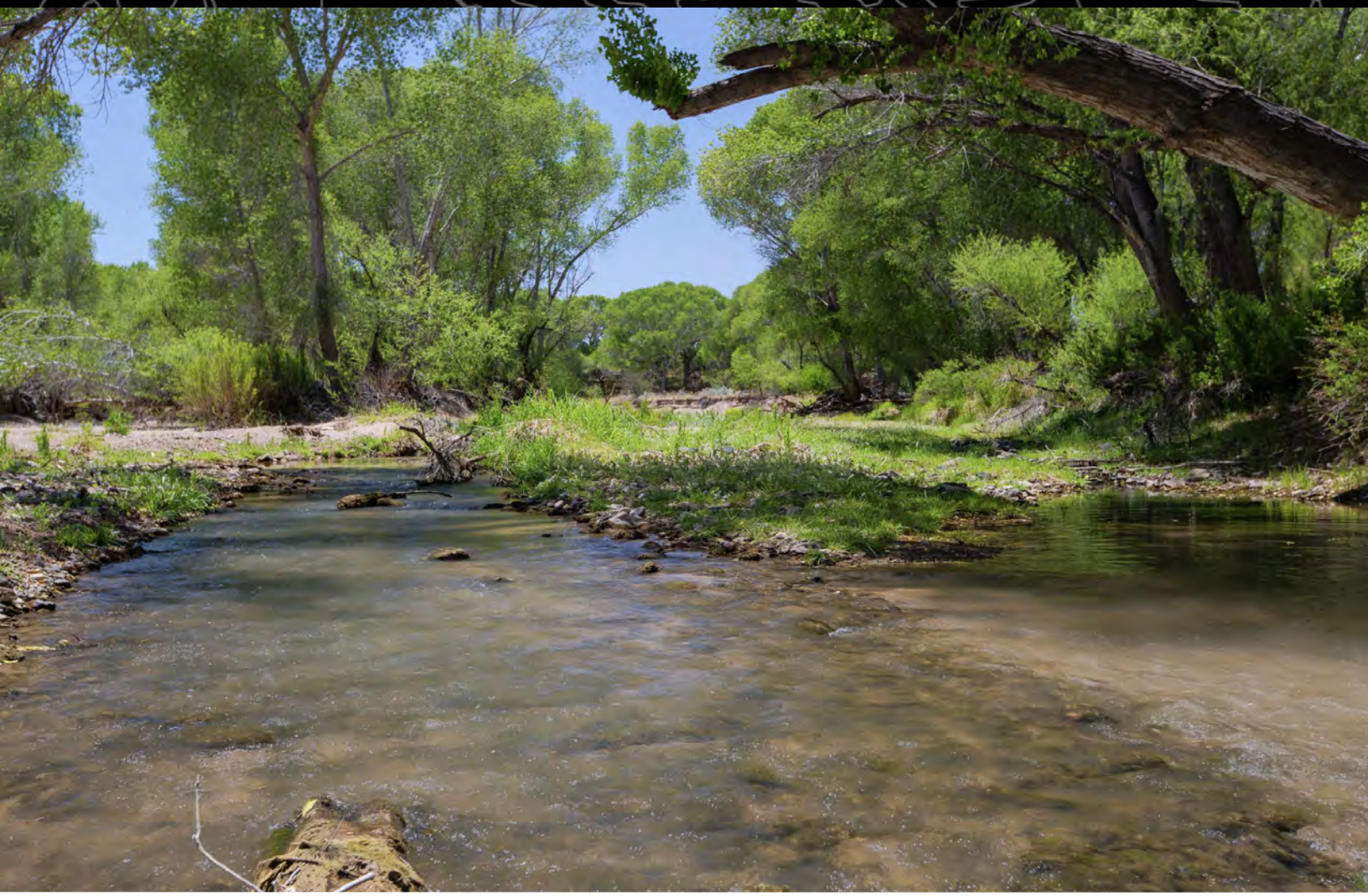
U.S. Department of the Interior
Bureau of Land Management
Gila District Office

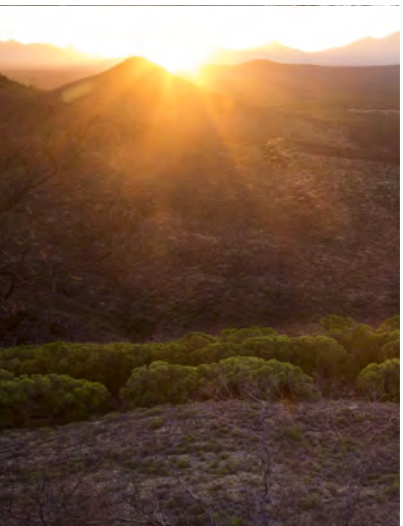
June 2018

San Pedro Riparian National Conservation Area

Draft Resource Management Plan and Environmental Impact Statement

Volume I: Executive Summary, Chapters 1-4, References, Glossary, and Index





BLM Mission

The Bureau of Land Management's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Gila District Office
3201 E. Universal Way
Tucson, Arizona 85756
www.blm.gov/az/

In Reply Refer To 1610(AZG000)

June 29, 2018

Dear Reader:

Enclosed for your review and comment is the Draft Resource Management Plan/Draft Environmental Impact Statement (Draft RMP/EIS) for the San Pedro Riparian National Conservation Area (SPRNCA). The Bureau of Land Management (BLM) prepared this document in consultation with cooperating agencies, and in accordance with the National Environmental Policy Act of 1969, as amended, the Federal Land Policy and Management Act of 1976, as amended, implementing regulations, the BLM's Land Use Planning Handbook (H-1601-1), Public Law 100-696 (the enabling legislation for the SPRNCA), and other applicable law and policy.

The planning area consists of approximately 58,250 acres of land, which includes about 55,990 acres of public lands managed by the Tucson Field Office. The entire planning area is in Cochise County. When approved, this RMP will replace the Safford District RMP for the SPRNCA portion, which incorporated RMP-level decisions from the San Pedro River Riparian Management Plan, and will guide the management of the SPRNCA administered by the Tucson Field Office into the future. The SPRNCA Draft RMP/EIS and supporting information is available on the project web site at: https://go.usa.gov/xnTuM.

The BLM encourages the public to provide information and comments pertaining to the analysis presented in the Draft RMP/EIS. We are particularly interested in feedback concerning the adequacy and accuracy of the proposed alternatives, the analysis of their respective management decisions, and any new information that would help the BLM as it develops the plan. In developing the Proposed RMP/Final EIS, which is the next phase of the planning process, the decision maker may select various management decisions from each of the alternatives analyzed in the Draft RMP/EIS for the purpose of creating a management strategy that best meets the needs of the resources and values in this area per the enabling legislation. As a member of the public, your timely comments on the San Pedro Riparian National Conservation Area Draft RMP/EIS will help formulate the Proposed RMP/Final EIS. Comments will be accepted for ninety (90) calendar days following the Environmental Protection Agency's (EPA) publication of its Notice of Availability in the *Federal Register*. The BLM can best utilize your comments and resource information submissions if received within the review period.

Comments may be submitted electronically from the project website: https://go.usa.gov/xnTuM. Comments may also be submitted by mail to: SPRNCA RMP Comments, Bureau of Land Management, Tucson Field Office, 3201 East Universal Way, Tucson, AZ 85756. To facilitate

analysis of comments and information submitted, we strongly encourage you to submit comments in an electronic format.

Your review and comments on the content of this document are critical to the success of this planning effort. If you wish to submit comments on the Draft RMP/EIS, we request that you make your comments as specific as possible. Comments will be more helpful if they include suggested changes, sources, or methodologies, and reference to a section or page number. Comments containing only opinion or preferences will be considered and included as part of the decision-making process, although they will not receive a formal response from the BLM.

Before including your address, phone number, email address, or other personal identifying information in your comment, be advised that your entire comment - including your personal identifying information - may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Public meetings to provide an overview of the document, respond to questions, and take public comments will be announced by local media, website, social media, and/or public mailings at least 15 days in advance.

Copies of the Draft RMP/EIS have been sent to affected Federal, state and local government agencies. Copies are also available for public inspection at the following BLM locations and on the BLM website at https://go.usa.gov/xnTuM.

Bureau of Land Management
Arizona State Office
One North Central Avenue, Suite 800
Phoenix, AZ 85004

Bureau of Land Management
Tucson Field Office
3201 East Universal Way
Tucson, AZ 85756

Thank you for your continued interest in the San Pedro Riparian National Conservation Area RMP/EIS. We appreciate the information and suggestions you contribute to the planning process. For additional information or clarification regarding this document or the planning process, please contact Amy Markstein at (520) 258-7231.

Sincerely,

Scott Feldhausen
Gila District Manager
Bureau of Land Management

Draft Resource Management Plan and Draft Environmental Impact Statement for the San Pedro Riparian National Conservation Area, Arizona

1. Responsible Agency: United States Department of the Interior
   Bureau of Land Management

2. Type of Action: Administrative (X) Legislative ( )

3. Document Status: Draft (X) Final ( )

4. Abstract: This Draft Resource Management Plan (RMP) and Environmental Impact Statement (EIS) describes and analyzes four alternatives for managing 55,990 surface acres on the San Pedro Riparian National Conservation Area (SPRNCA) in southeastern Arizona. The SPRNCA, located in Cochise County, is administered by the Bureau of Land Management (BLM) and includes approximately 47 miles of the San Pedro River. The BLM is the lead agency for the SPRNCA RMP/EIS with five cooperating agencies initially participating with the plan development: US Army Fort Huachuca; Arizona Game and Fish Department (AZGFD); Arizona Department of Transportation (AZDOT); Cochise County; and City of Sierra Vista. In January 2018, AZDOT withdrew from the project. The plan alternatives are as follows: Alternative A, the "no action" alternative, which continues the management decisions of the Safford District RMP and San Pedro River Riparian Management Plan; Alternative B, which emphasizes opportunities for increased public access and livestock grazing over the entirety of the SPRNCA, while focusing on active resource management to mitigate impacts from increased use; Alternative C, the preferred alternative, which balances resource protection and public use by authorizing livestock grazing in areas compatible with the conservation values and providing a diverse mix of recreational opportunities, while utilizing active resource management to minimize impacts and for ecosystem restoration; and Alternative D, which emphasizes resource protection and conservation by eliminating livestock grazing and limiting recreational opportunities, while focusing on natural processes and passive resource management for restoration. Planning issues addressed are soil and water resources, wildland fire, visual resources, cultural resources, lands with wilderness characteristics, livestock grazing, recreation management, lands and realty, wildlife and fish, transportation management, and social and economic conditions. The draft alternatives also address designating areas of critical environmental concern and wild and scenic river suitability findings.

5. Review Period: The review period on the SPRNCA Draft RMP/EIS is 90 calendar days. The review period began when the Environmental Protection Agency published a Notice of Availability in the *Federal Register*.

6. For further information contact:

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ACRONYMS AND ABBREVIATIONS

	Full Phrase
ACEC	areas of critical environmental concern
ACHP	Advisory Council on Historic Preservation
ACIC	Ak-Chin Indian Community
ACS	American Community Survey
ADA	Arizona Department of Agriculture
ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
AIRFA	American Indian Religious Freedom Act
AML	abandoned mine lands
AMP	allotment management plan
AMS	analysis of the management situation
AO	Authorized Officer
AQI	Air Quality Index
AQRV	air quality related value
ARIES	Artificial Intelligence for Ecosystem Services
ARPA	Archaeological Resources Protection Act
ARS	Arizona Revised Statutes
AUM	animal unit month
AZ	Arizona
AZDOT	Arizona Department of Transportation
AZGFD	Arizona Game and Fish Department
BCC	birds of conservation concern
BCE	before common era
BLM	Bureau of Land Management
BMP	best management practice
BO	biological opinion
CAA	Clean Air Act
CAP	Central Arizona Project
CCCP	Cochise County Comprehensive Plan
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO_2e	carbon dioxide equivalents
COA	Conditions of Approval
CRMP	Coordinated Resource Management Plan
CWA	Clean Water Act
CWPP	Community Wildfire Protection Plan
DHS	Department of Homeland Security
DOI	Department of Interior
DPC	Desired Plant Community
EIS	Environmental Impact Statement
EO	Executive Order

ACRONYMS AND ABBREVIATIONS *(continued)*

	Full Phrase
EPA	Environmental Protection Agency
ERMA	Extensive Recreation Management Area
ESA	Endangered Species Act
ESD	ecological site description
EIS	Ecological Site Inventory
ESR	emergency stabilization and rehabilitation
FAR	functional at risk
FCC	Federal Communications Commission
FLPMA	Federal Land Policy and Management Act
FLREA	Federal Lands Recreation Enhancement Act
Forest Service	US Department of Agriculture, Forest Service
FR	Federal Register
FSAT	Fort Sill Apache Tribe
GIS	Geographic Information System
GMU	Game Management Unit
GRIC	Gila River Indian Community
HCPC	historic climax plant community
Hopi	Hopi Tribe
HUC	hydrologic unit code
IBWC	International Boundary Water Commission
IM	Instruction Memorandum
IMPROVE	Interagency Monitoring of Protected Visual Environments
IMPLAN	Impact Analysis for Planning Model
InVEST	Integrated Valuation of Ecosystem Services and Tradeoffs
IPM	integrated pest management
ITA	Indian Trust Assets
IVMP	Integrated Vegetation Management Program
LRP	long range plan
LUPA	Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management
MAT	Mescalero Apache Tribe
MIST	Minimum Impact Suppression Tactics
MLRA	Major Land Resource Area
MOU	memorandum of understanding
MS	Manual Series
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEMO	Non-Point Education for Municipal Officials
NEPA	National Environmental Policy Act
NHL	National Historic Landmark
NHPA	National Historic Preservation Act

NOA	Notice of Availability
NOI	Notice of Intent
NPA	National Programmatic Agreement
NPS	US Department of the Interior, National Park Service NRCD Natural Resources Conservation District
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRST	National Riparian Service Team
NVDI	Normalized Difference Vegetation Index
NWSRS	National Wild and Scenic Rivers System
OHV	off-highway vehicle
ORV	outstandingly remarkable value
PCE	Primary Constituent Element
PEIS	programmatic environmental impact statement
PFC	proper functioning condition
PFYC	potential fossil yield classification
PILT	in payment in lieu of taxes
PL	Public Law
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$	particulate matter with an aerodynamic diameter of 2.5 microns or less
ppb	parts per billon
ppm	parts per million
PRUP	Paleontological Resources Use Permit
PSD	prevention of significant deterioration
PYT	Pascua Yaqui Tribe
RAC	Resource Advisory Council
R&PP	Recreation and Public Purpose
RFD	Reasonably Foreseeable Development
RFFA	Reasonably Foreseeable Future Action (RFFA)
RMP	Resource Management Plan
RMZ	recreation management zone
RNA	Research Natural Area
ROD	record of decision
ROW	right-of-way
RSC	recreation setting characteristics
SAP	Southern Arizona Project to Mitigate Damage from Illegal Border Activities
SCAT	San Carlos Apache Tribe
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SDWA	Safe Drinking Water Act
SGCN	species of greatest conservation need
SHPO	state historic preservation office(r)
SO	Secretarial Order

ACRONYMS AND ABBREVIATIONS *(continued)*

	Full Phrase
SOP	Standard Operating Procedure
SRPMIC	Salt River Pima-Maricopa Indian Community
SPRNCA	San Pedro Riparian National Conservation Area
SRMA	Special Recreation Management Area
SRP	Special Recreation Permit
STB	Surface Transportation Board
SWAP	State Wildlife Action Plan
SWAT	soil and water assessment tool
TAT	Tonto Apache Tribe
TCP	traditional cultural property
TFO	Tucson Field Office
TR	Technical Reference
TON	Tohono O'odham Nation
TTM	travel and transportation management
USACE	US Army Corps of Engineers
USC	United States Code
USFS	US Forest Service
USFWS	US Department of the Interior, Fish and Wildlife Service
USGS	US Geological Survey
USPW	Upper San Pedro Watershed
UXO	unexploded ordnance
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WSA	Wilderness Study Area
WMAT	White Mountain Apache Tribe
WSR	Wild and Scenic River
WSRA	Wild and Scenic Rivers Act
WUI	wildland-urban interface
YAN	Yavapai-Apache Nation
Zuni	Pueblo of Zuni
$\mu g/m^3$	micrograms per cubic meter

Executive Summary

ES.1 Introduction

The United States Department of the Interior (DOI), Bureau of Land Management (BLM) has prepared this Draft Resource Management Plan (RMP) and Draft Environmental Impact Statement (EIS) for the San Pedro Riparian National Conservation Area (SPRNCA). The BLM prepared it in accordance with the National Environmental Policy Act of 1969 (NEPA); the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 Code of Federal Regulations [CFR] 1500–1508); BLM NEPA regulations (43 CFR 46); the Federal Land Policy and Management Act (FLPMA) of 1976 (43 US Code [USC] 1701 et seq.); requirements of the BLM NEPA Handbook (H-1790-1; BLM 2008); and the requirements of the BLM's Land Use Planning Handbook (H-1601-1; BLM 2005) and Public Law 100-696.

The approved RMP will replace the Safford District RMP (BLM 1992, 1994) for the SPRNCA portion, which incorporated RMP-level decisions from the San Pedro River Riparian Management Plan (BLM 1989). The replacement RMP will guide management of public lands administered by the BLM's Tucson Field Office (TFO) into the future. Information about the RMP/EIS process can be obtained on the project website at https://go.usa.gov/xnTuM.

The 55,990-acre SPRNCA starts at the US-Mexico border and continues northward approximately 47 miles along the San Pedro River. It supports a nationally significant riparian area (**Figure 1-1**, **Appendix A**). The SPRNCA contains four of the rarest habitat types in the southwest, namely willow forests, marshlands (ciénegas), grasslands, and mesquite bosques. The SPRNCA's riparian area provides habitat for over 400 species of local and migrating birds. In addition, it is home to one of the richest assemblages of land mammals in the world, with more than 80 species.

The SPRNCA is in the center of the Fort Huachuca Sentinel Landscape. Sentinel landscapes are working or natural lands important to the nation's defense. They are places where preserving the working and rural character of key landscapes strengthens farm, ranch, and forest economies, conserves habitat and resources, and protects vital test and training missions on military installations.

The SPRNCA's location and unique ecological resources provide the BLM with an opportunity to work with partners to develop and implement priority habitat monitoring and improvement projects, to protect federally listed species, to enhance habitat, and to meet the public's demand for recreation access. All of these actions meet Fort Huachuca's need for open space, which reduces conflict with military training and operations.

The subsurface mineral estate was withdrawn under PL 100-696 from all forms of entry, appropriation, or disposal, from location, entry, and patent under the US mining laws, and from disposition under all laws pertaining to mineral and geothermal leasing and all amendments thereto; therefore, no decisions on the subsurface mineral estate have been made in this RMP.

ES.2 Purpose and Need for the Resource Management Plan

The purposes of the SPRNCA RMP are to guide the management of BLM-administered lands on the SPRNCA and to provide a framework for future land management in the decision area. It considers the

requirements of the enabling legislation (Public Law [PL] 100-696, November 18, 1988), which is to ensure that management conserves, protects, and enhances the riparian area and the aquatic, wildlife, archaeological, paleontological, scientific, cultural, educational, and recreational resources of the public lands surrounding the San Pedro River in Cochise County, Arizona.

This RMP is needed because current land use plans covering the SPRNCA are more than 25 years old. During the time that these plans have been in effect, new management issues have surfaced, and existing management decisions are no longer responsive. This is because the SPRNCA resource conditions have changed over time, new technologies have emerged, and surrounding conditions have also changed. In addition, the BLM committed to evaluating the effects of livestock grazing on the SPRNCA for the portions of the SPRNCA that were not acquired through the state land exchange.

The purpose of the RMP is to address changing circumstances, including increased population growth surrounding the SPRNCA, increased demand for access and public use of the SPRNCA, and increased demand for water, which could affect the riparian values of the SPRNCA. In addition, this RMP evaluates the effects of livestock grazing on the SPRNCA; this is to determine where and how livestock grazing could be compatible with the values of the National Conservation Area (NCA).

ES.3 SCOPING

The formal scoping period began with publication of the Notice of Intent (NOI; 78 *Federal Register* [FR] 25299) on April 30, 2013. Nothing relevant to the development of alternatives, such as resource conditions or issues to be addressed, has changed since 2013. The NOI notified the public of the BLM's intent to prepare the RMP for the SPRNCA planning area. It also provided the location of the public scoping meetings and identified the preliminary issues to be considered in the RMP revision process. The formal scoping period ended on September 27, 2013. Scoping meetings are described in **Section 4.2** and in the scoping report (BLM 2014).

The BLM received 48 unique submissions and 5 form letters during public scoping. These submissions contained a total of 526 separate comments (370 unique and 156 duplicate).

ES.4 ISSUES IDENTIFIED FOR CONSIDERATION

Broadly defined planning issue statements identified in scoping are listed in **Table ES-1**. More detailed information on each planning issue is included in the scoping report (BLM 2014).

Table ES-1
Planning Issue Categories and Statements

Issue	Planning Issue Category	Planning Issue Statement
1.	Water resources	How will the BLM manage water for resource use and to protect the values of the conservation area?
2.	Soil resources	How will the BLM manage areas with highly erodible or sensitive soils?
3.	Fish and wildlife habitat and vegetation	How will the BLM manage vegetation and fish and wildlife habitat?
4.	Fire management	How will the BLM manage fire in the wildland-urban interface?
5.	Cultural resources, paleontological resources, and Native American concerns	How will the BLM manage cultural and paleontological resources and Native American concerns?

Table ES-1
Planning Issue Categories and Statements

Issue	Planning Issue Category	Planning Issue Statement
6.	Protective designations (lands with wilderness characteristics, wild and scenic rivers [WSRs], and areas of critical environmental concern [ACECs])	In addition to the riparian NCA designation, what other designations does the BLM need for managing the SPRNCA?
7.	Livestock grazing	At what level and where can the BLM manage livestock grazing on the SPRNCA while furthering the primary purposes for which the conservation area was designated?
8.	Access and recreation	How can the BLM manage the demand for increased access and different recreation experiences while furthering the primary purposes for which the conservation area was designated?
9.	Socioeconomics	What impacts will management actions have on socioeconomic concerns and environmental justice?
10.	Lands and realty	Where can the BLM allow land use authorizations on the SPRNCA, while furthering the primary purposes for which the conservation area was designated?

ES.5 PLANNING CRITERIA AND LEGISLATIVE CONSTRAINTS

Planning criteria are the standards, rules, and guidelines that help guide data collection and alternatives formulation and selection in the RMP development process. In conjunction with the planning issues, planning criteria ensure that the planning process is focused. The criteria also help guide the final plan selection and provide a basis for judging the responsiveness of the planning options. Planning criteria are discussed in **Section 1.5**.

The BLM is constrained in its management decisions by the need to conserve, protect, and enhance the following conservation values: riparian area and the aquatic, wildlife, archaeological, paleontological, scientific, cultural, educational, and recreational resources. These resources summarize the conservation values that are to be the focus of protection in the RMP/EIS. The conservation values are further discussed in the text of PL 100-696 and in **Section 1.3**. Specific discussions on proposed uses for and potential impacts on these conservation values may be found in the relevant resource sections in **Chapter 2** and **Chapter 3** or in the appendices of this draft RMP/EIS.

The BLM must comply with the mandate and intent of many laws, presidential executive orders (EOs), regulations, and policies that apply to BLM-administered land and resources in the RMP planning area. **Appendix B** identifies pertinent legislative constraints to the RMP development and implementation.

ES.6 MANAGEMENT ALTERNATIVES

Following the close of the public scoping period in September 2013, the BLM began developing alternatives by assembling an interdisciplinary team of BLM Arizona resource specialists. The BLM coordinated with cooperating agencies throughout the planning process, including during alternatives development.

The RMP presents four management alternatives to fulfill the purpose and need, to meet the multiple-use mandates of FLPMA, and to address the 10 planning issues. **Chapter 2** describes the four

alternatives: the no action alternative (Alternative A) and three action alternatives: Alternatives B, C, and D.

