	406
Total	**389**	**13,814**

Key Observation Platforms

The Key Observation Platforms (KOPs) that may be affected by visual impacts from authorized activities under the Proposed Action and alternatives include State Route 82, Charleston Road, Babocomari Canyon Trail, the Charleston-Millville Recreation Site, San Pedro Trail, and the Brunckow Cabin site and access trail. The landscape in the allotments is viewed from these KOPs in the foreground-middle ground and in the background. The scenery viewed from these KOPs across the allotments and SPRNCA is largely natural open space, with sparse visual modifications from highways, roads, railroads, utilities, ranching, and past mining activities. The landscape is viewed from other locations, but these KOPs across the allotments characterize the landscape and the impacts from the Proposed Action and alternatives.

The highway and road KOPs are linear with multiple viewing locations along the route. Because of the open character of the landscape, some landforms features are highly viewed from multiple locations and are most vulnerable to visual impacts from activities that cause visual modifications to the ground surface or vegetation or introduce new structures. Because of topographic screening, the landscape in the allotments includes areas that are hidden from view or seen from very few locations, providing opportunities for reducing visual impacts and blending new visual modifications in with the landscape.

Appendix A: Figures A-27 through A-29 show the areas in the allotments that are most vulnerable to visual impacts from visual modifications due to their exposed locations, highly viewed from multiple locations and multiple KOPs. Visual modifications in these areas are best avoided or, if unavoidable, implemented with project specific visual design criteria to minimize visual contrasts.

Definitions for the visibility classes found in the allotments:

- Unseen and Seldom-Seen Areas: Unseen and seldom-seen areas identified in a KOPs viewshed analysis are considered effectively screened by topographic features and are preferred places for locating landscape modifications to blend in with the landscape, although the modification may have visual impacts on other KOPs.
- Moderately Viewed Areas: Moderately viewed areas include parts of the landscape that are partially screened by topographic features, but they are viewed from a substantial number of places and have a prevalent influence in the landscape. Modifications in these areas would likely be noticeable and attract attention and, depending on their visual contrast, may exceed VRM objectives.
- Highly Viewed Areas: Highly viewed areas are seen from most or all the viewing locations in or along a given KOP. These areas define landmark features in the landscape, and landscape modifications in these areas may be noticeable and attract attention depending on their visual contrast.

Visual Impact and Visual Contrast

Visual contrast ratings for the new range improvements and vegetation treatments under the Proposed Action and alternatives were completed to identify the visual contrast-causing elements, determine if the visual contrast is within VRM objectives, and to identify design modifications or mitigation measures to reduce or minimize visual contrasts. The principal visual contrast-causing element for new range improvements is the vegetation clearing needed for fence construction, with strong contrast across moderately dense and dense vegetation cover where underlying light soil surface colors are exposed, particularly across desertscrub. Visual contrast is expected to attenuate by revegetation within 3 to 5 years in the different vegetation types with the BMPs for fence construction described under the Proposed Action. BMPs include fence construction methods to minimize the overall disturbance, minimize visual scale, and reduce short-term visual impacts through minimizing the area along the fence that is disturbed, avoiding grubbing vegetation and topsoil, pruning and trimming instead of clearing, and requiring foot access for construction on steep slopes. Long-term visual impacts would be reduced by allowing revegetation in the disturbance area. The principal visual contrast-causing element for vegetation treatments are the treatment area boundaries and the shift in vegetation cover from desertscrub to grassland, with contrasting shapes, colors and textures in the landscape. Short-term visual impacts would be different depending on the treatment method used, with herbicide treatments leaving dead standing woody material that would be noticeable and attract attention for several years.

Alternative A - Proposed Action

Range Improvements

Babocomari SPRNCA and BLM Boundary Fence

Visual impact from construction of the proposed SPRNCA boundary fence along the straight alignments across Chihuahuan desertscrub-covered bajada and slopes would be noticeable in the foreground-middle ground, with low to moderate contrast, from the State Route 82 KOP and the administrative road to Babocomari Canyon, and in the background from the Lucky Hills-Three Brothers Road KOP. Visual modifications would be partly screened by topography and viewing angle, and visual contrast would reduce to low levels over 3 to 5 years as revegetation occurs. Visual contrasts would be consistent with VRM Class II and Class III objectives.

Babocomari River Canyon Pasture Fence

. Visual impact from construction of the proposed River Canyon Pasture fence along the Chihuahuan desertscrub-covered steep slopes on the north side of the Babocomari Canyon Trail and above the canyon rim would be

noticeable with moderate to strong contrast from the Babocomari Canyon Trail KOP and the existing administrative road to the canyon, and with low to moderate contrast in the background from the Lucky Hills-Three Brothers Road KOP. Visual contrast would reduce to low levels over 3 to 5 years as revegetation occurs. The new fence would also be viewed when encountered by dispersed recreational visitors using the washes to access the back country south of the canyon. The main concern for these viewers is finding the fence crossing, which would be provided and marked with signs. Because of its meandering alignment, the River Canyon Pasture fence weaves through both VRM Class II and VRM Class III areas. Visual contrasts would be consistent with VRM Class II and III objectives after revegetation of the disturbance area.

Expanded Babocomari River Canyon Pasture and Fence

Visual impact from proposed fence construction on the straight fence line across the Chihuahuan desertscrub-covered upland steep slopes and ridges would have noticeable short-term moderate contrast from nearby areas along the State Route 82 KOP and residential area, reducing to low contrast after revegetation occurs after about 3 to 5 years. Visual impacts would be screened from Babocomari Trail views. Visual contrasts would be consistent with VRM Class III objectives.

Babocomari Livestock Water Sites

Visual impact from construction of the proposed 10,000 gallon water storage tank and drinker in the Chihuahuan desertscrub flat on the north side of Babocomari Canyon would be low along State Route 82 KOP due to screening by local mesquite scrub and viewing angle. Visual impact from the proposed water storage tank and drinker would be noticeable and attract attention from dispersed recreational visitors using the historic existing road to access SPRNCA land in the area but would be screened from project KOPs. Visual impact of the water tank and drinkers south of Babocomari Canyon would be in Chihuahuan desertscrub slopes, with seldom seen areas created by local topography which would help blend the facilities into the landscape. Visual contrasts would be consistent with VRM Class III objectives.

Brunckow Hill SPRNCA Boundary Fence, Riparian Fence, and Allotment Boundary Fence

Visual impact from construction of the proposed SPRNCA boundary fence across Brunckow Ranch Road in Chihuahuan desertscrub flat would be noticeable with moderate contrast from the immediate vicinity for about 3 years after construction while revegetation reduces contrast to low levels. The new gate across the road, or cattleguard, would be the most noticeable project feature. Visual impact on foreground views from the Charleston Road KOP would be low due to the small scale of the project and other modifications in the project area (fences, power line). Visual impact on views on the Brunckow Cabin Trail route would be noticeable due to the need for access through the fence. Visual contrasts would be consistent with VRM Class II objectives.

Visual impact from construction of the riparian fence along the riverbank would be noticeable with moderate contrast but would only be visible from the immediate vicinity by dispersed recreational users. Visual impact from the allotment boundary fence across the Chihuahuan desertscrub-covered ridges and steep slopes would be noticeable with moderate contrast in views from elevated observation points in the Charleston-Millville recreation site. Visual contrast would be low as revegetation occurs. Visual contrasts would be consistent with VRM Class II objectives.

Brunckow Hill Water Development Sites

Visual impact from construction of the new water tank and drinkers on the Chihuahuan desertscrub-covered ridge would be noticeable and attract attention from the vicinity by dispersed recreational visitors using the existing road to access SPRNCA land but would be screened from project KOPs. Visual contrasts would be consistent with VRM Class III objectives.

Three Brothers SPRNCA Boundary Fence

Visual impact from new fence construction along the straight landlines across Chihuahuan desertscrub- and semidesert grassland-covered hillsides and steep slopes would be noticeable with moderate contrast for about 3 years while revegetation reduces contrast to low levels in foreground views along the Lucky Hills-Three Brothers Road and State Route 82 KOPs. Visual modifications would be screened by topography and viewing angle, and contrast would be low in background views along other KOPs. Visual contrasts would be consistent with VRM Class III objectives.

Lucky Hills SPRNCA Boundary Fence

Visual impact from construction of the new fence along the straight landlines across Chihuahuan desertscrub- and semidesert grassland-covered hillsides and steep slopes would be noticeable with moderate contrast for about 3 years while revegetation reduces contrast to low levels in foreground views along the Lucky Hills-Three Brothers Road KOP. Visual modifications would be screened by topography and viewing angle, and contrast would be low in background views along the State Route 82 and other KOPs. Visual contrasts would be consistent with VRM Class III objectives.

Lucky Hills Livestock Water Site

Visual impact from construction of the proposed water storage tank, trough, and pipeline would be noticeable and attract attention from the vicinity by dispersed recreational visitors using the road to access SPRNCA land but would be largely screened from the nearby Lucky Hills-Three Brothers Road KOP. The visual contrast would be low in views along other KOPs. Visual contrasts would be consistent with VRM Class III objectives.

Integrated Vegetation Management Treatments

Visual impacts from the proposed IVM treatments would be similar under the Proposed Action and the No Grazing with IVM alternative, the different treatments methods would have different short-term, but similar long-term, visual contrasting elements as vegetation cover objectives are achieved.

Herbicide Treatments

Visual impacts of treatment unit boundaries would be noticeable, but mostly follow natural features such as drainage corridors and steep slope breaks, creating natural shapes that would help blend in with the landscape. Standing dead-growth would be noticeable until woody material breaks down or is consumed by natural or prescribed fire. Grass cover would increase and shift landscape colors to bright green and straw colors in the winter, with residual strips of trees and desert scrub cover along washes and other no-treatment areas. Treatment areas would be visible from all KOPs in the foreground to background viewing distance zones, with topography partly screening the treatment areas. Visual contrast would be weak to moderate, and within Class III objectives.