The following sections provide some key components of the alternatives. They offer a range of management options that address the issues identified in the scoping process and other outreach activities, as follows:

- Input from cooperating agencies and reports, such as the Wild and Scenic River Eligibility Report (BLM 2016a)
- ACEC evaluation (**Appendix C**)
- Lands with wilderness characteristics inventory (BLM 2016b)

Each alternative stands alone as a potential RMP and provides direction for resource programs based on the development of specific goals, objectives, and management actions. Described under each alternative is specific direction influencing land management. There is an emphasis on different combinations of resource uses and protections, allowable uses, and restoration measures to address issues and to resolve user conflicts. Resource program goals are met under each alternative. Resources or resource uses not tied to planning issues or mandated by laws and regulations may contain few or no differences in management between alternatives. Alternatives may also result in different long-term outcomes and conditions, based on the objectives, actions, and allocations. Although each alternative stands alone as a potential RMP, the proposed RMP/final EIS may include elements from multiple alternatives analyzed in this draft.

A complete description of all decisions proposed for each alternative is in **Chapter 2**. **Table ES-2** highlights the meaningful differences among alternatives, relative to what they establish and where they occur.

ES.6.1 Alternative A (No Action Alternative)

Alternative A continues current management direction and prevailing conditions derived from the current Safford District RMP (BLM 1992, 1994). It incorporated RMP-level decisions from the San Pedro River Riparian Management Plan (BLM 1989). Laws and regulations that supersede RMP decisions also apply.

ES.6.2 Alternative B

Alternative B places an emphasis on opportunities for increased public access, livestock grazing, and motorized recreation uses, while using the broadest array of management tools for active resource management. This would include use of heavy equipment, herbicide (where appropriate), hand tools, and prescribed fire. These options would be used to achieve goals and objectives, mitigate effects from increased use, and to restore ecosystems. Alternative B sets desired outcomes and allocations for resources, including natural, cultural, and visual, while providing for public use and an array of visitor experiences and opportunities.

ES.6.3 Alternative C (Preferred Alternative)

Alternative C is the BLM's preferred alternative. It balances resource protection and public access, livestock grazing where compatible with the established conservation values, and recreation uses.

Table ES-2
Comparative Summary of Alternatives

Resources, Resource Uses, or Special Designations	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
Resources				
Soil resources, water resources, and vegetation communities	Restoration is not addressed.	Restoration would use the broadest array of management tools, including heavy equipment, herbicides, hand tools, and prescribed fire.		Restoration would occur using "light on the land methods," focusing on the use of hand tools and prescribed fire.
Fish and wildlife (acres)	Priority habitats: • Riparian—12,340 • Semidesert grassland—7,240 • Wetlands—40	Priority habitats: • Chihuahuan Desert scrub—33,070 • Interior marshland (ciénega)—20 • Fremont cottonwood-Goodding's willow—1,560 • Mesquite forest (bosque)—7,510 • Big sacaton grassland—3,250 • Semidesert grassland—7,240 • Aquatic (open water)—200 • Wetlands—40 • Sandy wash (xeric riparian)—2,110		
Wildland fire and management (acres)	• Wildland fire use—21,600 • Non-wildland fire use—34,390	• Wildland fire use—0 • Full suppression (non-wildland fire use)—55,990		
Cultural resources	Allocate cultural sites to certain uses, as described in BLM Manual 8130			
Paleontological resources	Protect paleontological resources on a case-by-case basis	Manage for the potential fossil yield classification (PFYC)		
Visual resources (acres)	• Class I—2,170 • Class II—19,170 • Class III—2,530 • Class IV—2,120	• Class I—0 • Class II—25,040 • Class III—30,950 • Class IV—0	• Class I—0 • Class II—27,850 • Class III—28,140 • Class IV—0	• Class I—0 • Class II—44,870 • Class III—11,120 • Class IV—0
Lands with Wilderness Characteristics	0 acres managed for wilderness characteristics	0 acres managed for wilderness characteristics as a priority		23,810 acres managed for wilderness characteristics as a priority
Resource Uses				
Livestock grazing (acres)	• Open—7,030 • Closed—48,960	• Open—55,990 • Closed—0	• Open—26,450 • Closed—29,540	• Open—0 • Closed—55,990
Recreation (acres)	Special recreation management area (SRMA): 55,990	Extensive recreation management area (ERMA): 55,990 • Primitive—0 • Backcountry—42,650 • Backcountry (Motorized)—8,440 • Rural—4,900	ERMA: 55,990 • Primitive—16,870 • Backcountry—30,960 • Backcountry (Motorized)—3,010 • Rural—5,150	ERMA: 55,990 • Primitive: 22,480 • Backcountry: 27,720 • Backcountry (Motorized): 640 • Rural: 5,150

Table ES-2
Comparative Summary of Alternatives

Resources, Resource Uses, or Special Designations	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
Areas available for the discharge of firearms (acres)	• Available—30,390 • Closed—25,600	• Available—51,910 • Closed—4,080		• Available—26,440 • Closed—29,550
Transportation and access (acres)	• Travel limited to designated roads and trails—55,990 • Closed to travel—0			• Travel limited to designated roads and trails—23,810 • Closed to travel—32,180
Lands and realty corridors (acres)	Charleston Road right-of-way (ROW) corridor—210			Charleston Road ROW corridor—0 (undesignated)
Lands and realty ROWs (acres)	Open to ROWs: 55,780	ROW avoidance: 55,780		ROW exclusion: 55,990
Special Designations				
ACECs (acres)	• St. David Ciénega—380 • San Pedro River—1,420 • San Rafael—370	Remove existing designations of ACECs		• St. David Ciénega—2,710 • San Pedro River—7,230 • San Rafael—560 • Curry-Horsethief—2,540 • Lehner Mammoth—30
Babocomari WSR preliminary suitability (acres)	Eligible as scenic: 530	Not suitable	Suitable as recreational: 480	Suitable as scenic: 480
San Pedro River WSR preliminary suitability (acres)	Suitable as recreational: 12,870		Suitable as recreational: 16,570	Suitable as: • Recreational—950 • Scenic—5,880 • Wild—9,740

Source: BLM Geographic Information System (GIS) 2018

Alternative C focuses on active resource management, using the broadest array of management tools, including use of heavy equipment, herbicide (where appropriate), hand tools, and prescribed fire. These options would be used to restore ecosystems and to achieve goals and objectives. As under Alternative B, it sets desired outcomes and allocations for resources, including natural, cultural, and visual, while proposing a diverse mix of recreation opportunities.

ES.6.4 Alternative D

Alternative D emphasizes resource protection and conservation, while allowing limited access and recreation, where appropriate. It focuses on natural processes and "light on the land" management methods to achieve ecosystem restoration and goals and objectives, such as the use of hand tools and prescribed fire, instead of heavy equipment or herbicides. As under the other alternatives, Alternative D sets desired outcomes and allocations for SPRNCA resources, including natural, cultural, and visual, while allowing a lower level of public use. It proposes mostly a primitive recreation experience.

ES.7 ENVIRONMENTAL CONSEQUENCES

The purpose of the environmental consequences analysis in this RMP/EIS is to determine the potential for significant impacts of the federal action on the human environment. CEQ regulations for implementing NEPA state that the human environment is the natural and physical environment and the relationship of people with that environment (40 CFR 1508.14). The federal action is the BLM's selection of an RMP on which future land use actions will be based for the SPRNCA.

Chapter 3 objectively evaluates the likely direct, indirect, and cumulative impacts on the human and natural environment in terms of environmental, social, and economic consequences that are projected to occur from implementing the alternatives. In addition, comprehensive management of the conservation values are considered.

Table 2-1 presents a comparison summary of impacts from management actions proposed for the four management alternatives; **Chapter 3** provides a more detailed impact analysis.

ES.8 CONSULTATION AND COORDINATION

Major public participation events included five scoping meetings in 2006 for an earlier start on the RMP, three engagement meetings in 2013 following the release of the NOI, five education and scoping forums in 2013 for specific topics, and four scoping meetings in 2013. There were numerous cooperating agency meetings and four alternatives development meetings in 2014 and 2015. The BLM mailed approximately 368 informational newsletters in 2013, 2014, and 2015 to agencies, organizations, and individuals to solicit additional comments. A detailed description of the scoping process is provided in the scoping report (BLM 2014). Other public input occurred during travel management planning and WSR evaluation.

The BLM has begun government-to-government consultation with 14 Native American tribes who claim cultural affiliation to or traditional use of the SPRNCA RMP planning area; in this way, the BLM invited tribal participation in the RMP development (see **Appendix D**). Government-to-government consultation will continue throughout the RMP process to ensure that the concerns of tribal groups are considered in RMP development.

The State Historic Preservation Office (SHPO) has been notified of the status of the SPRNCA RMP and will receive the draft RMP/EIS for review. Additional information on SHPO consultation will be added to the proposed RMP/final EIS.

As required by Section 7 of the Endangered Species Act (ESA) of 1973, the BLM began consulting with the US Fish and Wildlife Service (USFWS); it will continue consultation with the USFWS throughout the RMP process.

In addition to the outreach described above, there were other informal meetings, telephone conversations, and visits with agency representatives and the public when they requested them. Coordination between the five cooperating agencies was integral in the development of this RMP: Fort Huachuca (US Army), Arizona Game and Fish Department (AZGFD), Arizona Department of Transportation (AZDOT), Cochise County, and the City of Sierra Vista.

Chapter 1. Introduction

The Department of Interior (DOI), Bureau of Land Management (BLM) Tucson Field Office (TFO) has prepared this Draft Resource Management Plan (RMP) and Draft Environmental Impact Statement (EIS) for the San Pedro Riparian National Conservation Area (SPRNCA). Congress designated the SPRNCA as the nation's first Riparian National Conservation Area (NCA) on November 18, 1988, through the enabling legislation (Public Law [PL] 100-696) (see **Appendix B**). The enabling legislation requires the BLM to manage the area to conserve, protect, and enhance the values of the SPRNCA (see **Section 1.3**).

The 55,990-acre SPRNCA starts at the US-Mexico border and continues northward approximately 47 miles, along the San Pedro River supporting a nationally significant riparian area (**Figure 1-1**, **Appendix A**). The SPRNCA contains four of the rarest habitat types in the southwest: Fremont cottonwood/Goodding willow forests, marshlands locally known as ciénegas,[1] big sacaton[2] grasslands, and mesquite bosques.[3]

The National Audubon Society recognizes the SPRNCA as a Globally Important Bird Area (GIBA)It attracts birders from all over the world; the riparian area along the San Pedro River provides habitat for over 400 species of birds. Two hundred and forty of these species are considered neotropical[4] migrants that winter in Mexico and breed during summer in the US and Canada.

In addition, the SPRNCA contains more than 80 species of mammals, one of the richest assemblages of land mammal species in the world. More than 50 species of reptiles and amphibians have also been found within the boundaries of the SPRNCA. Historically, the river supported 13 species of native fishes; however, only two remain in the river, the longfin dace and desert sucker.

The SPRNCA is in the center of the Fort Huachuca Sentinel Landscape. Sentinel landscapes are working or natural lands important to the nation's defense mission. They are places where preserving the working and rural character of key landscapes strengthens the economies of farms, ranches, and forests; conserving habitat and natural resources; and protecting vital test and training missions on military installations. The US Army's Fort Huachuca is in the sentinel landscape. It operates premier restricted military airspace for unmanned aircraft system training in the western US and supports training for personnel from the Air Force and Marine Corps.

The primary objectives of the Fort Huachuca Sentinel Landscape is to identify common resource improvement goals and objectives among collaborators to accomplish and balance compatible missions, align efforts, preserve economic drivers that sustain the Fort Huachuca Sentinel Landscape region, and align ecologically connected areas with those of the BLM.

[1]Desert marshes, bogs, or a shallow slow-moving flow of water through dense surface vegetation; ciénegas are unique to the desert Southwest.
[2]Big sacaton is a native, warm-season grass that forms dense clumps. It is a coarse, upright, bunch grass that can grow from 3 to 8 feet tall. Leaves are anywhere from 1 to 2½ inches wide and up to 1 foot long. The pale flowers of big sacaton form in stiff, upright clusters 1 to 2 feet long.
[3]A gallery forest found along the riparian floodplains of streams and riverbanks in the desert Southwest.
[4] South and Central America, including the Caribbean and southern Mexico.

The location and unique ecological resources of the SPRNCA provide the BLM with an opportunity to work with partners to develop and implement priority habitat monitoring and improvement projects; examples are reducing hazardous fuels and protecting federally listed and other priority species through restoration that enhances habitat connectivity and resiliency. All of these support Fort Huachuca's need to improve habitat for federally listed and sensitive species and to mitigate impacts from its mission activities. In addition, the open space afforded by the SPRNCA not only provides opportunities for the BLM to meet the public's demand for access and diverse recreation opportunities, it helps Fort Huachuca's need for open space which reduces conflict with military training and operations.

The Draft RMP will consolidate or replace current management guidance and planning decisions for the SPRNCA under the following:

- Eastern Arizona Grazing EIS (BLM 1986)
- Safford District RMP and EIS (BLM 1992, 1994) and the San Pedro River Riparian Management Plan and EIS (BLM 1989), as amended
- Solar Programmatic Environmental Impact Statement (PEIS) Record of Decision (ROD) (BLM and Department of Energy 2012)
- Final Arizona Statewide Wild and Scenic River (WSR) Study Report/ROD (BLM 1997)
- Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management ROD (BLM 2004)
- Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States PEIS (BLM 2016)

This SPRNCA draft RMP/EIS was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) (42 US Code [USC] 4321 et seq.) and is consistent with the requirements and obligations set forth by the Federal Land Policy and Management Act of 1976 (FLPMA) (43 USC 1701). This process is also compliant with other appropriate BLM policies, guidance, and regulations.

1.1 PURPOSE AND NEED FOR THE RESOURCE MANAGEMENT PLAN

The purposes of the SPRNCA RMP are to guide the management of BLM-administered lands on the SPRNCA and to provide a framework for future land management in the decision area. It takes into account the requirements of the enabling legislation (Public Law [PL] 100-696, November 18, 1988), which is to ensure management conserves, protects, and enhances the riparian area and the aquatic, wildlife, archaeological, paleontological, scientific, cultural, educational, and recreation resources of the public lands surrounding the San Pedro River in Cochise County, Arizona.

This RMP is needed because current land use plans covering the SPRNCA are more than 25 years old. During the time that these plans have been in effect, new management issues have surfaced and existing management decisions are no longer responsive. This is because the SPRNCA resource conditions have changed over time, new technologies have emerged, and surrounding conditions have also changed. In addition, the BLM committed to evaluating the effects of livestock grazing on the SPRNCA for the portions of the SPRNCA that were not acquired through the state land exchange.

The purpose of the RMP is to address changing circumstances, including increased population growth surrounding the SPRNCA, increased demand for access and public use of the SPRNCA, and increased demand for water, which could affect the riparian values of the SPRNCA. In addition, this RMP evaluates

the effects of livestock grazing on the SPRNCA; this is to determine where and how livestock grazing could be compatible with the values of the NCA.

1.2 PLANNING AREA

The planning area identified in **Figure 1-1** (**Appendix A**) is the SPRNCA boundary designated by PL 100-696. It covers approximately 58,250 surface acres and includes BLM-administered, private, and state land (**Table 1-1**). The subsurface mineral estate was withdrawn from all forms of entry, appropriation, or disposal; from location, entry, and patent under the US mining laws; and from disposition under all laws pertaining to mineral and geothermal leasing and all amendments thereto.

The SPRNCA is in Cochise County, south of Benson and west of Tombstone and Bisbee, Arizona. The city of Sierra Vista is to the west of the SPRNCA. Surrounding landownership includes federal land (US Army, National Park Service lands, National Forest System land, and BLM-administered land); state land (Arizona State Land Department); and private land. The BLM is responsible for managing only public land in the planning area. This is known as the decision area, which is 55,990 acres of BLM-administered lands. The acres of public land reported in **Table 1-1** are subject to change if the BLM acquires more land inside the planning area.

Table 1-1
Landownership Inside the SPRNCA Planning Area

Ownership	Acres[1]
BLM	55,990
Private	1,970
State	280
International Boundary and Water Commission	10
Total	**58,250**

Source: BLM Geographic Information System (GIS) 2017

[1]Rounded to the nearest ten acres.

The San Pedro River, one of the last undammed rivers with perennial stretches of water in the arid Southwest, originates approximately 20 miles south of the US-Mexico border. This is close to Cananea, Mexico. It ends at its confluence with the Gila River near Winkelman, Arizona (BLM 1987). The river elevation ranges from 4,260 feet above sea level at the US-Mexico border to 1,920 feet above sea level at the Gila River confluence. Approximately 46 miles of the San Pedro River are on the SPRNCA.

1.3 CONSERVATION VALUES OF THE SAN PEDRO RIPARIAN NATIONAL CONSERVATION AREA

The purpose of the SPRNCA, as stated in Section 102 (a) of the Arizona-Idaho Conservation Act of 1988, is to conserve, protect, and enhance the riparian area and the aquatic, wildlife, archaeological, paleontological, scientific, cultural, educational, and recreational resources. These are referred to as conservation values in this document. The BLM's primary goal is to conserve, protect, and enhance the conservation values described above.

Because flows in the San Pedro River have been declining, the BLM's actions may include efforts to maximize water availability for that purpose. Nothing in this RMP is intended to address the quantity of

water reserved to achieve the purposes of the SPRNCA. **Table 1-2** describes specific indicators for protecting SPRNCA conservation values and references the resource management category in which each of the conservation values is addressed in the alternatives. The resource management goals and objectives for each of these resource management categories are identified in **Chapter 2**. These goals and objectives further define the BLM's actions to conserve, protect, and enhance SPRNCA conservation values.

Table 1-2
Conservation Values of the SPRNCA

Conservation Value from PL 100-696	Conservation Value Indicators	Resource Management Category
Aquatic resources	• Diversity of native aquatic species • Pools per mile and depth	Vegetation communities (refer to **Section 2.5.4**), fish, wildlife, and special status species (refer to **Section 2.5.5**)
Riparian resources	• Age class distribution • Distribution of plant communities • Proportion of bare ground • Species richness • Bank cover	Vegetation communities (refer to **Section 2.5.4**), fish, wildlife, and special status species (refer to **Section 2.5.5**)
Wildlife resources	• Habitat intactness • Distribution of plant communities • Species richness • Vegetation structural diversity	Vegetation communities (refer to **Section 2.5.4**), fish, wildlife, and special status species (refer to **Section 2.5.5**)
Archaeological resources	• Integrity of sites	Cultural resources (refer to **Section 2.5.7**)
Paleontological resources	• Integrity of sites • Pleistocene era fossils	Paleontological resources (refer to **Section 2.5.8**)
Scientific resources	• Number of research permits	Paleontological resources (refer to **Section 2.5.8**), vegetation communities (refer to **Section 2.5.4**), fish, wildlife, and special status species (refer to **Section 2.5.5**), cultural resources (refer to **Section 2.5.7**)
Cultural resources	• Culturally important plants and animals • Springs • Traditional cultural properties (TCPs)	Cultural resources (refer to **Section 2.5.7**)
Educational resources	• Number of educational programs	Recreation (refer to **Section 2.5.12**)
Recreational resources	• Visitor satisfaction • Number of users • Diversity of use • Access to public use sites	Recreation (**Section 2.5.12**), transportation and access (**Section 2.5.13**)

1.4 SCOPING ISSUES

The Council on Environmental Quality (CEQ) implementation regulations (40 Code of Federal Regulations [CFR] 1500 et seq.) require scoping meetings to be conducted as part of the RMP/EIS process.

During public scoping, the BLM solicited comments from federal, state, and local agencies; Native American tribes; the public; stakeholders; and other interested parties. Comments from these meetings formed the framework to develop the range of alternatives and the scope of the analysis.

The SPRNCA RMP/EIS public scoping process began on April 30, 2013, with publication of the Notice of Intent (NOI) in the *Federal Register* (FR) (78 FR 25299); it ended on September 27, 2013. Public scoping meetings were announced through the NOI in the *Federal Register*, the BLM project website, and BLM news releases. The TFO has provided public access to SPRNCA RMP/EIS-related information on the BLM's ePlanning website (https://go.usa.gov/xnTuM). This includes information related to the scoping process.

The BLM held three public scoping meetings and provided education forums to inform the public on different resource issues related to the SPRNCA (BLM 2014a). Detailed information can be found in the scoping report on the SPRNCA RMP ePlanning website. Nothing relevant to the development of alternatives, such as resource conditions or issues to be addressed, has changed since 2013.

1.4.1 Issues Identified for Consideration

For planning purposes, an issue is defined as a matter of controversy or dispute over potential land and resource allocations, levels of resource use, production, and related management practices. Issues help determine what decisions will be made in the RMP and what must be addressed in the EIS, as required by NEPA.

A detailed description of planning issues brought forward during scoping are in the Scoping Report, which is available on the ePlanning website (https://go.usa.gov/xnTuM). Key planning issues considered for developing alternatives in this plan are detailed below.

Issue 1: Water Resources

How will the BLM manage water for resource use and to protect the values of the conservation area?

Commenters raised concern about the availability of water to sustain the San Pedro River and riparian habitats; they suggested that regional growth and the demand for housing have contributed to a decrease in the availability of water resources. They further suggested constructing retention basins, diversion structures, and artificial recharge basins to slow and retain stormwater runoff and to recharge the aquifer. Finally, the commenters recommended coordinating with local and regional governments to implement a balanced water budget.

Other commenters were concerned about water resources and land beyond the SPRNCA boundary. These commenters recommended including water and land resources beyond the SPRNCA boundary as part of the cumulative effects area of the RMP. They suggested that the BLM analyze the direct, indirect, interdependent, and interrelated impacts of BLM parcels next to the SPRNCA on its desired water quantity and quality.

Issue 2: Soil Resources

How will the BLM manage areas with highly erodible or sensitive soils?

Commenters indicated that the RMP needs to include an erosion control plan that identifies soil stabilization opportunities and methods.

Issue 3: Fish and Wildlife Habitat and Vegetation

How will the BLM manage vegetation and fish and wildlife habitat?

Commenters recommended using a combination of tools, such as fire, mechanical, manual, biological, and chemical treatments, to remove noxious and invasive species. They recommended that the BLM manage nonnative grasses to prevent them from spreading to lands outside the SPRNCA and from competing with the Huachuca water umbel. Commenters recognized the need to protect riparian habitats and maintain the unimpaired flow of the San Pedro River; they noted the need to protect the cottonwood and willow gallery forest, mesquite bosques, ciénega wetlands, and other sensitive riparian habitats. Finally, they recommended monitoring the biological metrics of aquatic and riparian ecosystem health to adapt management to changing environmental conditions. One comment was raised regarding land health and water resources and the need to discuss both in an interrelated manner.

Other commenters recognized the value of riparian and upland habitats that support migratory birds, fish, and mammal species. They recommended managing for beaver, fish, migratory birds, mule deer, and pronghorn antelope and recommended collecting and sharing water inventory data for wildlife needs.

Issue 4: Fire Management

How will the BLM manage fire in the wildland-urban interface?

Commenters recommended the use of prescribed fire to reduce fuel load and modify vegetation communities toward desired conditions. They also suggested a fire management plan to protect the cottonwood and willow gallery forest from catastrophic fire and to restore grassland habitats.

Issue 5: Cultural Resources, Paleontological Resources, and Native American Concerns

How will the BLM manage for cultural and paleontological resources and Native American Concerns?

Commenters recommended developing the Lehner Mammoth Kill Site to encourage visitation and public education of paleontological resources. They suggested increased public access to cultural sites, especially the stamp mill sites, and that lands on the SPRNCA be considered as traditional use.

Issue 6: Protective Designations (Lands with Wilderness Characteristics, WSRs, and ACECs)

In addition to the Riparian National Conservation Area designation, what other designations does the BLM need for managing the SPRNCA?

Commenters recommended the San Pedro Research Natural Area (RNA) and Area of Critical Environmental Concern (ACEC), the San Rafael RNA and ACEC, and the St. David Ciénega RNA and ACEC should retain their special designation. They recommended identifying potential ACECs to protect resources and values of the San Pedro River. They requested continued protection of the 44 miles of the San Pedro River identified as suitable for WSR designation. The commenters recommended that the BLM inventory other river segments for possible WSR designation. Finally, they identified the need to protect wilderness characteristics by keeping trails to a minimum, prohibiting utility corridors, limiting landscape modifications, removing invasive species, restricting hunting, and allowing overnight camping by permit only.

Issue 7: Livestock Grazing

At what level and where can the BLM manage livestock grazing on the SPRNCA, while furthering the primary purposes for which it was designated?

Comments ranged from not allowing livestock grazing to protect sensitive riparian resources to allowing active and productive livestock grazing practices to benefit riparian habitat and native grasslands and reduce fuel loads. For existing grazing and potential grazing, commenters suggested limiting grazing during migratory breeding seasons, modifying rotations and stocking rates, frequently and regularly monitoring grazing practices, and monitoring the available forage to ensure that preferred species are not declining.

Issue 8: Access and Recreation

How can the BLM manage the demand for increased access and different recreational experiences, while furthering the primary purposes for which the SPRNCA was designated?

Comments ranged from prohibiting motor vehicle use, to prohibiting off-highway vehicle (OHV) use, to allowing some limited use of OHVs. Commenters observed that OHV use could disturb wildlife, disrupt the recreation experience, and affect the environment. They requested improving access to the St. David Ciénega and SPRNCA to meet the needs of users and for maintenance and requested improving highways, turning lanes, and parking areas to meet future regional travel demand and growth. Commenters also recommended developing sites to educate the public about the values and resources of the SPRNCA.

Other comments on hunting ranged from prohibiting hunting to allowing hunting in specific areas of the SPRNCA. Some commenters suggested that hunting should not be allowed, due to conflicts with other uses, public safety issues, and protection of special status species. They noted that hunting around high-use areas raises public safety issues for visitors; instead, they suggested limiting hunting to bow hunting. Other commenters suggested allowing rifle, shotgun, and bow hunting.

Issue 9: Socioeconomics

What impacts will management actions have on socioeconomic concerns and environmental justice?

Commenters recognized the value of the SPRNCA to the local and regional economy. They noted that management of the SPRNCA could affect the economic viability of lessees on BLM-administered lands outside the SPRNCA. They also noted that there are populations in the region that are on limited budgets and impacts on these populations should be addressed in the RMP.

Issue 10: Lands and Realty

Where can the BLM allow land use authorizations on the SPRNCA, while furthering the primary purposes for which it was designated?

Commenters recommended identifying, evaluating, and analyzing right-of-way (ROW) avoidance and exclusion areas to protect sensitive resources. They also recommended acquiring nonfederal inholdings and adjacent land.

1.4.2 Planning Issues Considered but Not Further Analyzed in this RMP

The issues identified during public scoping (discussed above) shaped the alternatives carried forward in this RMP. Other issues identified during public scoping were also considered but were not analyzed

further; this is because they fall outside of the BLM's jurisdiction or are beyond the scope of this RMP. A list of these issues and the rationale for not analyzing them further are provided below.

Planning Area Boundary

Initially, when the BLM started the planning process, the planning area had not been defined. The BLM asked for input through the scoping process on the geographic extent of the planning area and which, if any, BLM-administered lands outside of the SPRNCA should be included in the planning. The BLM decided to include public lands within the SPRNCA boundary only. The input that was received on this issue is documented in the scoping report (BLM 2014a).

Water Resources

Water usage plans for Sierra Vista that allow the river to keep flowing and adoption of a balanced water budget by the city, county, and the Upper San Pedro Partnership

Rationale—The BLM does not have the authority to develop water usage plans for non-public lands. Such authority lies with the local city and county.

Pursue legal rights to base flow

Rationale—The BLM is pursuing a federally reserved water right for the SPRNCA resources through the appropriate legal process. This process occurs through adjudication, not the RMP.

Ensure that recharge water from the Sierra Vista Environmental Operations Park is contaminant free.

Rationale—The BLM does not control the water that is recharged from the Sierra Vista Environmental Operations Park; the reclaimed water is recharged on land not administered by the BLM. In addition, the BLM does not have the authority to regulate water quality. Such authority lies with the Arizona Department of Environmental Quality (ADEQ).

The BLM should be proactive in developing viable funding mechanisms to [ensure] adequate groundwater is available to SPRNCA.

Rationale—The BLM receives appropriated funds from Congress that can be used for specific activities. The BLM does not have a mechanism to develop funding to purchase water.

Purchase of water rights, conservation easements prohibiting development, groundwater infiltration areas, Central Arizona Project water, urban enhanced runoff and stormwater recharge, and other supplemental groundwater augmentation programs should be addressed.

Rationale—The BLM may consider purchasing water rights at the request of existing water rights holders. No process or mechanism exists for the BLM to purchase Central Arizona Project water, water from urban areas, or groundwater sources from lands not administered by the BLM. The BLM works with a variety of organizations and agencies to identify areas suitable for conservation easements and holds several easements.

Riparian Vegetation

The BLM should manage riparian vegetation to reduce water consumption.

Rationale—Removing riparian vegetation to a level that could increase streamflow over the short term would not be in alignment with the conservation values for which the SPRNCA was established.

Fish and Wildlife and Special Status Species

The BLM should address the impact on the spread of animal diseases from its actions.

Rationale—The BLM does not manage animal diseases. It is unlikely that any management action proposed by the BLM would affect the spread of animal diseases, as there are many factors that contribute to this issue.

Minerals, Energy, and Lands and Realty

Withdraw the SPRNCA from mineral entry.

Rationale—The SPRNCA is already withdrawn from mineral entry under PL 100-696 Section 102(c).

The BLM should address the impact on the electromagnetic spectrum in the San Pedro River Valley.

Rationale—The BLM is not proposing any management actions as part of this RMP that would affect the electromagnetic spectrum in the San Pedro River Valley. The BLM would consult with the US Army on any implementation level decisions that could affect the electromagnetic spectrum.

International Border

Secure the International Border.

Rationale—The BLM does not have jurisdiction over the International Border. Securing it is a function of the Department of Homeland Security. The BLM coordinates with the Department of Homeland Security US Border Patrol on a regular basis.

Public Safety

Prohibit carrying weapons on the SPRNCA.

Rationale—By law, US citizens may carry weapons on or through public lands for many legitimate purposes, including for hunting and self-protection.

Other

Maintain Fort Huachuca and its mission.

Rationale—There are no decisions that can be made through the RMP process that can directly maintain the US Army's Fort Huachuca and its mission. The BLM works with other agencies and the US Army through the Fort Huachuca Sentinel Landscape to help ensure that the Fort Huachuca mission is maintained.

Restrict development on private land adjacent to the SPRNCA.

Rationale—The BLM does not have jurisdiction over lands next to the SPRNCA that it does not administer. This function lies with county and city zoning.

1.5 PLANNING CRITERIA AND LEGISLATIVE CONSTRAINTS

1.5.1 Planning Criteria

The BLM planning regulations (43 CFR 1610.4-2) require the development of planning criteria to guide RMP preparation. Planning criteria are the constraints or ground rules that guide and direct plan preparation. They ensure that the plan is tailored to the identified issues and that unnecessary data collection and analyses are avoided. Planning criteria are based on applicable laws and regulations, agency

guidance, public participation, and coordination with cooperating federal, state, and local agencies and Native American tribes. Additional information on laws and regulations can be found in **Appendix B**.

Preliminary planning criteria were included in the NOI and were modified, based on public scoping. The planning criteria are as follows:

- The RMP will meet the requirements of the Arizona-Idaho Conservation Act of 1988 (PL 100-696). The act calls for conserving, protecting, and enhancing the riparian area and the aquatic, wildlife, archaeological, paleontological, scientific, cultural, educational, and recreational resources, while allowing only such use that would further the primary purposes for which the conservation area was established.
- The RMP will not address SPRNCA boundary adjustments or proposals to change PL 100-696.
- Public participation and collaboration will be an integral part of the planning process.
- The BLM will use a collaborative and multi-jurisdictional approach, where possible.
- Decisions in the RMP will be consistent with other planning jurisdictions in and next to the planning area boundary, to the maximum extent, consistent with federal law and the enabling legislation.
- The BLM will use scientific information, research, technologies, and results of inventorying and monitoring to enhance or restore impaired ecosystem function and species diversity. It also will adhere to presidential and DOI orders of March 9, 2009, for scientific integrity.
- The BLM will consult with affiliated Native American tribes, in accordance with policy, to give tribal concerns full consideration in the plan. The planning process will consider any impacts on Native American trust assets.
- The BLM will coordinate with the Arizona State Historic Preservation Office (SHPO) throughout the planning process.
- Any lands or interests within the planning area boundary that the BLM acquires will be managed consistently with this plan, subject to any associated constraints.

1.5.2 Legislative Constraints

The primary purpose for the SPRNCA's designation is to conserve and protect the conservation values discussed in **Section 1.3** and in the text of PL 100-696. The resources mentioned above summarize the conservation values that are to be the focus of protection in the RMP/EIS. Specific discussion regarding proposed uses and potential impacts regarding these conservation values may be found in the relevant resource sections in **Chapters 2** and **3** or in the appendices of this draft RMP/EIS.

Additionally, in accordance with PL 100-696, the RMP will do the following:

- Recognize all valid existing rights
- Meet the requirements to assert and protect federal reserved water rights necessary to meet the purposes of the SPRNCA
- Limit motorized travel to designated routes, including primitive roads and trails

1.6 PLANNING PROCESS

An RMP is the master land use plan that guides management of public lands in a particular area or administrative unit.

In accordance with 43 CFR 1610.4, preparation of an RMP involves interrelated steps, as illustrated in **Diagram 1-1**, Planning Process, below.

1.7 COLLABORATION

1.7.1 Lead and Cooperating Agencies

The BLM is the lead agency for the SPRNCA RMP/EIS.

In December 2012 and January 2013, the BLM sent letters to 33 federal, state, local, and tribal representatives inviting them to be cooperating agencies. Five of the 33 invitees initially agreed to participate in the RMP/EIS as cooperating agencies: the US Army, Arizona Game and Fish Department (AZGFD), Arizona Department of Transportation (AZDOT), Cochise County, and the City of Sierra Vista. In January 2018, AZDOT determined that it no longer had the capacity to participate as a cooperating agency and withdrew from the project.

1.8 RELATED PLANS

The RMP process recognizes the many programs, plans, and policies that are planned or being implemented in or next to the SPRNCA by other land managers and governments. Plans consulted in the preparation of this Draft RMP/EIS can be found in **Appendix E**.

1.8.1 BLM Policy

The BLM has policy guidance already established under various instruction memoranda from both the Washington and Arizona state offices. There are numerous policies that apply to the SPRNCA, and all cannot be described here in detail. For more information on the BLM's policies applicable to land use planning, refer to BLM Handbook H-1601-1, Land Use Planning Handbook (BLM 2005), and the instruction memoranda available on BLM websites for the Washington and Arizona offices (https://www.blm.gov/media/blm-policy).

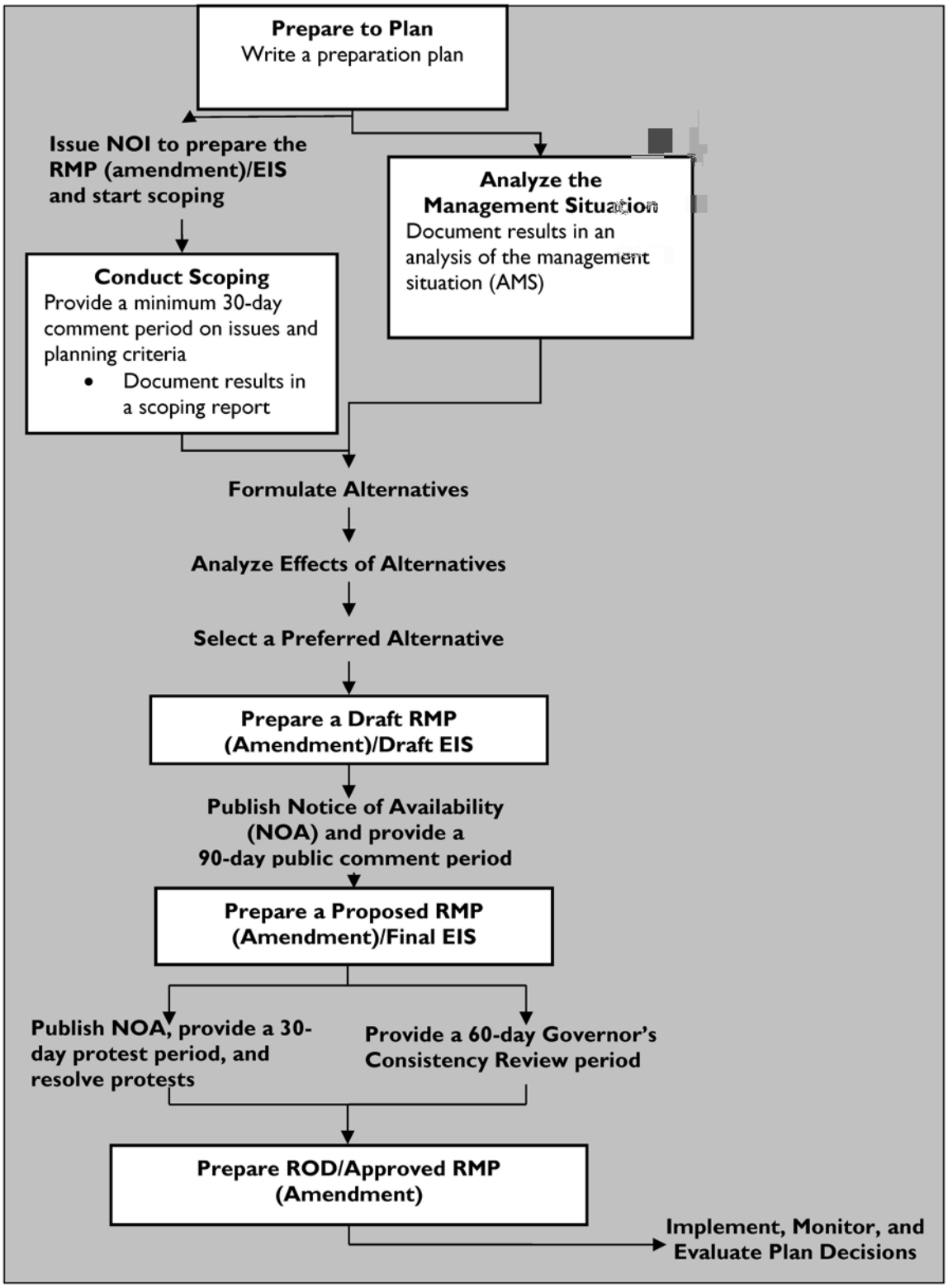
1.8.2 County and Local Plans

In accordance with the FLPMA, the BLM has an independent responsibility to coordinate with other units of government (43 USC 1712(c)(9)) in developing and revising land use plans. The BLM will, to the extent practicable, seek to maximize consistency with the plans and policies of other government entities, consistent with other federal law, whether or not a cooperating agency relationship has been established.

1.8.3 Other Relevant Plans, Agreements, or Memoranda of Understanding

Master memorandum of understanding (MOU) (AZ-930-0703) between the BLM Arizona and Arizona Game and Fish Commission establishing coordination and cooperation between Agencies—The commission sets policy for managing, preserving, and harvesting wildlife and fish. The BLM and AZGFD have agreed to cooperatively manage wildlife resources on public lands throughout Arizona. The master MOU establishes the BLM's responsibility for managing wildlife habitat on public lands and the AZGFD's

Diagram 1-1
Planning Process



responsibility to manage fish and wildlife through the authority of the commission. As stated in the MOU, the BLM and the AZGFD "consider the management of fish and wildlife resources as a high priority and agree to work cooperatively to achieve a shared goal to actively manage, sustain, and enhance those resources."

- MOU on the Federal Lands Hunting, Fishing, and Shooting Sports Roundtable
- MOUs pursuant to Executive Order (EO) 13186 to promote the conservation of migratory birds
- MOU between the BLM and US Fish and Wildlife Service (USFWS)
- MOU between the BLM and the Upper San Pedro Partnership
- Interagency agreement between the Bureau of Reclamation and the BLM, December 1982
- North American Waterbird Conservation Plan (US Geological Survey [USGS] and partners 2002)
- North American Waterfowl Management Plan (USFWS and partners 2012)
- US Shorebird Conservation Plan (USFWS and partners 2001)
- USFWS Birds of Conservation Concern—2008
- USFWS Game Birds Below Desired Condition
- San Pedro River Targeted Watershed *E coli* Reduction Improvement Plan (Coronado Resource Conservation & Development 2013)
- State protocol agreement between the BLM, Arizona, and the Arizona SHPO regarding the manner in which the BLM, Arizona, will meet its responsibilities under the National Historic Preservation Act (NHPA) and the National Programmatic Agreement between the BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers (executed December 14, 2014) (BLM 2014b).

1.9 POLICY

As previously discussed, PL 100-696 is the enabling legislation that established the conservation values for which the SPRNCA is to be managed. These conservation values direct the focus of SPRNCA management. All applicable decisions in the San Pedro River Riparian Management Plan (BLM 1989) and Safford District RMP (BLM 1992, 1994) will be incorporated into the no action alternative and may be incorporated in one or more action alternatives.

The decisions of the RMP will comply with all applicable laws and agency guidance. The BLM will consult with the USFWS on Section 7 of the Endangered Species Act (ESA). The BLM will review special status species, including species proposed for listing under the ESA, throughout the SPRNCA. The goal will be to conserve habitat through measures that assist in species conservation, thereby lessening the future need for federal listing.

The RMP will recognize AZGFD's authority to manage wildlife, including hunting and fishing, in the planning area, pursuant to the master MOU with the Arizona Game and Fish Commission establishing coordination and cooperation between agencies.

Chapter 2. Alternatives

This chapter describes and compares alternatives for developing the SPRNCA Draft RMP/EIS. The RMP analyzes the no action (or current management) alternative and three action alternatives, including the preferred alternative. Under Alternative A, the no action alternative, management of the affected public lands and resources would continue without change from the guidance provided by existing applicable land use plans and amendments, and the enabling legislation for the SPRNCA. The action alternatives—Alternatives B, C (the preferred alternative), and D—present various combinations of public land use and resource management practices that address issues identified during the scoping process.

Each alternative varies in perspective and intensity of management. Each includes a series of decisions and desired outcomes that collectively would direct future management for the SPRNCA planning area. Additionally, each alternative consists of a set of designations, land use allocations, allowable uses, and management actions needed for implementing that alternative.

The alternatives represent a reasonable range of management options identified in accordance with NEPA, other applicable laws, and public, government, and tribal participation. Based on input received, the BLM developed management alternatives that incorporated decisions for many resource or resource use categories. The BLM shared preliminary alternatives with the public in spring 2015 to see if the alternatives were responsive to issues raised during scoping. It used input received on the preliminary alternatives to refine the alternatives in this Draft RMP/EIS.

Each alternative portrays a different management focus, as defined by the desired outcomes, management actions, and allowable uses. All action alternatives focus on management to ensure protection of the riparian area and the aquatic, wildlife, archaeological, paleontological, scientific, cultural, educational, and recreational resource values of the SPRNCA, as identified in PL 100-696.

2.1 TYPES OF BLM DECISIONS

This RMP describes planning-level decisions and defers site-specific implementation-level decisions until after the ROD for this plan has been signed. For some resources, administrative actions that the BLM takes when managing public lands are provided in **Appendix F**. These types of decisions and administrative actions are described below. Implementation of all actions and decisions in the RMP are subject to available funding and staffing.

2.1.1 Planning-Level Decisions

These represent the goals and objectives for the planning area and the actions needed to achieve them. The decisions guide future land management actions and subsequent site-specific implementation decisions.

Goals

These are broad statements that describe desired outcomes that are usually not quantifiable. Goals generally apply to the entire planning area and do not vary by alternative.

Objectives

These identify specific desired outcomes for resources. Objectives are usually measurable and may have an established time frame for achievement.

Allocations and Allowable Uses

These are decisions that describe geographic areas for specific resources or uses, such as where grazing is authorized. Allocations have geographic boundaries, shown on maps provided in this document. RMPs identify uses, or allocations (as described above), that are allowable, restricted, or prohibited on public land to achieve goals and objectives.

Management Actions

These are actions anticipated to achieve desired future conditions, goals, and objectives. They include proactive measures, as well as measures or criteria that would be applied to guide day-to-day activities on public land. This RMP also establishes administrative designations, such as ACECs, and recommends findings of suitability for Congress to designate segments of the National Wild and Scenic River System (NWSRS).

2.1.2 Administrative Actions

These are not planning-level decisions and therefore a plan amendment is not required to change them. Administrative actions are day-to-day activities conducted by the BLM that are often required by FLPMA but do not require NEPA analysis or a written decision by a responsible official. Examples of administrative actions include, but are not limited to: mapping, surveying, inventorying, monitoring, partnering, developing educational materials, adjusting staffing, patrolling, and doing scientific research and studies. Examples of common BLM administration actions are provided in **Appendix F**. This is not an inclusive list and may change over time in response to new information, new policies, or other factors.

2.1.3 Best Management Practices

These are a suite of techniques that guide, or may be applied to, management actions in achieving desired outcomes. BMPs are applied on a project-by-project basis to minimize or reduce impacts identified in the project-level NEPA document. BMPs are described in **Appendix G**. In addition, the BLM would implement the mitigation hierarchy described in 40 CFR 1508.20 of avoid, minimize, rectify, reduce, and compensate at the project level.

2.2 SUMMARY OF ALTERNATIVES

The range of management alternatives considered in this Draft RMP/EIS is described in detail in this chapter. The following sections summarize the general scope and key highlights of each alternative.

2.2.1 Alternative A (No Action Alternative)

The BLM-administered lands in the planning area are managed under two separate management plans. The BLM is developing a stand-alone RMP for the SPRNCA. This is because the existing San Pedro River Riparian Management Plan (BLM 1989) is a combination of planning-level and activity-level decisions and does not identify comprehensive desired outcomes for the resources on the SPRNCA. In addition, the resource conditions and surrounding conditions have changed since the Safford District RMP and the San Pedro River Riparian Management Plan (BLM 1992, 1994a) were written. As a result, few of the

existing decisions were carried forward in this Draft RMP/EIS as common to all alternatives; instead they are restated as new action alternatives, where applicable.

The No Action Alternative would be a continuation of the existing management under the current Safford District RMP, which incorporated RMP-level decisions from the San Pedro River Riparian Management Plan. This continues current public use and resource protection/conservation prescriptions without change. It neither sets desired outcomes for resource management or most uses nor addresses new issues unforeseen or nonexistent when the current management plans were prepared. Alternative A has the following components:

- SPRNCA is managed as a sspecial recreation management area (SRMA).
- Livestock grazing occurs on 7,030 acres on four allotments that are partially located on the SPRNCA.
- The BLM conducts restoration for vegetation communities on a case-by-case basis.
- SPRNCA is managed under visual resource management (VRM) Class I (2,170 acres), VRM Class II (19,170 acres), VRM Class III (22,530 acres), and VRM Class IV (12,120 acres).
- No acreage is managed to protect wilderness characteristics.
- New ROWs are considered on a case-by-case basis; there is one designated utility corridor along Charleston Road.
- The San Pedro River is suitable as recreational for inclusion in the NWSRS; the Babocomari River is eligible as scenic for inclusion in the NWSRS.
- Three ACECs are designated for the protection of rare plants.