Herbicide/Prescribed Fire Treatments

Visual impacts of treatment area boundaries would be noticeable, but also mostly follow natural features such as drainage corridors and steep slope breaks, creating natural shapes that would help blend in with the landscape. Prescribed fire would remove standing vegetation growth either as an initial treatment or as a post-herbicide treatment. Grass cover would increase and shift landscape colors to brighter green and straw colors in the winter. Treatment areas would be visible from all KOPs in the foreground to background viewing distance zones, with topography partly screening the treatment areas. Visual contrast would be weak to moderate, and within Class III objectives.

Seeding

Visual impacts of seeding would cause a shift from predominantly bare ground to grass cover in the treatment area, mainly visible in the background from the State Route 82 KOP. Visual contrast would be weak to moderate, and within Class III objectives.

Erosion Control

Visual impacts of erosion control structures would be noticeable in the immediate area of the project sites due to the small scale of the projects and use of natural materials, hand tools and labor, and small mechanical equipment. The projects would not be noticeable in the overall landscape along the KOPs due to viewing distance greater than 2 miles. Visual contrast would be negligible, and within Class III objectives.

Alternative A.1

Brunckow Hill Allotment Boundary Modification

Visual impacts under this alternative would be the same as the Proposed Action (SPRNCA boundary fence, cattleguard along Brunckow Road), except the new allotment boundary fence would reconstruct the existing fence on the east side of the UPRR private property. No new fence would be authorized in the riparian area or west of the San Pedro River but could occur in the future as a separate action. Visual impacts of IVM treatments under this

alternative would be the same as under the Proposed Action. Visual impacts would be consistent with VRM Class II and Class III objectives.

Alternative A.2

Visual impacts from new fence construction on the SPRNCA boundary north of Babocomari River Canyon along Highway 82 and on the slopes south of the Canyon would be similar to those under the Proposed Action. Visual impacts from the Babocomari Canyon Pasture fence, or its variation under the expanded Canyon fence, and the new water developments would not occur under this alternative. Visual impacts of IVM treatments under this alternative would be the same as under the Proposed Action. Visual impacts would be consistent with VRM Class II and Class III objectives.

Alternative B (No Grazing with IVM Alternative)

Visual impact of new fence construction on the SPRNCA boundary would be the same as under the Proposed Action. Visual impacts from new water developments would not occur. Visual impact of existing range improvements would be reduced by their removal. Visual impacts of IVM treatments under this alternative would be the same as under the Proposed Action. Visual impacts would be consistent with VRM Class II and Class III objectives.

Alternative C (No Action Alternative)

Visual impact of existing grazing operations and range improvements would continue, primarily with localized visual contrasts seen in the foreground viewing distance from the project KOPs. Visual impact of new range improvements under the Proposed Action would not occur. Visual impacts of IVM treatments would not occur. Vegetation dominated by dense shrub cover would remain and become more widespread in the landscape. Visual impacts would be consistent with VRM Class II and Class III objectives.

Alternative D (No Grazing without IVM Alternative)

Visual impact of grazing operations and IVM treatments would not occur. Visual impact of new fence construction on the SPRNCA boundary would be the same as under the Proposed Action. Visual impact of existing range improvements would be reduced by their removal, and site revegetation. Without active IVM, vegetation cover in the landscape would remain similar to its current condition, with shrubs dominating upland communities and becoming more widespread. Changes in cover and composition would occur as a result of natural ecological succession and the influence of other allowable activities. Visual impacts would be consistent with VRM Class II and Class III objectives.

4 SUPPORTING INFORMATION

4.1 Tribes, Individuals, Organizations, or Agencies Consulted

4.1.1 Tribal Consultation

The BLM initiated government-to-government consultation with nine Native American Tribes who claim cultural affiliation to and/or traditional use of the area. Letters summarizing the cultural resources assessment data and the current range of action alternatives were sent to the Fort Sill Apache Tribe, Hopi Tribe, Mescalero Apache Tribe, Pascua Yaqui Tribe, San Carlos Apache Nation, Tohono O'odham Nation, White Mountain Apache Tribe, Yavapai-Apache Nation, and Zuni Tribe on January 13, 2021.

The White Mountain Apache Tribe responded via email on February 6, 2021, that "the proposed lease renewal[s] will 'Not have an Adverse Effect' on the tribe's cultural heritage resources and/or traditional cultural properties." The Hopi Tribe responded in a letter dated February 12, 2021, requesting additional information to determine the likelihood of potential impacts. No other responses or comments have been received; however, the BLM's Tribal consultations will continue throughout the EA process.

The BLM sent letters to eight Native American Tribes (all of the initial Tribes who BLM sent letters to in January 2021 with the exception of the White Mountain Apache Tribe as they responded that the project will 'not have an adverse effect' as described above) in April 2022 prior to the 30-day public comment period on the preliminary EA.

The BLM will continue government-to-government consultation with the nine Native American Tribes who claim cultural affiliation to and/or traditional use of the area for the duration of the project.

4.1.2 U.S. Fish and Wildlife Service

The BLM consulted with the US Fish and Wildlife Service as part of the requirements under Section 7(a)(2) of the Endangered Species Act. The BLM received a final Biological Opinion from the US Fish and Wildlife Service on November 23, 2022.

4.2 List of Preparers

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