2.2.2 Alternative B

This alternative places an emphasis on opportunities for increased public access, livestock grazing, and recreation uses, while focusing on active resource management, using the broadest array of management tools. This would include use of heavy equipment, herbicide, where appropriate, hand tools, and prescribed fire to achieve goals and objectives. These would be used to mitigate any effects from increased use and to restore the ecosystem. Alternative B sets desired outcomes and allocations for resources, including natural, cultural, and visual, while providing for use and an array of visitor experiences and opportunities. It has the following components:

- The SPRNCA would be managed as an extensive recreation management area (ERMA) with recreation management zones to target rural and backcountry recreation opportunities. New motorized recreation opportunities would be provided.
- The BLM would allow livestock grazing across the entire SPRNCA.
- For all vegetation communities, the BLM would use biological, chemical, mechanical, and prescribed fire treatments to meet the goals and objectives for all vegetation communities, including priority habitats.
- The BLM would manage for VRM Class I (0 acres), VRM Class II (25,040 acres), VRM Class III (30,950 acres), and VRM Class IV (0 acres).
- There would be no acreage managed to protect wilderness characteristics.

- The entire SPRNCA would be an avoidance area for new ROWs. The Charleston Road ROW utility corridor would continue to be managed as a utility corridor (750 feet by 12,040 feet [210 acres]).
- The San Pedro River would be suitable as recreational for inclusion in the NWSRS. The Babocomari River would not be suitable for inclusion in the NWSRS.
- Travel management designations limit motorized vehicle use.
- Existing ACEC designations would be removed and no new ACECs would be designated.

2.2.3 Alternative C (Preferred Alternative)

This alternative, which is the BLM's preferred alternative, represents a balance between resource protection and public access, livestock grazing, and recreation. To achieve goals and objectives, Alternative C focuses on active resource management, using the broadest array of management tools, including use of heavy equipment, herbicides, where appropriate, hand tools, and prescribed fire to restore ecosystems. As in Alternative B, it sets desired outcomes and allocations for the resources, including natural, cultural, and visual. It proposes a mix of recreational opportunities and includes the following components:

- The SPRNCA would be managed as an ERMA, with recreation management zones to target rural, backcountry, and primitive recreational opportunities. Motorized access would be provided to some backcountry settings.
- The BLM would allow livestock grazing in the upland portions of the SPRNCA, where it would further the area's primary purposes through adaptive management.
- The BLM would use biological, chemical, mechanical, and prescribed fire treatments to meet the goals and objectives for all vegetation communities, including priority vegetation.
- The BLM would manage for VRM Class I (0 acres), VRM Class II (27,850 acres), VRM Class III (28,140 acres), and VRM Class IV (0 acres).
- No acreage would be managed to protect wilderness characteristics.
- The entire SPRNCA would be an avoidance area for new ROWs. The Charleston Road ROW utility corridor would continue to be managed as a utility corridor (750 feet by 12,040 feet [210 acres]).
- Travel management designations would limit motorized vehicle use to designated routes.
- The San Pedro River would be suitable as recreational for inclusion in the NWSRS. The Babocomari River would be suitable as recreational for inclusion in the NWSRS.
- It would remove existing ACEC designations, and no new ACECs would be designated.

2.2.4 Alternative D

Alternative D emphasizes resource protection and conservation, while allowing access and recreation where appropriate. It focuses on natural processes and use of "light on the land" management methods; one example is the use of hand tools and prescribed fire, instead of heavy equipment or herbicide. Ecosystem restoration and goals and objectives would be achieved using the "light on the land" methods. As in the other alternatives, it sets desired outcomes and allocations for SPRNCA resources, including natural, cultural, and visual, while allowing a lower level of human use. It proposes mostly a primitive recreational experience and contains the following components:

- SPRNCA would be managed as an ERMA, with recreation management zones to target rural, backcountry, and primitive recreation opportunities. Only nonmotorized access would be provided in most backcountry settings.
- Livestock grazing would not be authorized on the SPRNCA.
- For all vegetation communities, including priority vegetation communities, the BLM would use predominantly natural processes and hand tools instead of heavy equipment and herbicide to meet goals and objectives.
- The BLM would manage for VRM Class I (0 acres), VRM Class II (44,870 acres), VRM Class III (11,120 acres), and VRM Class IV (0 acres).
- The BLM would manage the 23,810 acres identified to protect wilderness characteristics.
- The entire SPRNCA would be a ROW exclusion area. The Charleston Road ROW utility corridor would not be designated.
- Travel management designations would limit motorized vehicle use to designated routes on 32,180 acres and would close 23,810 acres.
- The San Pedro River would be suitable as recreational, scenic, and wild for inclusion in the NWSRS; the Babocomari River would be suitable as scenic for inclusion in the NWSRS.
- Three ACECs would be expanded to protect rare plants. Two new ACECs would be designated to protect cultural, historical, and paleontological resources.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

This section briefly describes alternatives considered but eliminated from further analysis in this Draft RMP. The management actions considered were recommended by resource specialists or by the public, during scoping and in the alternatives development workshops. The management actions are described below, along with the rationale for excluding them from further consideration.

2.3.1 Forage Reserve Allotment

The BLM considered an alternative with an approximately 38,000-acre forage reserve allotment. The forage reserve allotment would have been grazed by cattle only on a case-by-case basis for vegetation management. This was not a viable alternative because there would not have been lease holders responsible for constructing and maintaining the infrastructure. This would have been a community allotment, and operators would apply on a case-by-case basis.

2.3.2 ROW Corridors

The BLM considered designating ROW corridors along Highways 82, 90, and 92. The BLM's National Landscape Conservation System policy prevents the BLM from designating new corridors in NCAs and national monuments.

2.4 MANAGEMENT COMMON TO ALL ALTERNATIVES

2.4.1 Arizona Land Health Standards

The Arizona Standards for Rangeland Health and Guidelines for Grazing Administration were developed, pursuant to 43 CFR 4180 through collaboration of BLM staff and the Arizona BLM Resource Advisory Council. The standards were approved by the Secretary of the Interior in April 1997 (BLM 1997). The standards and guidelines were developed to identify the characteristics of healthy ecosystems on public lands and the management actions that promote them. When approved, the standards and guidelines

became Arizona BLM policy, guiding the planning for and management of BLM-administered lands; therefore, they have been incorporated into this Draft RMP/EIS.

The standards describe the conditions necessary to encourage proper functioning of ecological processes and are adopted as land health standards. In managing and implementing all resource programs, the BLM must consider these standards.

The Arizona Guidelines for Grazing Administration are a series of management practices used to ensure that grazing meets the Arizona Standards for Rangeland Health.

The standards and guidelines for grazing administration are incorporated into the Draft RMP/EIS in **Section 2.5.11**, Livestock Grazing, and are detailed in **Appendix H**.

2.4.2 Collaboration and Partnerships

Implementing this plan would require the involvement of many partners. The BLM invites citizens to help achieve the goals, and it will continue to do so.

The BLM recognizes the need to work with other local, county, and federal agencies and other stakeholders in the San Pedro watershed. The purpose is to leverage water conservation and augmentation strategies to achieve the water goals and objectives on the SPRNCA.

Monitoring and Partnerships

Monitoring related to implementing RMPs is important because it provides information on the relative success of strategies. Monitoring is the collection and analysis of repeated observations to track the status of a variable or system. It can be used to determine whether management actions are being implemented as written (implementation monitoring) or to evaluate success in achieving desired outcomes (effectiveness monitoring). Ongoing monitoring helps to adjust management decisions and strategies related to implementing RMPs.

This Draft RMP recognizes that many monitoring needs would require further design and planning. The BLM invites citizens and partners to help develop an effective monitoring and evaluation plan for implementation decisions on public land on the SPRNCA. It intends to monitor through established methods, such as Assessment, Inventory, and Monitoring and land health assessments.

2.4.3 Implementation

Many RMP decisions are implemented or become effective on approval of the ROD. These decisions are as follows:

- Goals and objectives
- Land use allocation decisions
- All special designations, such as ACECs

Management actions that require more site-specific project planning would require further environmental analysis. Decisions to implement site-specific projects are subject to administrative review when such decisions are made.

2.5 ALTERNATIVES

RMPs are broad-scale land management plans that establish desired outcomes (goals and objectives) for resource management. The following presentation of the alternatives identifies the goals and objectives for each resource and resource use. It includes the measures, including land use allocations, management actions, and allowable uses, that would achieve those goals and objectives. Once an alternative is selected, the goals, objectives, land use allocations, management actions, and allowable uses would become the RMP. It would provide the framework for subsequent, site-specific management decisions and actions. These site-specific implementation-level decisions would occur following adoption of the RMP.

As described above, four management alternatives have been developed for the SPRNCA. Goals and objectives, proposed land use allocations, and allowable uses and management actions are identified in each of the four alternatives described in **Section 2.5** and summarized in **Section 2.6**. The action alternatives (Alternatives B, C, and D) generally share the same goals and objectives (desired outcomes), that were identified through the planning and scoping process for this plan; the goals and objectives for the Alternative A are different because they are directly derived from the current land use plans (when goals and objectives are identified in those plans).

The goals and objectives are followed by different sets of management actions, allowable uses, and use allocations for each alternative; these identify areas and acreages where certain land uses would be prohibited, restricted, or allowed. In cases where the existing management plans or an action alternative do not have a comparable management goal, objective, action, allowable use, or use allocation, "N/A" is inserted under the appropriate alternative heading in the tables below.

2.5.1 Hyperlinks to Alternatives

Use the hyperlinks in the following table to access alternatives for resources, resource uses, and special designations.

Resources	
Air Quality	Cultural Resources
Soil Resources and Water Resources	Paleontological Resources
Vegetation Communities	Visual Resources
Fish, Wildlife, and Special Status Species	Lands with Wilderness Characteristics
Wildland Fire and Management	
Resource Uses	
Livestock Grazing	Transportation and Access
Recreation	Lands and Realty
Special Designations	
Areas of Critical Environmental Concern	Wild and Scenic Rivers

2.5.2 Air Quality

Air Quality			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
A. GOALS			
Goal 1: N/A	**Goal 1**: Manage activities and development on the SPRNCA to minimize emissions that cause or contribute to violations of air quality standards or that negatively impact air quality-related values (e.g., visibility).		
B. OBJECTIVES			
Objective: **1:** Comply with all federal and state statutes pertaining to air quality and cooperate with the State of Arizona in carrying out the State Implementation Plan (SIP).	**Objective 1:** Manage SPRNCA activities and development to comply with all applicable local, state, tribal, and federal air quality laws, regulations, standards, and implementation plans.		
Objective 2: Continue to manage the airshed in accordance with State of Arizona Class II standards unless redesignated.			
Objective 3: N/A	**Objective 3:** Manage SPRNCA activities and development to protect and improve air quality and, within the scope of the BLM's authority, minimize emissions that cause or contribute to violations of air quality standards or that negatively impact AQRVs. Maintain attainment status for all National Ambient Air Quality Standards (NAAQS) and ADEQ standards.		
C. LAND USE ALLOCATIONS			
1. N/A			
D. MANAGEMENT ACTIONS AND ALLOWABLE USES			
1. When implementing BLM or BLM-approved activities, minimize surface disturbances to prevent the addition of large quantities of dust to the air. Apply stipulations to mitigate the impacts on air quality.			
2. If any or all of the SPRNCA is designated as a non-attainment area for violations of the NAAQS, work with regulatory agencies to follow the SIP for reducing air pollutants in the area.			

2.5.3 Soil Resources and Water Resources

Soil Resources and Water Resources			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
II. SOILS AND WATERSHED MANAGEMENT			
A. GOALS			
Goal 1: Soils would exhibit infiltration, permeability, and natural erosion rates appropriate for the soil type, climate, and landform.			
Goal 2: N/A	**Goal 2:** Stream channel and riparian processes would promote building of bank and floodplain soils with low bulk density properties (high organic content) that promote bank storage of water where appropriate.		
B. OBJECTIVES			
Objective 1: Maintain and enhance the soils and watershed resources of the EIS area, i.e., the SPRNCA, to reduce future soil erosion.	**Objective 1:** Maintain or improve ground cover that protects sensitive soils and prevents accelerated erosion (**Figures 2-1** and **2-2** in **Appendix A**).		
Objective 2: N/A	**Objective 2:** Conserve, protect, and enhance proper functioning watershed conditions to help maintain groundwater levels and base flows on the SPRNCA.		
C. LAND USE ALLOCATIONS			
1. N/A			
D. MANAGEMENT ACTIONS AND ALLOWABLE USES			
1. N/A	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.		1. Use predominantly natural processes, hand tools, or low impact erosion control structures to control sheet, rill, and gully erosion in areas indicating accelerated erosion from lack of vegetation cover and soil erosivity.
2. N/A	2. Implement seeding and plantings (using only native seeds and plants), if needed following fire, flood, or other disturbance.		
3. N/A	3. Improve watershed health and prioritize treatments for recharge enhancements in ephemeral tributaries (refer to **Appendices G** and **I**). Monitor groundwater levels in monitoring wells near recharge enhancement projects, if there are not increases in groundwater levels, implement recharge enhancement projects that are larger in scale, closer to the river, or are a different type of recharge enhancement.		3. Use natural processes, hand tools, and nonstructural features for recharge enhancement projects and to improve watershed health (refer to **Appendices G** and **I**).

Soil Resources and Water Resources			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
			Monitor groundwater levels in monitoring wells near recharge enhancement projects, if there are not increases in groundwater levels, implement recharge enhancement projects closer to the river or a different type of recharge enhancement.
4. N/A	4. Enhance riverine geomorphology and bank recharge to protect base flow through low impact structural and nonstructural approaches where needed in San Pedro River segments (refer to **Appendices** and **I**). Implement small structures and monitor channel sloped, sinuosity, soil moisture, groundwater levels near treatments, and vegetation cover.		4. Implement no structural or nonstructural projects in the main stem of the San Pedro River.
5. N/A	5. Assess the man-made structures from historical land uses (e.g. agricultural dikes and berms, railroad grades, and ditches and diversions) for hydrologic function, determine their level of impairment, and rehabilitate (either dismantle or alter) as necessary.		5. Make no changes to existing man-made structures.
6. N/A	6. Modify all routes affecting watershed health and function, as necessary to restore watershed function and long-term health (see **Section 3.2.3**).		6. Use natural processes or hand tools to mitigate impacts from routes on watershed health.
I. WATER MANAGEMENT			
A. GOALS			
Goal 1: N/A	**Goal 1:** Provide a base flow sufficient for SPRNCA management purposes.		
Goal 2: N/A	**Goal 2:** Improve water quality to reach State of Arizona standards (ADEQ 2018).		
B. OBJECTIVES			
Objective 1: The objective for management of water quality is to maintain or enhance water quality at or above established standards for designated uses to meet management goals for each water source. Adhere to federal and state water quality laws and standards.	**Objective 1:** Reduce or prevent contamination of surface and groundwater by nonpoint source pollution to meet state requirements.		

Soil Resources and Water Resources			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
Objective 2: N/A	**Objective 2:** Improve summertime water quality (dissolved oxygen levels) in reaches that have experienced fish kills.		
Objective 3: N/A	**Objective 3:** Provide adequate water quantities to sustain woody vegetation comprised of cottonwood, willow, and other native deciduous riparian trees and to meet desired ecological conditions, especially those for tree regeneration (see **Section 2.5.4** for desired riparian plant community).		
Objective 4: N/A	**Objective 4:** Maintain and enhance hydrologic function at Saint David Ciénega, Dunlevy artesian wetlands, Kolbe artesian wetland, and the Lewis Spring Ciénega complex to meet the desired wetland plant community as described in the vegetation section (see **Section 2.5.4**) and associated ecological conditions.		
Objective: 5 Conserve the groundwater resource, while providing necessary support for other programs.	**Objective 5:** Conserve groundwater on the SPRNCA, while allowing for appropriate uses on the SPRNCA.		
C. LAND USE ALLOCATIONS			
1. N/A			
D. MANAGEMENT ACTIONS AND ALLOWABLE USES			
1. N/A	1. Review and assess water needs for resources managed on the SPRNCA and acquire and perfect new water rights as deemed necessary for management purposes.		
2. N/A	2. Design any pumping of groundwater for BLM-authorized actions to reduce impacts on base flows; this could include putting floats in troughs and seasonally restricting groundwater pumping.		2. Decrease groundwater pumping for BLM-authorized actions.
3. N/A	3. Do not approve land use authorizations (realty actions) involving additional groundwater pumping on the SPRNCA, subject to valid existing rights		
4. Keep some of the non-irrigation wells operational to provide the required water for various resource activities and for administrative.	4. Assess existing wells on the SPRNCA for use as monitoring wells, administrative use, wildlife use (drinking and habitat), habitat restoration (for maintaining a limited number of off-channel aquatic habitats for threatened and endangered species recovery), livestock use, emergency habitat augmentation, and other potential uses.		4. Assess existing wells on the SPRNCA for use as monitoring wells. Keep Some non-irrigation wells operational to provide the required water for administrative purposes (e.g., San Pedro House and Fairbank).

2.5.4 Vegetation Communities

Vegetation Communities			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
I. VEGETATION MANAGEMENT: ALL VEGETATION COMMUNITIES			
A. GOALS: ALL VEGETATION COMMUNITIES			
Goal: **1** Maintain and enhance the vegetation communities on the SPRNCA.	**Goal 1:** Ensure that natural processes (e.g., fire, flood, and hydrology) are maintained or restored to support vegetation expression that approaches or meets the ecological site potential.		
Goal 2: N/A	**Goal 2:** Maintain or restore each vegetation community in its natural range of variation in plant composition, structure, and cover (basal and canopy) at the landscape level.		
Goal 3: N/A	**Goal 3**: Ensure that noxious and undesirable plant species do not occur on the landscape or, if they occur, they make up a sufficiently small percentage of the vegetation community that they do not affect ecological processes.		
Goal 4: N/A	**Goal 4:** Ensure that vegetation supports a diversity of suitable habitats available for future establishment and maintenance of populations of endangered, threatened, and special status plant and animal species for species recovery.		
B. OBJECTIVES: ALL VEGETATION COMMUNITIES			
Objective 1: Restore and maintain plant communities, wildlife, watershed condition, and livestock.	**Objective 1:** Ensure that the natural diversity and abundance of native vegetation occurs as expected for landform and ecological sites.		
Objective 2: N/A	**Objective 2:** Maintain or improve the ecological processes and function of habitats that support priority or special status plant species.		
Objective 3: N/A	**Objective 3:** In areas where firebreaks are identified to protect or maintain WUI areas and other values at risk, reduce fuel characteristics, which changes fire behavior characteristics (reduced flame lengths, slower rates of spread, reduced fire intensity levels, and reduced crown fire potential).		
C. LAND USE ALLOCATIONS: ALL VEGETATION COMMUNITIES			
1. N/A			
D. MANAGEMENT ACTIONS AND ALLOWABLE USES: ALL VEGETATION COMMUNITIES			
1. N/A	1. Use combinations of biological, mechanical, prescribed fire, and chemical management to suppress, control, and/or eliminate invasive species/noxious weeds.		1. Use hand tools to suppress, control, and/or eliminate invasive species/noxious weeds. Monitor the treatment effectiveness. If invasive

Vegetation Communities			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
			species/noxious weeds are not suppressed with the hand tool treatment, use prescribed fire and herbicide to suppress invasive species/noxious weeds as needed.
2. N/A	2. Use native trees, shrubs, and herbs and native seed mixes for restoration.		
3. Reduce the potential for damage to resources and structures by using firebreaks, both natural and constructed. Emphasize the following areas; the southwest portion of the EIS area, where extensive fuels are within 1 mile of private dwellings; near the El Paso Natural Gas pipeline; and near any structures.	3. Use biological, chemical, mechanical, and prescribed fire treatment methods to create and maintain firebreaks to reduce fuel characteristics.		3. Use hand tools and prescribed fire to maintain existing firebreaks. Create no new firebreaks, except in the event of a wildfire.
4. N/A	4. After a vegetation/restoration treatment, exclude livestock from the treatment area for two growing seasons or until resource objectives are met.		4. Authorize no livestock grazing on the SPRNCA.
5. N/A	5. The following criteria would apply for plant collection in all vegetation communities: ● Collection of living or dead native plant material for commercial uses would be prohibited; ● Collection of living or dead native vegetation and byproducts that are proposed for federal listing, federally listed as threatened or endangered species, or highly safeguarded native plants identified in the Arizona Native Plant Law would be prohibited, except as permitted by USFWS; ● Collection of live vegetation or vegetative products would be allowed for scientific uses (except where stated above) when covered by an approved BLM research permit; ● Reasonable amounts of wood and other plant materials may be used for administrative purposes; ● Collection of living native vegetation and seeds for restoration purposes or to establish new populations of rare or federally listed plants would require BLM authorization; and ● Collection of plants for noncommercial, personal use quantities of herbals, medicines, traditional use items by Native American tribes would be allowed in areas identified in coordination with Native American tribes.		
6. Permit gathering of dead and down wood for use in designated areas only.	6. Allow gathering of dead and down wood for campfires.		6. Prohibit gathering of dead and down.
7. N/A	7. Allow for biomass utilization for usable wood products generated during restoration treatments to be collected by the public with a permit.		7. Prohibit biomass collecting.

Vegetation Communities			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
8. N/A	8. Allow for the use of any wood from vegetation treatments for on-site erosion control (e.g., Zeedyke structures in damaged water courses) or chips for soil improvements designed to add organic material, hold more water, and slow erosion.		
II. VEGETATION MANAGEMENT: RIPARIAN VEGETATION COMMUNITY			
A. GOALS: RIPARIAN VEGETATION COMMUNITY			
Goal 1: Riparian areas and wetlands are in proper functioning condition (PFC).			
Goal 2: N/A	**Goal 2:** Maintain and improve approximately 12,340 acres of riparian habitat. Riparian habitats should contain a diversity of native riparian obligate trees and shrubs of various age and size classes and herbaceous plants to maintain and restore ecological condition and function. Manage for a diverse age structure that supports tree replacement where channel and hydrologic conditions support tree regeneration.		
B. OBJECTIVES: RIPARIAN VEGETATION COMMUNITY			
Objective 1: The objective for management of riparian areas is to maintain or improve 75 percent of the acreage of riparian vegetation on public lands within the district in good or excellent condition by 1997.	**Objective 1**: Maintain the Fremont cottonwood-Goodding's willow gallery, except in areas where firebreaks are planned.		
Objective 2: N/A	**Objective 2:** Maintain and achieve PFC.		
Objective 3: N/A	**Objective 3:** Provide sufficient vegetated bank cover to prevent erosion, slow down water, and improve bank soil condition including porosity for recharge.		
Objective 4: N/A	**Objective 4:** In areas where firebreaks are planned or currently exist, maintain acceptable levels of fuels in riparian areas and floodplains. A secondary objective in firebreak areas is to maintain or enhance key biological elements for priority or special status species.		
Objective 5: N/A	**Objective 5:** Maintain the native plant community (dominated by big sacaton grassland and mesquite forest [bosque]) on adjacent floodplains.		
Objective 6: N/A	**Objective 6:** Between Fairbank and Land Corral, reduce salt cedar acres from 22 percent to less than 5 percent of the total riparian vegetative cover.		

Vegetation Communities			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
C. LAND USE ALLOCATIONS: RIPARIAN VEGETATION COMMUNITY			
1. N/A			
D. MANAGEMENT ACTIONS AND ALLOWABLE USES: RIPARIAN VEGETATION COMMUNITY			
1. N/A	1. Restore riparian function.		
2. N/A	2. Allow for herbicide and mechanical vegetation treatments to meet riparian vegetation objectives.		2. Use hand tools to meet riparian vegetation objectives. Monitor treatment effectiveness. If riparian vegetation objectives are not met, use herbicide.
3. N/A	3. Use a broad array of management tools to remove salt cedar and maintain past salt cedar treatments.		3. Use hand tools to remove salt cedar and maintain past salt cedar treatments. Monitor salt cedar hand tool treatment effectiveness. If reduction of salt cedar is not effective, use heavy equipment and herbicide to remove salt cedar and maintain past salt cedar treatments.
4. Grazing would continue on the four allotments.	4. Monitor riparian grazing and adjust as appropriate to maintain appropriate vegetation species, vegetation density, and bank conditions.	4. Authorize no livestock use (see **Figure 2-16**, **Appendix A**, and **Section 3.3.1**) until fencing or other control methods are in place to prevent livestock access to riparian areas.	4. Authorize no Livestock grazing on the SPRNCA.
5. N/A	5. Design new recreation developments to minimize impacts on riparian vegetation and critical habitat (see **Figure 3-5**).		5. Allow no new recreation development.
6. Travel routes identified in the 1995 Intermodal Transportation Plan (BLM 1995) would be maintained using BMPs to minimize erosion.	6. Monitor and maintain existing recreational trails on upper banks and floodplains. Limit spur trails to channel edges to short segments.		
III. VEGETATION MANAGEMENT: WETLAND VEGETATION COMMUNITY			
A. GOALS: WETLAND VEGETATION COMMUNITY			
Goal 1: N/A	**Goal 1:** Ensure the vegetation community wetland areas on the SPRNCA support healthy, diverse, and abundant populations of native wetland plants, fish, and wildlife species.		

Vegetation Communities			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
B. OBJECTIVES: WETLAND VEGETATION COMMUNITY			
Objective 1: N/A	**Objective 1:** Maintain, restore, or enhance approximately 40 acres of wetland plant communities. Maintain the Lewis Springs wetland complex in its current state and enhance the Dunlevy wetlands [3], Kolbe Wetland and White House Wetland (supplied by artesian wells), and Murray Springs. Restore the St. David Ciénega to approximate historical conditions. Maintain the Little Joe Wetland, restored in 2011. Manage wetlands currently developing along the San Pedro River and other stream courses to enhance or maintain processes that foster further expansion of this habitat type.		**Objective 1:** Maintain, restore, or enhance Murray Springs and Saint David Ciénega. Manage the other wetlands for natural wetland processes.
Objective 2: N/A	**Objective 2:** Manage for a mixture ecological sites and wetlands that are a mixture of water depths, open water areas, low-growing herbaceous wetland plants, such as sedges and rushes, and dense patches of cattails, bulrush, and grasses, with an emphasis on priority and listed species.		**Objective 2:** Manage wetlands for natural wetland processes, except for Murray Springs and Saint David Ciénega.
Objective 3: N/A	**Objective 3:** Ensure herbaceous cover is sufficient to prevent erosion, slow down water, and improve wetland soil condition, including porosity for recharge.		
Objective 4: N/A	**Objective 4:** Protect wetlands from invasive species (both plant and animal).		
C. LAND USE ALLOCATIONS: WETLAND VEGETATION COMMUNITY			
1. N/A			
D. MANAGEMENT ACTIONS AND ALLOWABLE USES: WETLAND VEGETATION COMMUNITY			
1. N/A	1. Protect sensitive riparian and wetland ecological sites and surrounding areas that support rare or special status plant species from activities that disrupt key ecological processes (e.g., ecological site stability, erosion, deposition, or recharge potential) through restricted use and/or mitigate using erosion prevention structures (e.g., signage, fencing, cross logs, proper trail drainage, or other stabilization methods).		
2. N/A	2. To enhance or create fish and wildlife habitat, use prescribed fire and mechanical methods to maintain and restore wetland function; continue to create wetlands where natural or adequate artesian water sources have already been developed (Dunlevy [3], Kolbe, and White House artesian wells and the Saint David Ciénega).		2. Use hand tools and prescribed fire to maintain and restore wetland function in Murray Springs and Saint David Ciénega.
3. N/A	3. Use soft structures created with wood, tree plantings, and hand placed rocks to direct flood energy to enhance Murray Springs. Excavation using heavy equipment may be used.		3. Use soft structures created with wood, tree plantings, and hand placed rocks to direct flood energy to enhance Murray Springs. hand tools would be

Vegetation Communities			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
			used to excavate the Murray Springs if needed.
4. N/A	4. Install bullfrog proof fencing around perimeter of restored and artificial wetland ponds (Dunlevy, Kolbe, Flowing Well, Curtis Well).		4. Manage wetlands, except for Murray Springs and Saint David Ciénega, for natural wetland processes.
5. N/A	5. Promote wetland development by restoring channel processes (see **Section 2.5.3**).	5. Manage development of off-channel wetlands through natural processes.	
6. N/A	6. Continue to manage vegetation in the wetland at Little Joe Spring for recovery of federally listed aquatic species.		6. Use mainly natural processes to manage vegetation in the wetland at Little Joe Spring.
IV. VEGETATION MANAGEMENT: UPLAND VEGETATION (CHIHUAHUAN DESERT SCRUB AND GRASSLANDS)			
A. GOALS: UPLAND VEGETATION (CHIHUAHUAN DESERT SCRUB AND GRASSLANDS)			
Goal 1: Maintain or increase perennial grasses to cover their historic range of variability.			
Goal 2: Maintain or increase an adequate cover and mix of natural plant species that have good vigor.			
B. OBJECTIVES: UPLAND VEGETATION (CHIHUAHUAN DESERT SCRUB AND GRASSLANDS)			
Objective 1: N/A	**Objective 1:** Manage 40,310 acres of upland vegetation toward restoring the perennial native grass component to address shrub encroachment.		
Objective 2: N/A	**Objective 2:** In the grassland vegetation community, maintain or enhance density, vigor, cover, and species richness of palatable native perennial grass, shrub, and forb species based on ecological site potential.		
Objective 3: N/A	**Objective 3:** In the Chihuahuan desert scrub vegetation community, increase palatable species of native annual and perennial herbaceous plants, based on ecological site potential.		
C. LAND USE ALLOCATIONS: UPLAND VEGETATION (CHIHUAHUAN DESERT SCRUB AND GRASSLANDS)			
1. N/A			
D. MANAGEMENT ACTIONS AND ALLOWABLE USES: UPLAND VEGETATION (CHIHUAHUAN DESERT SCRUB AND GRASSLANDS)			
1. Land treatments (vegetation manipulation) would be used to decrease invading woody plants and increase grasses and forbs	1. Allow for mechanical, chemical, and prescribed fire 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.		1. Use hand tools and prescribed fire to restore habitat conditions in semidesert grasslands.

Vegetation Communities			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
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.			
2. 742 acres of abandoned farm field would be planted and restored to a desired plant community of big sacaton grassland, interspersed with mesquite forest (bosque) and a variety of other shrubs and trees. Plant one abandoned farm field, on an experimental basis, with preferred forage species. Use prescribed fires to improve terrestrial habitat.	2. Assess the need for restoration of abandoned farm fields. Restore using native plantings, seeding, heavy equipment, herbicide, and prescribed fire as appropriate.		2. Assess the need for restoration of abandoned farm fields. Restore using native plantings, seeding, prescribed fire, and hand tools as appropriate.

2.5.5 Fish, Wildlife, and Special Status Species

Fish, Wildlife, and Special Status Species			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
A. GOALS			
Goal 1: Continue to maintain and improve wildlife habitat, emphasizing priority habitat. See **Figure 2-3** in **Appendix A**.	**Goal 1:** Support priority habitats that maintain and enhance species richness and viability of native fish and wildlife species by maintaining a wide distribution and abundance within habitat carrying capacity, ecosystems with a high level of function supported by processes that sustain habitat integrity and diversity, and unfragmented habitat that provides adequate forage or prey, cover, and water for healthy populations. Ensure that species movement is unhampered in corridors between mountain ranges and in riparian corridors See **Figure 2-4** in **Appendix A**.		

Fish, Wildlife, and Special Status Species			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
B. OBJECTIVES			
Objective 1: Determine the condition and status of wildlife and their habitat.	**Objective 1:** Conserve, protect, and enhance wildlife and aquatic resources in accordance with the aquatic, wildlife, scientific, cultural, educational, and recreational values of the SPRNCA.		
Objective 2: Emphasize consumptive and non-consumptive use of fish and wildlife.	**Objective 2:** Restore and maintain habitat of suitable quality and quantity to support identified priority fish and wildlife species (see C.1, below).		**Objective 2:** Allow natural processes to maintain habitat of suitable quality and quantity to support identified priority fish and wildlife species.
Objective 3: N/A	**Objective 3:** Conserve, protect, and enhance the areas on the SPRNCA that were historically used for agriculture, providing management that allows ecological sites to return to habitat for priority species, appropriate to the land form, soils, and precipitation at the site.		**Objective 3:** Conserve and protect the areas on the SPRNCA that were historically used for agriculture.
Objective 4: N/A	**Objective 4:** Contain, control, or eliminate nonnative, invasive aquatic species to meet the objectives in recovery plans for federally listed species and implementation plans for wildlife habitat.		**Objective 4:** Allow predominantly natural processes and/or use limited management to manage nonnative, invasive aquatic species.
Objective 5: N/A	**Objective 5:** Manage springs for priority wildlife habitat.		
Objective 6: N/A	**Objective 6:** Conserve, protect, and enhance desert washes with adequate cover and width, while considering habitat connectivity and adequate patch size.		
C. LAND USE ALLOCATION			
1. N/A	1. **Establish** the following priority habitats and species (see **Figure 2-4** in **Appendix A**). The following species listed under each priority habitat type are indicator species for that habitat (species' scientific names are in **Appendix J**). **Riparian Areas and Wetlands Priority Species and Habitats:** Cottonwood-willow riparian forest • Yellow-billed cuckoo • Southwestern willow flycatcher • Gray hawk Mesquite Forest (Bosque) • Yellow-billed cuckoo		

Fish, Wildlife, and Special Status Species			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
	• Gray hawk • Arizona Bell's vireo Big Sacaton Grassland • Arizona Botteri's sparrow • Collared peccary Wetlands (interior marshland [ciénega], wetlands [other than ciénega], aquatic [open water]) • Huachuca water umbel • Canelo Hills ladies' tress • Arizona eryngo • Northern Mexican garter snake • Gila topminnow • Desert pupfish • Spikedace • Loach minnow • Roundtail chub • Gila chub • Razorback sucker • Arizona tree frog • Lowland leopard frog • Longfin dace • Desert sucker • Beaver • Chiricahua Leopard Frog **Desert Washes Priority Species and Habitats:** Sandy Wash (Xeric-riparian) • Gambel's quail **Uplands Priority Species and Habitats:** Semidesert Grassland • Grassland birds (Botteri's sparrow) Chihuahuan Desert scrub • Mule deer • Lesser long-nosed bats		

Fish, Wildlife, and Special Status Species			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
D. MANAGEMENT ACTIONS AND ALLOWABLE USES			
1. Provide for the reintroduction of native wildlife species, including threatened and endangered species. Use habitat improvements to optimize habitat availability.	1. Reintroduce, transplant, and augment fish and wildlife populations, in collaboration with AZGFD or the USFWS, for the following purposes: ● To maintain or increase populations, distributions, and genetic diversity ● To conserve or recover threatened or endangered species ● To restore or enhance native wildlife species diversity and distribution		
2. Species identified for reintroduction in USFWS plans are the aplomado falcon and woundfin.	2. Species that may be reintroduced, transplanted, or augmented include: • Fish: Gila topminnow, desert pupfish, spikedace, loach minnow, roundtail chub, Gila chub, razorback sucker, or any of the other 13 species found in the system as historically based on changes in habitat suitability over time. • Reptiles and amphibians: Chiricahua leopard frog, Arizona tree frog, northern Mexican garter snake, and lowland leopard frog. • Birds: Gould's Turkey, burrowing owl, and aplomado falcon. • Mammals: Beaver, mule deer, and pronghorn antelope. • Plants: Huachuca water umbel, Canelo Hills ladies' tresses, Wright's marsh thistle, Arizona giant sedge, and Arizona eryngo.		2. Listed species that may be reintroduced, transplanted, or augmented are Gila topminnow, loach minnow, spikedace, Chiricahua leopard frog, northern Mexican garter snake, and Huachuca water umbel.
3. Identify and protect springs and associated indigenous riparian vegetation for wildlife water, cover, and forage.			
4. N/A	4. Install fish barriers at Murray Springs and Government Draw as necessary to protect native fish.		
5. N/A	5. Allow the use of mechanical and chemical fishery renovation techniques to control nonnative species.		
6. N/A	6. Identify potential or suitable habitat for special status species on the SPRNCA.		
7. N/A	7. Restore habitat with the potential to reach suitability for special status species on the SPRNCA.		
8. N/A	8. Huachuca water umbel: Manage the designated critical habitat (approximately 33.7 miles; see **Figure 3-5**) to preserve existing occurrences and its seed banks and to protect occupied habitat, unoccupied corridors, and habitat quality.		
9. N/A		9. Huachuca water umbel: Remove stressors, such as trampling and invasive, nonnative plant competition.	9. N/A
10. N/A	10. Huachuca water umbel: Evaluate unoccupied areas on the SPRNCA for suitability to establish new populations to help ensure long-term survival.		
11. N/A	11. Establish refugia habitats through restoration or enhancement within ciénegas and wetlands for priority species identified in **Section 2.5.5**.		11. Use natural processes to manage refugia habitats.

2.5.6 Wildland Fire and Management

Wildland Fire and Management			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
A. GOALS			
Goal 1: Recognize fire as a natural process in fire-adapted ecosystems and use it to achieve objectives for other resources.			
B. OBJECTIVES			
Objective 1: Protect human life (firefighter and public), communities, property, and the natural resources on which they depend. Firefighter and public safety are the highest priority in all fire management activities.	**Objective 1:** Improve public and firefighter safety from hazards associated with wildland fire suppression on public lands.		
Objective 2: Control wildfires threatening natural resources and structures and reduce the acreage burned.	**Objective 2:** Manage all wildfires commensurate with the values at risk.		
C. LAND USE ALLOCATIONS			
1. Areas suitable for managing wildland fire to achieve resource benefit (21,600 acres). 2. Full suppression (34,390 acres; see **Figure 2-5** in **Appendix A**).	1. The SPRNCA is a full suppression area (55,990 acres) for all natural and human-caused ignitions (see **Figure 2-6** in **Appendix A**).		
D. MANAGEMENT ACTIONS AND ALLOWABLE USES			
1. Firefighter and public safety is the first priority in every fire management activity. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources must be based on the values to be protected, human health and safety, and costs of protection.	1. The fire management program would manage all fires in accordance with resource management objectives established in this RMP based on current conditions and fire location. Firefighter and public safety is the first priority in all fire management and suppression. A response can vary from aggressive, initial, and direct action to indirect actions, based on firefighter and public safety. Tailor strategies and tactics to address areas of resource concerns.		

Wildland Fire and Management			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
2. Investigate human-caused wildfires in accordance with BLM policy.			
3. Develop an active fire prevention and mitigation program and conduct public education and outreach, such as through Firewise.			
4. N/A	4. Manage no acreage to protect wilderness characteristics.		4. In areas managed to protect wilderness characteristics and when suppression actions are required, use the minimum required actions needed to suppress a wildfire.
5. N/A	5. Implement appropriate emergency stabilization and rehabilitation (ESR) actions following a wildfire. Use ESR to prevent further and unacceptable resource damage from wildland fire.		
6. N/A	6. Implement post-ESR rehabilitation and restoration using mechanical, chemical, erosion control, native seeding, and native planting treatments.		6. Implement post-ESR rehabilitation and restoration using hand tools, native seeding, and planting.

2.5.7 Cultural Resources

Cultural Resources			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
I. ARCHAEOLOGICAL AND HISTORIC RESOURCES			
A. GOALS			
Goal 1: N/A	**Goal 1**: Identify, preserve, and protect significant cultural resources to ensure they are available for appropriate uses by present and future generations, for such purposes as research, education, and preservation of cultural heritage.		
Goal 2: N/A	**Goal 2:** Reduce imminent threats from natural or human-caused deterioration and resolve potential conflicts with other resource uses by ensuring all authorizations for land and resource use would comply with Section 106 of the NHPA.		
Goal 3: N/A	**Goal 3:** Improve management of and access to cultural resources data for use in qualified research and public education.		
B. OBJECTIVES			
Objective 1: Manage cultural resources.		**Objective 1:** Manage all sites on public lands in accordance with their use allocations.	
Objective 2: Manage most sites for their information potential.		**Objective 2:** Prioritize research and monitoring of cultural resources by targeting data gaps and imperiled sites/features.	

<table>
<tr><th colspan="4">Cultural Resources</th></tr>
<tr><th>Alternative A (No Action)</th><th>Alternative B</th><th>Alternative C (Preferred)</th><th>Alternative D</th></tr>
<tr><td colspan="2">Objective 3:
Manage a small number of sites for public values.</td><td colspan="2">Objective 3:
Promote activities that fall under Section 110 of the NHPA, including research, development of interpretive and educational materials, site stabilization and restoration, and detailed recording and monitoring.</td></tr>
<tr><td>Objective 4:
Manage a few sites for conservation to protect and preserve representative samples of all the cultural resources on the SPRNCA.</td><td colspan="3">Objective 4:
Manage appropriate sites for conservation to protect and preserve representative samples of all the cultural resources on the SPRNCA.</td></tr>
<tr><td rowspan="7">Objective 5:
Allocate each site to one or more of the following use categories: scientific use, management use, public use, socio-cultural use, and conservation for future use.</td><td colspan="3">Objective 5:
Allocate each site to one or more of the following uses according to their nature and relative preservation value in accordance with BLM Manual 8130 (BLM 2004):</td></tr>
<tr><td>Use Category</td><td>Management Action</td><td>Desired Outcome</td></tr>
<tr><td>a. Scientific use</td><td>Permit appropriate research</td><td>Preserved until research or data recovery potential is realized</td></tr>
<tr><td>b. Conservation for future use</td><td>Provide protective measure and/or designation</td><td>Preserved until conditions for use are met</td></tr>
<tr><td>c. Traditional use</td><td>Consult with interested parties; determine limitations</td><td>Long-term preservation</td></tr>
<tr><td>d. Public use</td><td>Determine permitted use</td><td>Long-term preservation; on-site interpretation</td></tr>
<tr><td>e. Experimental use</td><td>Determine nature of experiment; permit activities accordingly</td><td>Protected until used</td></tr>
<tr><td>f. Discharge from management</td><td>Remove protective measures</td><td>No use after recordation; not preserved</td></tr>
<tr><td colspan="4">C. ALLOCATIONS</td></tr>
<tr><td>1. N/A</td><td colspan="3">1. Allocate the Diack, Murray Springs Clovis Site, and Lehner Mammoth-Kill Site for scientific use and monitor/manage them accordingly.</td></tr>
<tr><td colspan="4">2. Continue to manage the following 11 sites for scientific use: AZ EE:4:3(ASM), AZ EE:8:1(ASM), AZ EE:8:5(ASM), AZ EE:8:7(ASM), AZ EE:8:34(ASM), AZ EE:8:48(ASM), AZ EE:8:4(AMF), Benson 8:3 (GP), AZ EE:8:283(ASM)/SPII-10, SPII-16, and SPII-20.</td></tr>
<tr><td>3. N/A</td><td colspan="3">3. As identified and evaluated, allocate Archaic, Sobaípuri, Apachean, and rock art sites across the SPRNCA for scientific use and monitor/manage accordingly.</td></tr>
<tr><td>4. N/A</td><td colspan="3">4. Allocate the Fairbank Cemetery (in combination with the Fairbank Historic Townsite), Grand Central Mill Site, Contention City, and Clanton Ranch for public use, and manage/monitor them accordingly.</td></tr>
</table>

Cultural Resources			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
5. N/A	5. Allocate the Lewis Springs Site for public use and manage/monitor it accordingly.	5. N/A	
6. Continue to manage the following 10 sites for public use: Presidio of Santa Cruz de Terrenate, Fairbank (Historic Townsite), Murray Springs Clovis Site, Lehner Mammoth-Kill Site, Charleston, Millville (Gird and Corbin Mills), the Boquillas Ranch Headquarters (a.k.a. Little Boquillas), Brunckow Cabin, the San Pedro Ranch House, and Gaybanipitea.			
7. N/A	7. Allocate the Charleston and Millville rock art sites and sites with "isolated" adobe or masonry walls to experimental use.		
8. N/A	8. Allocate a representative sample of cultural site types to conservation for future use, and manage/monitor them accordingly. Allocated sites should represent the range of variability among cultural and temporal contexts, as identified by an updated cultural history for the SPRNCA.		
9. N/A	9. Evaluate and revise allocations as appropriate, when circumstances change or new data become available. Use the following criteria to determine when allocations should be evaluated and revised: • Modification to SPRNCA legislation, or some other unforeseen legislation, requires a different management approach. • The BLM determines that a previous allocation is resulting in adverse effects on or undue degradation of a resource. • The BLM determines that a previous allocation hinders its ability to meet other resource management goals. • Previous allocation is no longer applicable or appropriate (e.g., a site allocated to conservation for future use is now able to be studied because of new technology, so the site would be allocated to scientific use instead; or a site allocated to scientific use would be allocated to public use because based on the research results, the BLM can now develop the site as a public interpretive site).		
10. Release sites from conservation for future use only if they meet the required conditions.	10. Discharge sites from management after successfully completing documentation and assessment, and in consultation with the SHPO, Native American tribes, and other affected or interested parties, as appropriate.		
11. See **Section 2.5.15** for ACEC designations related to significant historic, cultural, and paleontological values.			
D. MANAGEMENT ACTIONS AND ALLOWABLE USES			
1. Manage sites allocated for scientific use to preserve scientific values and other cultural resource values.	1. Provide opportunities for and permit scientific research by qualified professionals at sites allocated for scientific use.	1. Provide opportunities for and permit scientific research by qualified professionals at sites allocated for scientific use; prioritize support for research projects that target key data gaps.	
2. Continue stabilization and rehabilitation work at the following 11 sites to preserve cultural values: Presidio of Santa Cruz de Terrenate, Fairbank,	2. Stabilize and rehabilitate the following sites to preserve cultural values: Presidio of Santa Cruz de Terrenate, Fairbank Townsite and Cemetery (and the greater Fairbank area beyond the Historic Townsite) Charleston, Brunckow Cabin, Contention, Grand Central Mill, Sunset Mill, Boquillas Ranch Headquarters, and the San Pedro Ranch House.		

Cultural Resources			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
Charleston, Brunckow Cabin, Carr Canyon School, Millville, Contention, Contention City, Grand Central Mill, Sunset Mill, and the San Pedro Ranch House.			
3. Nominate eligible properties to the National Register of Historic Places (NRHP).	3. At management's discretion, nominate historic properties[1] to the NRHP and assess historic structures for placement onto a priority heritage asset list.		
4. N/A	4. Do not manage, expand, or designate any existing or new ACECs to protect significant historic or cultural values.		4. Within ACECs, nominate all historic properties for listing on the NRHP and assess historic structures for placing them on a priority heritage asset list.
5. Complete a Class III Intensive Field Inventory of the entire SPRNCA and record all cultural resources.	5. Prepare a comprehensive Class I overview and updated cultural context for the entire SPRNCA planning area.		
6. N/A	6. Identify data gaps to prioritize Class III inventory and/or scientific investigation of areas known or likely to contain unique and/or threatened cultural resource types (e.g., rock art and Archaic, Sobaípuri, and Apachean sites).		
II. NATIVE AMERICAN CONCERNS			
A. GOALS			
Goal 1: Strengthen government-to-government relationships through increased coordination.			
Goal 2: Increase knowledge and documentation of Native American traditional cultural values and uses of the SPRNCA.			
Goal 3: Accommodate traditional cultural uses as consistent with laws, regulations, and authorities.			
B. OBJECTIVES			
Objective 1: N/A	**Objective 1:** Uphold government-to-government responsibilities with Native American tribes to manage cultural resources and landscapes associated with their ancestral homeland.		

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

Cultural Resources			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
Objective 2: N/A	**Objective 2:** Engage in cooperative projects with Native American tribes to identify and manage TCPs, sacred sites, traditional uses, and cultural landscapes.		
C. LAND USES ALLOCATIONS			
1. N/A			
D. MANAGEMENT ACTIONS AND ALLOWABLE USES			
1. N/A	1. Allocate TCPs and sacred sites for traditional use.		
2. N/A	2. Facilitate traditional use access for Native Americans with cultural and historic ties to the SPRNCA.		
3. N/A	3. Prepare comprehensive ethnographic and/or ethnoecological studies in coordination with interested Native American tribes with cultural and historical ties to the SPRNCA.		

2.5.8 Paleontological Resources

Paleontological Resources			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
A. GOALS			
Goal 1: Manage paleontological resources to preserve their scientific and interpretative values.	**Goal 1**: Protect and conserve paleontological resources.		
B. OBJECTIVES			
Objective 1: Preserve and enhance the scientific and potential public-use values of paleontological resources to increase the knowledge of the SPRNCA's natural history.	**Objective 1:** Preserve and enhance the scientific, educational, and interpretive values of paleontological resources to increase the knowledge of the natural history on the SPRNCA.		
Objective 2: N/A	**Objective 2:** Ensure that significant paleontological localities are adequately protected by reducing human and natural impacts.		
Objective 3: N/A	**Objective 3:** Preserve and protect scientifically significant paleontological localities by collecting fossil and promoting ongoing research.		
Objective 4: N/A	**Objective 4:** Focus surveys and monitoring activities in areas that are potential fossil yield classification (PFYC) Class 4 and Class 5.		

Paleontological Resources			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
C. LAND USE ALLOCATIONS			
1. N/A	1. Classify the SPRNCA according to its potential to contain vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils using the PFYC system. In this system, geologic units are classified based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils, with a higher class number to indicate a higher potential. The PFYC classes and associated acres (**Figure 2-7** in **Appendix A**) are as follows: **Class 1 (very low sensitivity)—**2,070 acres; geologic units that are igneous or metamorphic, excluding air-fall and reworked volcanic ash units. Geologic units are Precambrian in age. Management concern for paleontological resources is usually negligible or not applicable. **Class 2 (low sensitivity)—**21,100 acres; geologic units that are not likely to contain paleontological resources **Class 3 (moderate sensitivity)—**0 acres (currently); sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence. **Class 4 (high sensitivity)—**11,440 acres; geologic units that are known to contain a high occurrence of paleontological resources. **Class 5 (very high sensitivity)—**0 acres (currently); highly fossiliferous geologic units that consistently and predictably produce significant paleontological resources. **Class U (Unknown)—**21,380 acres; geologic units that cannot receive an informed PFYC assignment.		
D. SPECIAL DESIGNATIONS			
1. See **Section 2.5.15** for ACEC designations related to significant historic, cultural, and paleontological values.			
E. MANAGEMENT ACTIONS AND ALLOWABLE USES			
1. Promote the excavation and collection of the Diack site, Horse Thief Draw Mammoth site, and Horsethief No. 2 site.	1. Manage the Diack, Horsethief, Murray Springs Clovis Site, and Lehner Mammoth-Kill sites for scientific research. Research would be allowed in accordance with BLM permitting procedures.		1. Manage the Murray Springs Clovis Site for scientific research. Monitor and protect sites managed for scientific research, using actions described in detail below. Additional paleontological sites may be managed for these uses. based on their significance and preservation value.
2. N/A	2. Murray Springs and Lehner would be closed to BLM-permitted surface disturbing activities.		
3. N/A	3. Manage the Murray Springs Clovis Site and Lehner Mammoth-Kill Site for public visitation. Monitor and protect the sites managed for public visitation, using actions described in detail below. Evaluate and manage additional paleontological sites for public visitation, based on their significance and preservation value.		

Paleontological Resources			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
4. N/A	4. As funds are available, inventory future land acquisitions for paleontological resources, classify them using the PFYC, and allocate as appropriate.		
5. Protect significant paleontological resources by controlling other resource and land uses through avoidance, mitigation, and other measures.	5. Before any surface-disturbing activities take place in PFYC Class 3, 4, and 5 areas, a qualified BLM staff must perform a records search and paleontological survey; alternatively, this would be performed by a consulting paleontologist holding a valid BLM paleontological resources use permit, per BLM Manual 8270—General Procedural Guidance for Paleontological Resource Management (BLM 1998). After the initial survey, if fossil localities are discovered, the BLM or a BLM-permitted paleontologist would be required to monitor them to avoid or minimize impacts during surface-disturbing activities.		
6. Collect significant fossils threatened by natural and human disturbance.	6. Collecting any vertebrate fossils and invertebrate and plant fossils for scientific research would require BLM authorization.		
7. N/A	7. Casual collection of paleontological resources would be prohibited.		

2.5.9 Visual Resources

Visual Resources			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
A. GOALS			
Goal 1: Manage the EIS area's visual resources to preserve the outstanding scenery and to enhance areas impaired by human disturbance.	**Goal 1:** Preserve, protect, and enhance the SPRNCA's visual resources and rehabilitate disturbed areas that degrade the visual quality of the landscape.		
B. OBJECTIVES			
The VRM Handbook (BLM 1984) establishes four management classes that provide general management standards for visual resources. The objective would be to manage the visual values of the SPRNCA and the impacts on those values, according to the designated VRM class (see **Appendix K**).			
C. LAND USE ALLOCATIONS			
1. Designate the visual resources of the subject lands into the following VRM classes (**Figure 2-8** in **Appendix A**): Class I—(2,060) 2,170 acres Class II—(8,311) 19,170 acres Class III—(11,926) 22,530 acres	1. The following VRM classes would be designated (**Figure 2-9** in **Appendix A**): Class I—0 acres Class II—25,040 acres Class III—30,950 acres Class IV—0 acres	1. The following VRM classes would be designated (**Figure 2-10** in **Appendix A**]: Class I—0 acres Class II—27,850 acres Class III—28,140 acres Class IV—0 acres	1. The following VRM classes would be designated (**Figure 2-11** in **Appendix A**): Class I—0 acres Class II—44,870 acres Class III—11,120 acres Class IV—0 acres

Visual Resources			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
Class IV—(25,371) 12,120 acres Note: Acres in parentheses are from the San Pedro River Riparian Management Plan (BLM 1989, p. 26). Updated acres are based on changes in landownership and an updated visual resource inventory (VRI), because the description in the San Pedro River Riparian Management Plan was vague and nonspecific.			
D. MANAGEMENT ACTIONS AND ALLOWABLE USES			
1. N/A	1. Prioritize for rehabilitation areas that are visible in the foreground from the local public highways (State Routes 82, 90, and 92, Charleston Road, and other sightseeing routes), from the San Pedro Trail system and those visible from designated public use areas (see **Figures 2-19**, **-20**, and **-21** in **Appendix A**).		
2. Allowable land use activities that require landscape modifications to achieve other resource management objectives would be subject to design features and mitigation measures, so as to be consistent with the applicable VRM class objective.			

2.5.10 Lands with Wilderness Characteristics

Lands with Wilderness Characteristics			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
A. GOALS			
Goal 1: N/A	**Goal 1**: Protect wilderness characteristics on the SPRNCA where current resource conditions provide the most outstanding opportunities for a combination of naturalness and solitude or primitive and unconfined recreation.		
B. OBJECTIVES			
Objective 1: N/A	**Objective 1:** Allocate no areas to protect wilderness characteristics as a priority.		**Objective 1:** Manage the resources and uses to protect the following characteristics: Roadlessness—The area does not contain routes for motorized or

Lands with Wilderness Characteristics			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
			mechanized use. Naturalness—The area appears to be affected primarily by the forces of nature, and any work of human beings is substantially unnoticeable. Human-made features that may be found in the area but considered substantially unnoticeable are trails, trail signs, bridges, firebreaks, pit toilets, fisheries enhancement facilities, fire rings, historic properties, archaeological resources, hitching posts, snow or precipitation gauges, water quantity and quality measuring devices, research monitoring markers and devices, minor radio repeater sites, air quality monitoring devices, fencing, spring developments, barely visible linear disturbances, stock ponds and revegetated vegetation treatments, and revegetated historic travel routes. Solitude—The area provides outstanding opportunities for visitors to avoid the sights, sounds, and evidence of other people in the area. Primitive and unconfined recreation—The area provides outstanding opportunities for primitive and unconfined recreation, including dispersed and undeveloped recreation that does not require facilities, motor vehicles, motorized equipment, or mechanized transport.

Lands with Wilderness Characteristics			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
			Activities that may occur in the area are hiking, backpacking, hunting, horse or other stock riding, wildlife and natural scenery viewing, and sightseeing.
C. LAND USE ALLOCATIONS			
1. N/A (**Figure 2-12** in **Appendix A**).	1. No areas would be allocated to protect wilderness characteristics as a priority (**Figure 2-12** in **Appendix A**.		1. Manage the following identified areas to protect wilderness characteristics (total approximately 23,810 acres), shown on **Figure 2-13** (**Appendix A)**: • Cereus: 5,290 acres • Coati Wash: 4,870 acres • Kestrel: 5,900 acres • Oxbow: 7,750 acres Only lands on the SPRNCA would be allocated to protect wilderness characteristics.
D. MANAGEMENT ACTIONS AND ALLOWABLE USES			
1. N/A	1. No areas would be managed to protect wilderness characteristics as a priority.		1. Designate wilderness characteristics management units as VRM Class II to protect the character of the landscape.
2. N/A	2. No areas would be managed to protect wilderness characteristics as a priority.		2. Future landscape changes would be due to natural ecological processes and very limited management activity.
3. N/A	3. No areas would be managed to protect wilderness characteristics as a priority.		3. Designate wilderness characteristics management units as closed to motor vehicles (approximately 23,810 acres) to protect resource values.
4. N/A	4. No areas would be managed to protect wilderness characteristics as a priority.		4. Prohibit road construction in the units. Trails could be designated

Lands with Wilderness Characteristics			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
			and maintained for nonmotorized, nonmechanized use.
5. N/A	5. No areas would be managed to protect wilderness characteristics as a priority.		5. Do not allow motorized and mechanical transport, such as bicycles and wagons, in the units.
6. N/A	6. No areas would be managed to protect wilderness characteristics as a priority.		6. Continue to allow nonmotorized and nonmechanized cross-country travel.
7. N/A	7. No areas would be managed to protect wilderness characteristics as a priority.		7. Do not authorize livestock grazing on the SPRNCA.
8. N/A	8. No areas would be managed to protect wilderness characteristics as a priority.		8. Remove range improvements, using the minimum required actions needed to protect wilderness characteristics.
9. N/A	9. No areas would be managed to protect wilderness characteristics as a priority.		9. Do not allow new watershed treatments or projects to be constructed in areas managed to protect wilderness characteristics, if they would alter the area's roadlessness, naturalness, and opportunities for solitude or primitive and unconfined recreation.
10. N/A	10. No areas would be managed to protect wilderness characteristics as a priority.		10. Maintain projects using the minimum required actions needed to protect wilderness characteristics.
11. N/A	11. No areas would be managed to protect wilderness characteristics as a priority.		11. Consider new projects if they would not affect the area's roadlessness, naturalness, and opportunities for solitude or primitive and unconfined recreation. New project development plans would incorporate the minimum

Lands with Wilderness Characteristics			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
			required actions needed for project design and implementation.
12. N/A	12. No areas would be managed to protect wilderness characteristics as a priority.		12. Allow wildfire suppression activities, using the minimum required action.
13. N/A	13. No areas would be managed to protect wilderness characteristics as a priority.		13. Allow postfire rehabilitation, using a minimum requirement analysis.

2.5.11 Livestock Grazing

Livestock Grazing			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
A. GOALS			
Goal 1: N/A	**Goal 1:** Manage livestock grazing in a manner consistent with other multiple-use needs and other desired resource condition objectives to ensure that they are compatible with the established conservation values.		**Goal 1:** Do not authorize livestock grazing on the SPRNCA.
B. OBJECTIVES			
Objective 1: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate, and landform (ecological sites).			**Objective 1:** Do not authorize livestock grazing on the SPRNCA.
Objective 2: Maintain productive, diverse upland and riparian and wetland plant communities of native species.			**Objective 2:** Do not authorize livestock grazing on the SPRNCA.
Objective 3: N/A	**Objective 3:** Provide for multiple uses by allowing for livestock grazing, while conserving, protecting, and enhancing the conservation values of the SPRNCA and moving toward desired plant communities that provide habitat for native species.		**Objective 3:** Do not authorize livestock grazing on the SPRNCA.

Livestock Grazing			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
C. LAND USE ALLOCATIONS			
Open:[2] 7,030 acres Closed: 48,960 acres Total: 55,990 acres	Open: 55,990 acres Closed: 0 acres Total: 55,990 acres	Open: 26,450 acres Closed: 29,540 acres Total: 55,990 acres	Open: 0 acres Closed: 55,990 acres Total: 55,990 acres
Existing animal unit months (AUMs):[3] 592 Removed AUMs: 0 Additional AUMs: 0 Total AUMs: 592	Previous AUMs: 592 Removed AUMs: 0 Additional AUMs: 12,740 Total AUMs: 13,332	Previous AUMs: 592 Removed AUMs: 0 Additional AUMs: 3,363 Total AUMs: 3,955	Previous AUMs: 0 Removed AUMs: 592 Additional AUMs: 0 Total AUMs: 0
1. Livestock grazing would continue on the added 6,521-acre area in accordance with the State exchange agreements (**Figure 2-14** in **Appendix A**). The remainder of the SPRNCA (49,177 acres) would be closed to grazing. There would be a 15-year moratorium on grazing on the 49,177-acre San Pedro Allotment. Note: The acreage difference between 55,698 and 55,990 is due to how the acreage was calculated with improvements in GIS.	1. All BLM-administered lands on the SPRNCA are available for livestock grazing (**Figure 2-15** in **Appendix A**). These additional acreages would be made available for livestock grazing following the process outlined in 43 CFR 4110.4-1.	1. The uplands of the SPRNCA would be identified as available for livestock grazing (**Figure 2-16** in **Appendix A**). No grazing would occur in the riparian areas, exception along the Babocomari River. Livestock use would not be authorized in the additional lands until fencing or other control methods are in place to prevent livestock access to the riparian area. These additional acreages would be made available for livestock grazing following the process outlined in 43 CFR 4110.4-1.	1. No lands on the SPRNCA would be identified as available for livestock grazing (**Figure 2-17** in **Appendix A**). The 592 AUMs on the SPRNCA boundary would be removed from the current grazing allotments, which would still exist outside the SPRNCA boundary but with reduced BLM-administered acres and AUMs.
D. MANAGEMENT ACTIONS AND ALLOWABLE USES			
1. The Arizona Standards for Rangeland Health would continue, with established schedules and congressional requirements. The Arizona Standards for Rangeland Health and Guidelines for Grazing Administration (BLM 1997) would apply to all livestock grazing on BLM-administered lands, consistent with the appropriate enabling legislation. These guidelines address management actions common to all alternatives for livestock grazing that are intended to maintain desirable resource conditions or improve undesirable rangeland conditions within reasonable time			1. Do not authorize livestock grazing on the SPRNCA.

[2]The acreage discussed in the Safford RMP is 6,551 acres. It is believed the difference between that number and the current number (7,030 acres) is due to how the acreage was calculated with improvements in GIS.
[3]All AUMs are the initial stocking rate. (See **Appendix L** for the method used to calculate AUMs under each alternative.)

Livestock Grazing			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
frames. The BLM interdisciplinary land health allotment evaluation process would continue to be used to provide specific guidance and actions for managing livestock grazing. Existing or new allotment management plans and other activity plans would be consistent with achieving the Desired Future Conditions and Standards for Rangeland Health. They would contain the site-specific management objectives, as well as actions, methods, tools, and appropriate monitoring protocols.			
2. Any changes to the existing grazing leases would be based on activity-level planning.	2. Make all lands (55,990 acres) available yearlong for cattle grazing. Base any changes to the existing grazing leases on activity-level planning.	2. Make 26,450 acres available yearlong for cattle grazing. Any changes to the existing grazing leases would be based on activity-level planning.	2. Do not authorize livestock grazing on the SPRNCA.
3. N/A	3. Install, as needed, additional range improvements, including fencing and water sources.		3. Address existing range improvements inside the SPRNCA boundary, per 43 CFR 4120.3-6.
4. N/A	4. 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.		4. Do not authorize livestock grazing on the SPRNCA.
5. N/A	5. In order to minimize impacts, conduct trailing (crossing permits) through BLM riparian areas so that 1) livestock are present for the shortest period of time possible in riparian/aquatic areas, 2) the shortest route across the stream/river is taken, 3) trailing across streams/rivers is conducted as infrequently as possible, and 4) whenever possible, trailing is conducted when bank line soil moisture is relatively low.	5. Do not authorize livestock crossing permits through the riparian area on the SPRNCA.	5. Do not authorize livestock grazing on the SPRNCA.
6. Locate new range improvements away from riparian areas and wetlands if they conflict with achieving or maintaining riparian or wetland function or goals for threatened and endangered species. Existing range improvements would be managed in a way that does not conflict with riparian or wetland function or threatened and endangered species goals or would be relocated or modified when incompatible with riparian wetland function or threatened and endangered species goals.			6. Do not authorize livestock grazing on the SPRNCA.

Livestock Grazing			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
7. N/A	7. Livestock could graze in occupied or unsurveyed, suitable habitat.	7. Do not allow livestock to graze in designated critical habitat during the breeding season (April 1–September 1) for listed species (see **Figure 3-6**).	7. Do not authorize livestock grazing on the SPRNCA.
8. N/A	8. Livestock could graze on the entire SPRNCA.	8. Exclude livestock from the developed public use areas and sites to protect the setting quality and to avoid conflicts with grazing operations and use (see **Figure 3-7**).	8. Do not authorize livestock grazing on the SPRNCA.
9. N/A	9. Evaluate and modify fences as needed to restrict vehicle access or to allow safe passage by dispersed recreationist (hunters, hikers, and equestrians) or to safely accommodate wildlife movement.		9. Evaluate range improvements for reuse for other purposes or remove and restore them to enhance the recreational setting qualities.
10. Evaluate and modify as necessary all livestock water developments to provide the maximum benefit and minimum impact on wildlife and special status species.			10. Do not authorize livestock grazing on the SPRNCA.
11. Implement grazing management systems, such as rest rotation, deferred rotation, deferred seasonal rotation, or short duration, where needs are identified through monitoring. Coordinate with private landowners, Arizona State Land Department, and other stakeholders responsible for land management when implementing grazing systems or changing season of use.			11. Do not authorize livestock grazing on the SPRNCA.
12. fencing or other control mechanisms would be installed to allow for management of upland allotments separately from the SPRNCA riparian corridor to prevent livestock from using the riverine riparian areas.	12. Livestock could graze in the entire SPRNCA.	12. Install fencing or other control mechanisms to allow for upland areas to be managed separately from the SPRNCA riparian corridor. All new fencing would be wildlife friendly.	12. Install and maintain fencing or other control mechanisms along the boundary of the SPRNCA to prevent livestock from entering.
13. Land not available for livestock use would remain unallocated for this use, and its forage and other vegetation would be reserved for wildlife and non-consumptive uses.	12. Livestock could graze in the entire SPRNCA.	13. Land not available for livestock use would remain unallocated.	

Livestock Grazing			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
14. If an evaluation of land health standards identifies an allotment where the standards cannot be achieved at any level or management of livestock use, where grazing has been identified as the causal factor, then revisit decisions identifying those areas as available for livestock grazing.			14. Do not authorize livestock grazing on the SPRNCA.
15. Should a livestock grazing lease be relinquished, evaluate the allotment and associated resources and other resources and public uses to determine the appropriate allocation of available forage.			15. Do not authorize livestock grazing on the SPRNCA.

2.5.12 Recreation

Recreation			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
A. GOALS			
Goal 1: Provide for moderate recreation use of the SPRNCA to the extent possible, without affecting other sensitive resources, with both dispersed and developed recreation available.	**Goal 1:** Conserve, protect, and enhance the variety of settings in the area to provide recreation and education opportunities that promote appropriate use, enjoyment, and appreciation of the natural and cultural resources and to further the purposes of the SPRNCA.		
Goal 2: N/A	**Goal 2:** Residents, visitors, and the public are aware of and understand the importance and benefits of the riparian, aquatic, wildlife, archaeological, paleontological, scientific, cultural, and recreational resources. A variety of educational and interpretive programs are available to promote awareness, understanding, and appreciation of the SPRNCA resources among visitors and residents of all ages and interests.		
B. OBJECTIVES			
Objective 1: Manage SPRNCA as a SRMA. Allow dispersed recreation**.**	**Objective 1:** Manage the SPRNCA as an ERMA and designate recreation management zones to target a variety of recreation opportunities, with appropriate physical, social, and managerial settings.		
Objective 2: N/A	**Objective 2:** Manage access and sites or areas to accommodate targeted recreational and educational activities and programs, with appropriate facilities, signs, and visitor services, depending on the recreation management zone.		
Objective 3: N/A	**Objective 3:** **Primitive RMZ** in visitor assessments, 70 percent of sampled participants in targeted activities in the primitive recreation management zone (RMZ) report they are highly satisfied with their experience.		

Recreation			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
	Targeted Activities: Walking, hiking, equestrian riding, wildlife viewing in a remote setting, viewing natural scenery, hunting, and camping **Experiences:** Enjoying the natural environment in remote places, away from concentrations of other visitors, away from developed areas and vehicle traffic. **Benefits:** Practicing and developing primitive outdoor recreation skills, abilities, and ethics requiring a high degree of self-reliance; preserving opportunities for a variety of recreational opportunities; preserving and protecting areas with outstanding natural characteristics in a naturally appearing condition. **Physical Setting Components:** a. Area is remote; access requires time and physical effort and the ability to travel on primitive foot and horse or other livestock trail or cross-country. b. Area is natural, with improvements or facilities of very low visual impact. c. Facilities for visitors are minimal and rustic. **Social Setting Components**: a. Infrequent contacts among users, six or fewer encounters per day. b. Group size of between three and six persons. c. Evidence of use includes footprints; vehicles and people are encountered.		
Objective 4: N/A	**Objective 4:** **Backcountry RMZ** In visitor assessments, 70 percent of sampled participants in targeted activities in the Backcountry RMZ report they are highly satisfied with their experience. **Targeted Activities:** Birding, wildlife viewing, viewing natural scenery, viewing remnants of human history, walking, hiking, horseback riding or other livestock riding, mountain biking, limited motorized vehicle driving, sightseeing, hunting, and camping. **Experiences:** Enjoying the natural environment in upland and riparian settings, away from concentrations of other visitors and away from developed areas and vehicle traffic. **Benefits:** Practicing and developing outdoor recreational skills, abilities, and ethics; learning about the natural environment and human history of the area; preserving opportunities for a variety of recreational opportunities; preserving and protecting areas with natural characteristics in a naturally appearing condition. **Physical Setting Components:** a. Area is accessed from designated ingress/egress sites, by improved and maintained trails designated for nonmotorized use (foot, horse or other riding livestock, and bicycle), and by limited motor vehicle and primitive roads. b. Access by foot or horse, or other riding livestock, allowed cross-country.		

Recreation			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
	c. Area is largely natural, with some improvements or facilities of very low visual impact. d. Facilities for visitors are minimal and rustic, and are used to for safety and to protect resources or public health (i.e., access roads and trails, signs, designated fireplaces/fire rings, rustic toilets, fencing, and hardening to prevent damage). **Social Setting Components:** a. Low to moderately frequent contacts among users, 7 to 15 or fewer encounters per day. b. Group size of between 6 and 12 persons. c. Evidence of use includes footprints, tracks, people, infrequent vegetation trampling or damage, and trail or site maintenance activities.		
Objective 5: N/A	**Objective 5:** **Rural RMZ** In visitor assessments, 70 percent of sampled participants in targeted activities in the rural RMZ report they are highly satisfied with the experience from visiting the area. **Targeted Activities:** Organized learning and interpretive activities, birding, wildlife viewing, viewing scenery, viewing remnants of human history, obtaining visitor and area information, walking, hiking, horseback riding or other livestock riding, mountain biking, picnicking, parking, and going into the backcountry or primitive areas. **Experiences:** Enjoying the natural environment in upland and riparian settings as individuals and as groups; enjoying the remnants and reminders of human history. **Benefits**: Practicing and developing outdoor recreational skills, abilities, and ethics; learning about the natural environment and human history of the area; increased awareness and personal responsibility for protecting resources. **Physical Setting Components:** a. Area is not remote and is readily accessed from the public highway, with improved roads and parking areas for passenger cars and large vehicles (trailer-towing vehicle, bus, and motorhome). b. Area has designated ingress/egress sites for access to improved and maintained trails into backcountry areas (or primitive areas) by nonmotorized travel (foot and horse or other riding livestock, or bicycle). c. Access by foot or horse or other riding livestock on designated routes, not allowed cross-country to prevent trail sprawl. d. Area retains natural characteristics, but includes noticeable developments related to the highway, utilities, and site improvements or facilities to accommodate access and public use. e. Facilities for recreational and educational purposes are provided to meet recreational and educational objectives and to protect resources, safety, or public health (i.e., visitor information, interpretive programs, signs, designated day-use facilities, fireplaces, toilets, fencing, and hardening to support heavy use and prevent damage).		

Recreation			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
	f. Programs and activities are accessible according to the Architectural Barriers Act Accessibility Guidelines for Outdoor Developed Areas. **Social Setting Components**: a. Frequent contacts among users, 30 or more encounters per days. b. Group size of between 25 and 40 persons, including organized groups. c. Vehicles in parking area, footprints, tracks, people, infrequent vegetation trampling or damage, official personnel on trail, or site maintenance activities.		
Objective 6: N/A	**Objective 6:** Seventy-five percent of visitors and residents sampled randomly during the winter high visitation season are aware of what the SPRNCA resource values are and can identify at least one of them and the benefits from protecting them.		
C. LAND USE ALLOCATIONS			
1. The entire SPRNCA is designated as an SRMA, totaling approximately 55,990 acres (**Figure 2-18** in **Appendix A**).	1. Designate the 55,990-acre SPRNCA as an ERMA, with different zones to achieve different objectives.		
2. N/A	2. Manage uses, activities, and settings according to the following RMZs as delineated in **Figure 2-19** (**Appendix A**): Primitive: 0 acres Backcountry: 42,650 acres Backcountry (motorized): 8,440 acres Rural: 4,900 acres	2. Manage uses, activities, and settings according to the following RMZs as delineated in **Figure 2-20** (**Appendix A**): Primitive: 16,870 acres Backcountry: 30,960 acres Backcountry (motorized): 3,010 acres Rural: 5,150 acres	2. Manage uses, activities, and settings according to the following RMZs as delineated in **Figure 2-21** (**Appendix A**): Primitive: 22,480 acres Backcountry: 27,720 acres Backcountry (motorized): 640 acres Rural: 5,150 acres
D. MANAGEMENT ACTIONS AND ALLOWABLE USES			
1. Length of stay—Persons may occupy any specific location in developed campgrounds or on public lands for no more than 7 days in any period of 21 consecutive days, unless otherwise authorized.			
2. Campgrounds would be developed in the San Pedro House, Hereford, Lewis Springs areas.	2. Campgrounds could be developed.		2. Front country campgrounds would not be developed.
3. Overnight camping outside developed campgrounds is allowed only with a permit.	3. Backcountry camping outside developed campgrounds would be allowed with a permit.		3. Allow camping only at designated backcountry sites and with a permit.

Recreation			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
4. Overnight camping outside developed campgrounds is allowed only with a permit.	4. Dispersed camping would not be allowed within a half-mile of public access points or where otherwise prohibited.		
5. N/A	5. Camping would not be allowed at sensitive sites and areas developed for other purposes (e.g., trailheads, interpretive or educational sites, visitor contact, and administrative facilities).		
6. N/A	6. Overnight parking at trailhead and access points would be allowed for vehicles belonging to primitive and backcountry campers.		
7. Overnight camping and campfires are prohibited within identified ACECs.	7. There are no existing or new ACECs designated under this alternative.		7. Overnight camping in designated sites, in ACECs, would be allowed with a permit.
8. Pets, including hunting dogs, must be leashed at all developed facilities and in other posted areas, in accordance with 43 CFR 8360.			8. Pets, except for hunting dogs, would be required to be leashed always throughout the SPRNCA.
9. Unleashed hunting dogs may only be used during the recognized hunting period in the areas open to firearms discharge.	9. Hunting dogs may be used for hunting, according to AZGFD regulations.		
10. Campfires are allowed only in designated areas.	10. Campfires would be allowed in designated areas within fire rings provided for that purpose, subject to seasonal fire restrictions.		10. Campfires would be prohibited throughout the SPRNCA.
11. Woodcutting is prohibited. Gathering of dead and down wood for use in campfires is permitted only in designated areas.	11. Woodcutting would continue to be prohibited. Gathering of dead and down wood for use in campfires would be permitted.		11. Woodcutting would continue to be prohibited. Gathering dead and down wood would be prohibited.
12. N/A	12. The use of stoves would be required for backcountry camping where no fire rings are provided.		12. The use of stoves would be required for backcountry camping.
13. Tethering or corralling horses is prohibited at campgrounds and picnic areas, unless facilities have specifically been provided for such use or unless otherwise authorized.	13. In developed sites, tethering or corralling horses is restricted to those areas that have been specifically provided for such use.		

Recreation			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
14. Horses would be allowed in all areas.	14. Horses and mountain bikes would be limited to existing trails in all developed recreational, education, and interpretative sites.	14. Murray Springs, Fairbank Cemetery, Kingfisher Interpretative Site (except for the trail that surrounds the site), Lehner, Millville mills and petroglyphs, and Clanton Ranch would be closed to equestrians and mountain bikers. Equestrians and mountain bikers would be limited to existing trails in all other developed recreational, education, and interpretative sites.	
15. N/A	15. Certified weed-free feed for riding livestock and pack animals would be required on the SPRNCA.		
16. The use of metal detectors would be prohibited, so as to protect cultural resources on the SPRNCA, except for a special use permit to search for lost items, such as a wedding ring or specialized field equipment.			
17. N/A	17. Geocaching would be allowed.	17. Geocaching would not be allowed.	
18. Bicycles would be allowed on designated roads, the main San Pedro Trail system, and administrative roads, except for developed recreational, education, and interpretative sites. Bicycle use in developed recreational, education and interpretative sites is addressed above.			
19. N/A	19. Develop trail connections from nearby communities to the San Pedro Trail system.		19. New trail connections would not be developed.
20. The following sites (see **Appendix M**) and areas are designated for public use: • San Pedro Ranch House Complex • Fairbank Historic Townsite Complex • Murray Springs Clovis Site • Escapule Trailhead • Millville Complex • Charleston trailhead • Charleston Townsite • Presidio Santa Cruz de Terrenate • Land Corral • Hereford Bridge • Lehner Mammoth-Kill Site • Palominas • Brunckow Cabin • Clanton Ranch • Contention City • Lewis Spring Trailhead	20. The following sites (see **Appendix M**) and areas would be designated for public use to meet the objectives: • San Pedro Ranch House Complex • Fairbank Historic Townsite Complex • Boquillas Ranch Headquarters • Little Boquillas trailhead • Horsethief camping area • Hereford camping area • Murray Springs Clovis Site • Escapule Trailhead • Millville Complex • Charleston trailhead • Presidio Santa Cruz de Terrenate • Land Corral • Curtis Flats (new) • Hereford	20. The following sites (see **Appendix M**) and areas would be designated for public use to meet the objectives: • San Pedro Ranch House Complex • Fairbank Historic Townsite Complex • Boquillas Ranch Headquarters • Little Boquillas trailhead • Horsethief camping area • Hereford camping area • Murray Springs Clovis Site • Escapule Trailhead • Millville Complex • Charleston trailhead • Presidio Santa Cruz de Terrenate • Land Corral • Curtis Flats (new) • Hereford	20. The following sites (see **Appendix M**) and areas would be designated for public use to meet the objectives: • San Pedro Ranch House Complex • Fairbank Historic Townsite Complex • Murray Springs Clovis Site • Escapule Trailhead • Millville Complex • Charleston trailhead • Presidio Santa Cruz de Terrenate • Land Corral • Hereford • Lehner Mammoth-Kill Site • Palominas • Clanton Ranch • Contention City • Lewis Spring Trailhead • Miller Backcountry Camp

Recreation			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
• Lewis Spring Camp Area • Miller Backcountry Camp • Summers Lane • Whitehouse Wetland Area	• Lehner Mammoth-Kill Site • Palominas • Babocomari (new) • Lewis Springs Trailhead • Lewis Spring Camp Area • Brunckow Cabin • Clanton Ranch • Contention City • Miller Backcountry Camp • Summers Lane • Whitehouse Wetland Area	• Lehner Mammoth-Kill Site • Palominas • Babocomari (new) • Brunckow Cabin • Clanton Ranch • Contention City • Lewis Spring Trailhead • Miller Backcountry Camp • Summers Lane • Whitehouse Wetland Area	• Summers Lane • Whitehouse Wetland Area
21. N/A	21. Manage the access and transportation system to provide appropriate access to public use areas (see **Figure 3-7 in Appendix A**).		
22. Pursue a rails-to-trails project on the Union Pacific Railroad property.	22. Relocate trails in the Union Pacific Railroad property, unless permission is obtained to maintain them.		
23. All public lands on the SPRNCA between Charleston Road and the Hereford area, and all public lands within a quarter-mile of developed facilities are closed to the discharge of firearms at any time during the year. The discharge of firearms in the remainder of the SPRNCA is allowed only for the purpose of regulated hunting as authorized by the laws of the State of Arizona, but only during the period of September 1 through March 31. The use of archery equipment is allowed anywhere on the SPRNCA, except within a quarter-mile of developed facilities, but only for the purpose of regulated hunting	23. Discharging firearms is allowed for hunting only, according to AZGFD hunting regulations throughout the area (approximately 51,910 acres; see **Figure 2-23** in **Appendix A**).		23. Discharging firearms is allowed for hunting only, on SPRNCA lands north of Charleston Road to the SPRNCA boundary at Escalante Crossing, in accordance with AZGFD hunting regulations (approximately 26,440 acres). Discharging firearms would not be allowed on the SPRNCA between Charleston Road and Waters Road (see **Figure 24** in **Appendix A**). Firearms discharge would not be allowed on the SPRNCA south of Highway 92 to the international boundary. Hunting would continue to be allowed in areas closed to discharge of firearms using other lawful weapons, as

Recreation			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
according to AZGFD hunting regulations (see **Figure 2-22** in **Appendix A**).			defined in Arizona hunting regulations, except within a quarter-mile of developed facilities.
24. Trapping would be managed in accordance with Arizona State Hunting Regulations.			
25. Allow commercial uses only if compatible with the management of the San Pedro.	25. Competitive, commercial, and organized group activities that support recreational and educational objectives would be permitted through a special recreation permit (SRP). SRPs would be subject to special terms, conditions, and stipulations to protect public safety and resource values and to prevent or avoid use conflicts. Individual SRPs would continue to be required for noncommercial backcountry camping.		
26. N/A	26. Maintain and improve existing staffed sites to provide visitor contact, information, interpretive and educational facilities, programs, and services (San Pedro House and Fairbank Historic Townsite).		
27. N/A	27. Maintain and improve existing and proposed self-service or unstaffed sites to provide educational and interpretive facilities and materials with SPRNCA-wide themes.		
28. N/A	28. Deliver educational and interpretive programs through displays, exhibits and signs, handouts, flyers, brochures, publications, special programs or events, walks, field trips, school and youth programs, special events, the internet, and social media.		
29. N/A	29. Provide guided and supervised programs in the field focusing on themes available on-site and representing the SPRNCA resources.		

2.5.13 Transportation and Access

Transportation and Access			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
A. GOALS			
Goal 1: Designate public lands on the SPRNCA as open, closed or limited, pursuant to 43 CFR 8342.1, to protect resources, promote safety, and minimize conflicts among the various users.	**Goal 1:** Establish travel and transportation management designations to support multiple resource management objectives, connect with adjacent communities, protect resources, promote safety, and minimize conflicts among the various users.		
Goal 2: N/A	**Goal 2**: Access points, public use areas, and attractions are connected on the SPRNCA.		

Transportation and Access			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
B. OBJECTIVES			
Objective 1: 1. Identify and maintain the administrative vehicle access routes. 2. Identify and maintain the public vehicle access routes. 3. Identify and maintain the San Pedro Trail System.	**Objective 1:** Provide a comprehensive transportation system to accommodate access for administrative purposes and public use, including access points, roads, primitive roads, and trails necessary to achieve the resource management objectives, consistent with the purposes of the conservation area.		
Objective 2: N/A	**Objective 2:** Manage and maintain the transportation system to adequately and safely accommodate the types of travel on the SPRNCA and to minimize impacts on resources on adjacent lands.		
Objective 3: N/A	**Objective 3:** Provide an interconnected trail system for multiple nonmotorized uses and special trails for interpretive and educational purposes.		
C. LAND USE ALLOCATIONS			
1. Except where needed for administrative or emergency purposes, the use of motorized vehicles in the conservation area should be allowed only on roads, primitive roads, and trails specifically designated for such use (PL 100-696) and to achieve resource management objectives.			
2. Public lands are under current designations, pursuant to 43 CFR 8342, established in the Safford District RMP, shown on **Figure 2-25** (**Appendix A**). • Open: 0 acres • Closed: 0 acres • Limited to existing routes and trails: 55,990 acres	2. OHV designations under these alternatives, shown on **Figure 2-25** (**Appendix A**): • Open: 0 acres • Closed: 0 acres • Limited to designated roads, primitive roads, and trails (to protect natural resources and accommodate motorized access): 55,990 acres	2. OHV Designations under this alternative, shown on **Figure 2-26** (**Appendix A)**: • Open: 0 acres • Closed (to protect natural resources and primitive characteristics): 23,810 acres • Limited to designated roads, primitive roads, and trails (to protect natural resources and accommodate motorized access): 32,180 acres	
D. MANAGEMENT ACTIONS AND ALLOWABLE USES			
1. Public nonmotorized mechanized (mountain bike) use is allowed on the San Pedro	1. Public nonmotorized mechanized use (bikes, wagons, and carts) would continue to be allowed on the San Pedro Trail System, other designated roads, and administrative vehicle routes; mileage to be determined in the travel management plan.		

Transportation and Access			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
Trail System, other designated roads, and administrative vehicle routes.			
2. N/A	2. Nonmotorized game carts would be allowed cross-country for the retrieval of game.		2. Nonmotorized game carts would be allowed cross-country for the retrieval of game. except in lands with wilderness characteristic and wild corridors.
3. Allow equestrian use.	3. Horses and other riding livestock would not be allowed on interpretive paths in developed education sites.		
4. N/A	4. Horses and other riding livestock use would be allowed on designated roads, primitive roads, and trails and cross-country throughout the SPRNCA, unless otherwise prohibited and posted.		
5. Current route designations are based on the designations made in the San Pedro Intermodal Transportation Plan, and in the San Pedro River Riparian Management Plan.	5. Route designations would be determined through an interdisciplinary route evaluation process that would result in a comprehensive transportation plan for the SPRNCA. Approximately 202 miles on the SPRNCA route inventory would be evaluated. The route evaluation process would use the following criteria: • The conservation values of PL 100-696 • Access purpose and type of use (car, truck, bus, all-terrain-vehicles, horse and other riding livestock, foot, and bicycle) • Legal status and jurisdiction • Route condition • Connectivity with communities (towns, municipalities, and adjacent residential communities) • Recreation, education, and interpretive opportunities • Access needs related to RMP decisions • Emergency and law enforcement use • Potential conflicts among various users • Potential resource impacts, as identified through 43 CFR 8342.1: minimize damage to soil, watersheds, vegetation, air, or other resources of the public lands and harassment of wildlife or significant disruption of wildlife habitats. Special attention would be given to protect endangered and threatened species and their habitats and to not adversely affect natural, aesthetic, scenic, or other values.		
6. Close roads, as needed, to manage visitors, protect resources, and meet objectives.	6. Identify as decommissioned those routes not needed to accommodate access and allow or enhance natural revegetation. Develop site- and route-specific project plans if surface disturbance is needed to restore natural drainage patterns and stabilize erosion, remove weeds or hazards, or control entry.		
7. Obtain legal administrative and public access across private and state lands on existing foot and horse trails. Obtain public and	7. Acquire legal access where needed across nonfederal land to achieve management objectives. Access acquisition would be from willing landowners and according to federal acquisition procedures and state laws and regulations.		

Transportation and Access			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
administrative access to the public.			
8. New routes may be designated, improved, or maintained to meet management objectives.	8. New designated routes may be constructed, improved, or maintained to achieve management objectives and to avoid conflicts or protect resources.		8. No new routes would be constructed.
9. Maintain designated public use roads.	9. Maintenance standards, guidelines, and intensities would be identified in the travel management plan for the designated transportation system.		
10. In areas allocated as limited, motorized use should keep within the designated routes, with reasonable use of the shoulder and immediate roadsides, allowing for vehicle passage, emergency stopping, and parking, unless otherwise posted.			

2.5.14 Lands and Realty

Lands and Realty			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
A. GOALS			
Goal 1: Acquire lands with public values that complement existing management programs. Consolidate ownership patterns to improve management efficiency. Improve service to the public.	**Goal 1:** Improve management of the conservation values of the SPRNCA through acquisition.		
Goal 2: N/A	**Goal 2**: Acquire fee ownership lands or easements to improve public access to the SPRNCA, especially where access is limited or where access can be improved from adjacent communities.		
Goal 3: N/A	**Goal 3:** Manage lands and realty actions to protect, conserve, and enhance the aquatic, riparian, wildlife, recreation, cultural, scientific, paleontological, archaeological, and educational values of the SPRNCA.		
B. OBJECTIVES			
Objective 1: Provide for future land use authorizations across the SPRNCA.	**Objective 1:** Manage existing and new land use authorizations to accommodate use, maintenance, and operation, with minimal impacts on SPRNCA resources.		
C. LAND USE ALLOCATIONS			
1. Designate a ROW utility corridor along Charleston	1. Continue to manage the Charleston Road ROW utility corridor, as described in Alternative A (defined as 375 feet north of the centerline of		1. The Charleston Road ROW utility corridor would not be

Lands and Realty			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
Road. The northern boundary would be no farther north than the existing northern ROW, and the southern boundary would be 660 feet south (**Figure 2-27** in **Appendix A**).	the Charleston Road and 375 feet south; **Figure 2-28** in **Appendix A**).		designated (**Figure 2-29** in **Appendix A**).
2. Restrict ROWs to areas where they would not significantly affect resources.	2. The entire SPRNCA would be an avoidance area for new ROWs, except for the Charleston Road ROW utility corridor (**Figure 2-28** in **Appendix A**). Areas outside this corridor may be considered for new ROWs if they allow for the following: • Access to private property in holdings when there is no other reasonable access across nonfederal land • Emergency, public safety, and administrative uses Proposed ROWs must further the primary purposes for which the conservation area is established. Stipulations would be included to reduce impacts on the conservation values of the SPRNCA. BMPs discussed in **Appendix G** would be the minimum required for all ROW projects.		2. The SPRNCA would be an exclusion area for new ROWs (**Figure 2-29** in **Appendix A**), except for access to private property in holdings when there is no other reasonable access across nonfederal land.
D. MANAGEMENT ACTIONS AND ALLOWABLE USES			
1. The BLM's Western Solar Plan (BLM 2012) specifically excluded utility-scale renewable energy projects from NCAs.	1. The SPRNCA would be closed to all commercial energy development. Consider developing noncommercial, public, renewable energy projects to support BLM SPRNCA administration or recreation facilities (e.g., restrooms and public access facilities) on a case-by-case basis.		
2. N/A	2. The SPRNCA would be closed to new communication sites, except for those proposed by government agencies to provide for emergency services, health and safety, or administrative uses. These would be considered on a case-by-case basis.		2. The SPRNCA would be closed to consideration of new communication sites.
3. Renewal of ROWs are considered on a case-by-case basis.	3. Renewal of existing ROWs would be considered on a case-by-case basis, with possible new stipulations to reduce impacts on the conservation values of the SPRNCA.		
4. Issue land use authorizations on a case-by-case basis, minimizing disturbances and being consistent with the management objectives of the SPRNCA. Film permit applications are	4. Other leases and permits would be allowed on the SPRNCA only if they would further the primary purposes for which the conservation area is established and do not compromise the rights of other authorized land users. These authorizations could include the following: • Activities less than 1 acre in ground disturbance • Apiaries		

Lands and Realty			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
addressed on a case-by-case basis.	• Filming permits • Geophysical exploration methods and associated survey monuments • Meteorological devices		
5. PL 100-696 states specifically that all federal lands on the SPRNCA are withdrawn from disposal and mineral entry under the public land laws. It also allows lands within the boundaries of the SPRNCA to be acquired through exchange, purchase, or donation. Any lands acquired would be managed in accordance with the conservation values outlined in PL 100-696 and the approved RMP and ROD.			
6. Acquire State of Arizona and private lands if they become available.	6. Prioritize the acquisition of inholdings and edge holdings, in accordance with the 2017 Land Tenure Adjustment Strategy for Arizona (BLM 2017). At a minimum, the acquisition targets must meet the following criteria: • Have a willing seller • Enhance management of the SPRNCA values or improve public access • Are environmentally compliant • Have a clear title		
7. N/A	7. Secure easements across non-BLM-administered lands to provide legal access to the SPRNCA where needed on a case-by-case basis. In addition, pursue interest in lands (e.g., public access, water rights, and mineral rights).		
8. Withdrawal for the Charleston Dam and Reservoir would continue.	8. A withdrawal revocation action for the Charleston Dam and Reservoir would be forwarded to the Secretary of the Interior for approval to clear the record of this withdrawal that is no longer needed. If the withdrawal is revoked, the land would be managed according to decisions in this RMP.		
9. N/A	9. Retain all land and do not consider R&PP leases and patents.		
10. N/A	10. Existing land use authorizations, including ROWs for utility lines, are limited to and managed in accordance with the valid existing rights granted before the SPRNCA was designated. Maintenance of these facilities would be permitted, subject to compliance with current BLM policies and practices, in such a manner that reduces impacts on SPRNCA resources.		
11. N/A	11. Access to utilities on existing vehicle routes is an administrative use and would be allowed. Design and maintain vehicular routes for access to correct hazardous or unsafe conditions within the minimum footprint necessary to provide access.		

2.5.15 Areas of Critical Environmental Concern

Areas of Critical Environmental Concern			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
A. GOAL			
1. N/A	1. Provide special management to protect and prevent irreparable damage to important historic, cultural, paleontological, and biological resources (see **Appendix C**).		

Areas of Critical Environmental Concern			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
B. OBJECTIVES			
Objective 1: N/A	**Objective 1:** N/A		**Objective 1:** Maintain and enhance the ciénega habitat of the Saint David Ciénega ACEC.
Objective 2: N/A	**Objective 2:** N/A		**Objective 2:** Conserve, protect, and enhance the cultural and historical values of the Saint David Ciénega ACEC.
Objective 3: N/A	**Objective 3:** N/A		**Objective 3:** Conserve, protect, and enhance the upland and riparian areas and rare plants of the San Pedro ACEC.
Objective 4: N/A	**Objective 4:** N/A		**Objective 4:** Conserve, protect, and enhance the cultural and historical values of the San Pedro ACEC.
Objective 5: N/A	**Objective 5:** N/A		**Objective 5:** Conserve, protect, and enhance the rare plants, big sacaton grasslands, and mesquite forest (bosques) of the San Rafael ACEC.
Objective 6: N/A	**Objective 6:** N/A		**Objective 6:** Conserve, protect, and enhance the cultural, historical, and paleontological values, while balancing public use and research of the Curry-Horsethief ACEC.
Objective 7: N/A	**Objective 7:** N/A		**Objective 7:** Conserve, protect, and enhance the cultural, historical, and paleontological values while balancing public use and research of the Lehner Mammoth ACEC.
C. LAND USE ALLOCATIONS			
1. ACECs would be designated where values are determined to	1. Remove existing ACEC designations and no new ACECs designated (**Figure 2-31** [**Appendix A**]).		1. The following ACECs would be designated (**Figure 2-32**):

Areas of Critical Environmental Concern			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
be of the appropriate level of significance, and special management prescriptions would be required for their protection. The three areas on the SPRNCA are (see **Figure 2-30** in **Appendix A**): • Saint David Ciénega (380 acres) • San Pedro River (1,420 acres) • San Rafael (370 acres)			• Saint David Ciénega ACEC (2,710 acres) would be designated to protect its habitat and cultural and historical values. • San Pedro River ACEC (7,230 acres) would be designated to protect rare plants and cultural and historical values. • San Rafael ACEC (560 acres) would be designated to protect rare plants.
2. N/A	2. No new ACECs designated.		2. Curry-Horsethief ACEC (2,540 acres) would be designated to protect significant historical, cultural, and paleontological values (**Figure 2-32**).
3. N/A	3. No new ACECs designated.		3. Lehner Mammoth ACEC (30 acres) would be designated to protect significant historical, cultural, and paleontological values (**Figure 2-32**).
D. MANAGEMENT ACTIONS AND ALLOWABLE USES			
1. The Saint David Ciénega, San Pedro River, and San Rafael ACECs would be managed as VRM Class I.	1. N/A		1. The Saint David Ciénega, San Pedro River, San Rafael, Curry-Horsethief, and Lehner ACECs would be managed as VRM Class II.
2. **Saint David Ciénega ACEC:** • Prohibit developments and new ROWs • Prohibit overnight camping and campfires • Encourage avoidance by recreation users	2. N/A		2. **Saint David Ciénega ACEC:** • Improve the ciénega habitat using hand tools and prescribed fire • Maintain and enhance watershed conditions in western and northern

Areas of Critical Environmental Concern			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
• Preserve and enhance vegetation communities • Place signs where needed along the boundaries • Control exotic vegetation • Prohibit the introduction of nonnative species • Preclude vehicular access			uplands above the slope to the ciénega through limited erosion control • Maintain species beneficial to wildlife • Control woody invasives that are encroaching on the ciénega, with limited management (hand tools and prescribed fire) • Investigate and remediate effects (if necessary) to surface water flow to the ciénega
3. **San Pedro ACEC:** • Prohibit developments and new ROWs • Prohibit overnight camping and campfires • Encourage avoidance by recreation users • Preserve and enhance vegetation communities • Place signs where needed along the boundaries • Control exotic vegetation • Prohibit the introduction of nonnative species • Preclude vehicular access	3. N/A		3. **San Pedro ACEC:** • Prohibit broadcasting herbicide treatments for dicots in areas containing San Pedro River wild buckwheat • Maintain and enhance mesquite forest (bosques), using hand tools and prescribed fire, on appropriate soils and groundwater depths • Maintain and enhance species beneficial to wildlife, such as hackberry, saltbush, greythorn, and littleleaf sumac, using hand tools and prescribed fire
4. **San Rafael ACEC:** • Prohibit developments and new ROWs	4. N/A		4. **San Rafael ACEC:** • Maintain at least minimum perennial base flows

Areas of Critical Environmental Concern			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
• Prohibit overnight camping and campfires • Encourage avoidance by recreation users • Preserve and enhance vegetation communities • Place signs where needed along the boundaries • Control exotic vegetation • Prohibit the introduction of nonnative species • Preclude vehicular access			• Enhance the big sacaton grassland community
5. N/A	5. N/A		5. **Curry-Horsethief ACEC:** • Exclude land use authorizations (ROWs, leases, and permits) • Nominate all historic properties for listing on the NRHP and assess historic structures for placement on a priority heritage asset list • Focus on scientific research and public education
6. N/A	6. N/A		6. **Lehner Mammoth ACEC:** • Exclude land use authorizations (ROWs, leases, and permits) • Nominate all historic properties for listing on the NRHP and assess historic structures for placement on a priority heritage asset list • Focus on scientific research and public education

2.5.16 Wild and Scenic Rivers

Wild and Scenic Rivers (see Appendix N, Draft Wild and Scenic Rivers Suitability Report)			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
A. GOALS			
Goal 1: Continue management to protect free-flowing conditions and outstandingly remarkable values (ORVs) of the San Pedro River WSR study corridor, as described in the San Pedro River WSR Study Area, Final Legislative EIS (BLM 1994b) and the recommendations approved by the DOI on May 29, 1996, for designation by Congress.	**Goal 1:** Preserve, protect, and enhance study river values on the SPRNCA to ensure that a decision on suitability can be made for eligible river segments and to ensure suitability for addition to the National WSR System is maintained until Congress acts on suitable river segments.		
B. OBJECTIVES			
Objective 1: N/A	**Objective 1:** Prohibit uses and activities that would have an adverse effect on the study river's free-flowing condition until Congress acts on the designation recommendations.		
Objective 2: N/A	**Objective 2:** Manage uses and activities to avoid adverse effects on the study river's water quality until Congress acts on the designation recommendations.		
Objective 3: N/A	**Objective 3:** Manage uses and activities to avoid adverse effects on the study river's ORVs until Congress acts on the designation recommendations.		
Objective 4: N/A	**Objective 4:** Manage uses and activities consistent with protective management guidelines for the tentative study river classifications until Congress acts on the designation recommendations.		
Objective 5: N/A	**Objective 5:** Manage uses and activities to enhance water quality and ORVs, where feasible.		
C. LAND USE ALLOCATIONS			
1. The existing San Pedro River study corridor includes a quarter-mile river corridor on both sides of the San Pedro River, including approximately	1. The San Pedro River study corridor includes a quarter-mile river corridor on both sides of the San Pedro River, including approximately 48.3 river miles	1. The San Pedro River study corridor boundary varies according to topography to include the river bottomland and immediately adjacent slopes. The river study corridor includes approximately 48.3 river miles and 16,570 preliminarily suitable acres on the SPRNCA.	

Wild and Scenic Rivers (see Appendix N, Draft Wild and Scenic Rivers Suitability Report)			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
48.3 river miles and 12,870 acres on the SPRNCA. Note: These figures are different from the 1996 recommendations, due to changes in land status and more accurate measurements.	and 12,870 preliminarily suitable acres on the SPRNCA.		
2. Manage the San Pedro River study corridor according to the existing classification, shown on **Figure 2-33** in **Appendix A**. Recreational: 12,870 acres Scenic: 0 acres Wild: 0 acres		2. Manage the San Pedro River study corridor according to the following classification shown on **Figure 2-34** in **Appendix A**. Recreational: 16,570 acres Scenic: 0 acres Wild: 0 acres	2. Manage the San Pedro River study corridor according to the following classifications, shown on **Figure 2-35** in **Appendix A**. Recreational: 950 acres Scenic: 5,880 acres Wild: 9,740 acres
3. The Babocomari River study corridor, including approximately 4 river miles and 530 acres on the SPRNCA, was found to be eligible as scenic in areas not overlapping with the suitable San Pedro River corridor.	3. The Babocomari River study corridor is preliminarily unsuitable for designation.	3. The Babocomari River study corridor, including approximately 4 river miles and 480 acres on the SPRNCA in areas not overlapping with the preliminarily suitable San Pedro River corridor, is suitable for designation.	3. The Babocomari River study corridor, including approximately 4 river miles and 480 acres on the SPRNCA in areas not overlapping with the preliminarily suitable San Pedro River corridor, is suitable for designation.
4. Manage the Babocomari River study corridor according to the existing classification, shown on **Figure 2-36** in **Appendix A**. Recreational: 0 acres Scenic: 530 acres Wild: 0 acres	4. N/A (see **Figure 2-37** in **Appendix A**)	4. Manage the Babocomari study corridor according to the following classification shown on **Figure 2-38** in **Appendix A**: Recreational: 480 acres Scenic: 0 acres Wild: 0 acres	4. Manage the Babocomari study corridor according to the following classification shown on **Figure 2-39** in **Appendix A**: Recreational: 0 acres Scenic: 480 acres Wild: 0 acres
D. MANAGEMENT ACTIONS AND ALLOWABLE USES			
1. The San Pedro River study corridor ORV values are scenery, recreation, fish and	1. ORVs identified in the eligibility report for the San Pedro River corridor are scenery, recreation, fish and wildlife habitat, cultural, historic, botanic, and paleontological.		

Wild and Scenic Rivers (see Appendix N, Draft Wild and Scenic Rivers Suitability Report)			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
wildlife habitat, cultural, historic, and paleontological.			
2. The Babocomari River study corridor ORVs are scenery, recreation, fish, wildlife, historic, and cultural.	2. The Babocomari River study corridor is preliminarily unsuitable for designation.	2. The Babocomari River study corridor ORVs are scenery, recreation, fish, wildlife, historic, and cultural.	
3. Implement protective management to ensure free-flowing conditions, water quality, tentative classification, and ORV protection, consistent with management guidelines for the appropriate classifications (see **Appendix O**).			
4. Remediate hazardous abandoned and inactive mines to protect and enhance water quality, the tentative classification, and ORVs.			4. Remediate hazardous abandoned and inactive mines, using the minimum required actions to protect and enhance free-flowing conditions, water quality, tentative classification, and ORVs.
5. Motorized vehicle use is limited to designated routes.	5. Motorized and nonmotorized mechanized vehicle travel would be limited to designated routes.		
6. New roads or trails in the river study corridor would be considered on a case-by-case basis.	6. During travel management planning, evaluate the impacts of all routes on ORVs and mitigate them appropriately.		6. New roads or trails may be developed to meet management objectives. No new roads would be allowed in wild corridor segments.
7. New ROWs across the river study corridor are considered in the existing Charleston Road ROW utility corridor and on a case-by-case basis, subject to terms, conditions, and stipulations, to ensure that free-flowing conditions and ORVs are protected.	7. The entire SPRNCA would be a ROW avoidance area, as described in **Section 2.5.14**. Any new ROWs in the Charleston Road ROW utility corridor or for access to private land would have special stipulations to protect the free-flowing conditions, water quality, tentative classification, and ORVs.		7. The entire SPRNCA would be an exclusion area for new ROWs.
8. Maintaining ROWs is allowed.	8. Maintenance and upgrades of ROWs would be considered on a case-by-case basis, with special stipulations to protect free-flowing conditions, water quality, tentative classification, and ORVs.		

Wild and Scenic Rivers (see Appendix N, Draft Wild and Scenic Rivers Suitability Report)			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
9. Recreational opportunities would continue to be available for developed and dispersed (undeveloped) recreation uses and activities on the SPRNCA and the river study corridor.	9. Allow recreation uses and activities consistent with the river classification and to protect the free-flowing conditions, water quality, tentative classification, and ORVs.		
10. Maintenance of existing recreational and educational developments in the river study corridor are allowed, including replacing and upgrading facilities, consistent with the "Recreational" classification.	10. Maintenance of recreation facilities would be allowed, including replacing and upgrading recreation facilities, to achieve recreation management objectives, while protecting free-flowing conditions, water quality, tentative classification, and ORVs.		
11. N/A	11. New facilities may be developed in the study corridor to meet recreation management objectives while protecting free-flowing conditions, water quality, tentative classification, and ORVs.		11. New facilities would not be developed.
12. Minor wildlife habitat improvement projects, including structures and developments, would be considered, such as fisheries and aquatic habitats, riparian habitat, and upland habitats, if they are designed to preserve, protect, or enhance the river's free-flowing conditions, water quality, tentative classification, and ORVs.			
13. Vegetation treatments are considered on a case-by-case basis, including consistency with the river's free-flowing condition and its ORVs.	13. Vegetation treatments would be considered, including consistency with the river's free-flowing conditions, ORVs, water quality, and tentative classification.		13. Removal of native vegetation would not be allowed in river corridor segments classified as "Wild," except to provide for access (trail maintenance), fire suppression, or control of invasive species.
14. Currently, authorized livestock grazing does not extend into the river study corridor.	14. Livestock grazing would be authorized and managed to protect ORVs, water quality, and the tentative classification in the river study corridor.	14. Livestock grazing would be authorized in upland portions of the river study corridor but not in the riparian area, except for the Babocomari. Grazing would be managed to protect free-flowing conditions, water quality, tentative classification, and ORVs.	14. Livestock grazing would not be authorized on the SPRNCA.

Wild and Scenic Rivers (see Appendix N, Draft Wild and Scenic Rivers Suitability Report)			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
15. N/A	15. Existing range improvements (fences, corrals, and water developments) would be maintained.		15. Existing range improvements may be removed and the sites restored to their natural condition using the minimum actions required.
16. N/A	16. New range projects would be allowed if the project design is consistent with free-flowing conditions, water quality, tentative classification, and ORVs.		16. Livestock grazing would not be authorized on the SPRNCA.
17. Vegetation treatments are considered on a case-by-case basis, including consistency with the river's free-flowing condition and its ORVs.	17. A full range of noxious species treatments (biological, chemical, mechanical, and prescribed fire) would be allowed. This would be to prevent and control the spread of terrestrial and aquatic species and to protect free-flowing conditions, water quality, tentative classification, and ORVs. This would be consistent with guidance in the vegetation section of the RMP, and applicable policies and regulations.		17. Noxious species would be treated with limited management in a manner that has the least impact on the free-flowing conditions, water quality, tentative classification, and ORVs.
18. New impoundments, hydroelectric power projects, or diversions would not be allowed.			
19. Part of the river study corridor is under VRM Class I to protect the natural, undeveloped visual quality of the landscape: the San Rafael ACEC, San Pedro River ACEC, and Saint David Ciénega ACEC. The rest of the study corridor is under VRM Class II or Class III, depending on the location, to provide for landscape modifications required for allowable management.	19. The study corridors would be managed under VRM Class II to protect the free-flowing conditions, water quality, tentative classification, and ORVs.		
20. Use of wildland fire to achieve resource conditions would be allowed.	20. Removal of hazardous fuels would be allowed in designated locations to protect public safety, free-flowing conditions, water quality, tentative classification, and ORVs.		20. Predominantly natural processes and hand tools would be used to remove hazardous fuels to protect public safety, free-flowing conditions, water quality, tentative classification, and ORVs.

Wild and Scenic Rivers (see Appendix N, Draft Wild and Scenic Rivers Suitability Report)			
Alternative A (*No Action*)	**Alternative B**	**Alternative C (*Preferred*)**	**Alternative D**
21. Watershed improvements are considered on a case-by-case basis.	21. Watershed improvement would be allowed to promote groundwater recharge and sustain in-stream flows, provided the river's free-flowing condition, water quality, tentative classification, and ORVs are protected.		21. Allow predominantly natural processes, largely unaided by active management, or use limited management to achieve objectives.
22. N/A	22. Minor structures and developments would be allowed to preserve, protect, or enhance the river's free-flowing conditions or to protect its ORVs and water quality, consistent with the river segment classifications, such as watershed restoration/enhancement projects, vegetation management, bank stabilization projects, and channel restoration projects.		22. Allow predominantly natural processes largely unaided by active management, or use limited management to achieve objectives.

2.6 SUMMARY COMPARISON OF ENVIRONMENTAL CONSEQUENCES

Table 2-1 presents a comparison summary of impacts from management actions proposed for the four management alternatives. **Chapter 3** provides a more detailed impact analysis.

Table 2-1
Summary of Environmental Consequences of Alternatives A, B, C, and D

Summary of Impact	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
Water Resources				
Impacts on reducing groundwater and degrading water quality	Slight	Highest	Moderate	Fewest
Effectiveness of restoration efforts for water recharge	No direction for restoration	Active: larger in scale and faster effectiveness	Active: larger in scale and faster effectiveness	Passive: Small scale, less effective
Water use estimated for the Decision Area (acre-feet/year)	17.63	41.97	23.8	15.8
Biological Resources (Soils, Vegetation, Fish, Wildlife, and Special Status Species)				
Sensitive Soils Potentially Affected by Surface-Disturbing Activities	No change	Highest Increase	Minimal Increase	Least Increase
Relative potential slight to severe erosion hazard for soils affected by livestock grazing (acres)	6,975	47,140	24,460	0
Areas of cottonwood/willow gallery affected by livestock grazing in the Decision Area	<0.1%	2%	0.10%	0%
Vegetation communities potentially affected by reasonably foreseeable new development/facilities (acres)	41	49	12	1
Vegetation communities and wildlife habitat potentially affected by reasonably foreseeable disturbance vegetation management (acres)	No direction for vegetation management	26,284	26,284	16,700
Acres of potential fish & wildlife habitat open to grazing (acres)	860	55,000	26,040	0
Potential Disturbance to Proposed and Designated Critical Habitats by Reasonably Foreseeable New Development/Facilities (acres)	19	22	6	1
Acres Proposed and Designated Critical Habitats Impacted by Reasonably Foreseeable Vegetation Treatments	No direction for vegetation management	2,500	2,500	430
Acres Proposed and Designated Critical Habitats Impacted by Grazing	460	17,280	1,670	0
Effectiveness of restoration efforts for vegetation management and wildlife habitat	No direction for restoration	Active: larger in scale and faster effectiveness	Active: larger in scale and faster effectiveness	Passive: Small scale, less effective
Cultural and Paleontological Resources				
Potential risk to cultural resource sites and historic properties from public motorized access (acres)	105	121	65	55

Table 2-1
Summary of Environmental Consequences of Alternatives A, B, C, and D

Summary of Impact	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
Estimated maximum potential impacts to cultural resource sites and historic properties by grazing (acres)	31	250	118	0
Visual resource management strategy for historic properties	Least protective	Moderately protective	Moderately protective	Most protective
Potential disturbance to PFYC 4 units by reasonably foreseeable new development/facilities (acres)	0	2	2	0
Potential disturbance to PFYC 4 units by vegetation treatments (acres)	No direction for vegetation management	8,250 (active)	8,251 (active)	7,200 (passive)
Lands with Wilderness Characteristics				
Land use allocations within lands with wilderness characteristics	Not managed to protect wilderness characteristics	Emphasis on grazing and recreation uses	Balanced use between grazing and primitive recreation	Emphasis on protection of wilderness characteristics
Livestock Grazing				
Acres available to livestock grazing (acres)	7,030 (current)	55,990 (8 times more than A)	26,450 (3.8 times more than A)	0
Permitted AUMs within the Decision Area	592	13,332	3,955	0 (592 AUMs removed)
Recreation				
Area managed as primitive RMZ within the Decision Area (acres)	0	0	16,870	22,480
Area managed as backcountry RMZ within the Decision Area (acres)	0	42,650	30,960	27,720
Area managed as backcountry (motorized) RMZ within the Decision Area (acres)	0	8,440	3,010	640
Areas managed as rural RMZ within the Decision Area (acres)	0	4,900	5,150	5,150
Areas of Critical Environmental Concern (ACECs)				
Protection of ACECs in the Decision Area	Maintain current protection of 2,170 acres of ACEC	Removal of ACEC designations: no protection	Removal of ACEC designations: no protection	ACECs would be expanded to a total of 13,070 acres protected

Table 2-1
Summary of Environmental Consequences of Alternatives A, B, C, and D

Summary of Impact	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
Wild and Scenic Rivers				
Babocomari River Segment	Determined eligible: classified as recreational	Determined not suitable: not protected as WSR	Determined suitable: classified as recreational	Determined suitable: classified as scenic
San Pedro River Segment	Determined suitable: classified as recreational	Determined suitable: classified as recreational	Determined suitable: classified as recreational	Determined suitable: classified as wild, scenic, and recreational

Chapter 3. Affected Environment and Environmental Consequences

3.1 INTRODUCTION

This chapter describes the existing biological, physical, and socioeconomic characteristics of the planning area, and the environmental consequences, also referred to as "impacts" or "effects," of implementing the alternatives described in **Chapter 2**. It presents the likely direct, indirect, and cumulative impacts on resources, resource uses, special designations, and social and economic features. Impacts can either be short term or long term. Short term is defined as anticipated to occur within 1 to 5 years of implementation of the activity. Long term is defined as following the first 5 years of implementation but within the life of the RMP (projected to be 20 years or more). Each management action that is expected to affect a specific resource, resource use, special designation, or social or economic feature is analyzed. Where data are limited, professional judgment is used to project environmental impacts. Professional judgment is based on observation, experience, analysis of conditions, and responses in similar areas.

The scope of the impact analysis presented in this chapter is commensurate with the level of detail of the actions presented in **Chapter 2** and the availability and/or quality of data necessary to assess impacts. Current conditions in the planning area serve as the baseline for characterizing impacts from the alternatives. For each topic area, the analysis of impacts begins with a qualitative discussion of management decisions and their impacts on the resource. This qualitative analysis is followed by a tabular quantitative comparison of how much of these impacts would occur under each alternative.

3.1.1 Analysis Assumptions

Chapter 2 alternatives identified management actions that may be implemented to meet the goals and objectives for each resource program and use on the SPRNCA. Some of these actions would subsequently allow for surface disturbance or other activities that could have adverse impacts on other resources and uses. BMPs would be applied to these activities to mitigate such adverse impacts. See **Appendix G** for a list of BMPs.

In an attempt to estimate possible future development levels on the SPRNCA, reasonably foreseeable development (RFD) scenarios were developed. The specific locations of where recreation developments, livestock grazing infrastructure, erosion control structures, and vegetation treatments would occur on the SPRNCA are unknown; however, general locations where these categories of development would and would not occur can be reasonably determined based on management direction and restrictions in the proposed alternatives. When implementation-level projects are proposed for these types of activities, site-specific NEPA analysis and disclosure of project impacts would be conducted. For the purposes of programmatic planning-level analysis to help make a reasoned choice among the RMP EIS alternatives, the BLM assumed that recreation developments, livestock grazing infrastructure, erosion control structures, and vegetation treatments would occur based on the factors described below for each of these activities.

The BLM assumed that these RFD scenarios would occur over the life of the plan and that these estimates are the maximum level of development. If the RFD scenarios are exceeded, NEPA analysis for

site-specific projects would not be able to tier to the RMP for cumulative impacts, and the BLM would need to prepare a new cumulative impact analysis. Because decisions in this RMP do not authorize actions, all impacts described in this chapter are maximum potential impacts based on subsequent authorized actions.

The RFD scenario for Alternative A (No Action Alternative) includes future disturbance that could occur if Alternative A was chosen but does not include disturbance that currently exists on the ground today. Existing disturbance, such as disturbance from the existing utility corridor, is captured under disturbance from past and present actions and is described in the cumulative impacts section for each resource.

Due to multiple datasets manipulation (GIS intersects) and rounding, data may not sum correctly. Calculations are rounded based on the level of confidence in the data. Additionally, the calculations presented in the RFD tables are estimates of actions on the SPRNCA and include BLM- and non-BLM-administered lands.

Campground RFD Scenario

- Campground numbers and sizes were estimated based on the plans for campground developments in the 1989 San Pedro River Riparian Management Plan.

	Alternative A	Alternative B	Alternative C	Alternative D
Number of campgrounds	3	3	0	0
Acres of total campgrounds	41	41	0	0

Recreation Site RFD Scenario

There is only one new recreation site proposed under Alternatives A, B, and C. The recreation site would result in less than 1 acre of disturbance. The footprints of the existing recreation sites are captured under the past and present disturbance footprint and discussed in the cumulative effects section.

Planned Trail RFD Scenario

The BLM assumed potential trails to be in the same location and have the same extent as those that were designated in the 1995 Intermodal EA (BLM 1995). Four miles (1.2 acres) of planned trails are assumed under each alternative; however, the actual number and location of trails could change based on implementation-level travel management planning.

Livestock Grazing Infrastructure RFD Scenario

The number and location of potential new livestock grazing water sources under the expanded grazing alternatives (Alternatives B and C) are based on locations of existing wells. Disturbance from existing livestock waters is captured under the past and present disturbance in the cumulative impacts section for each resource.

Under Alternative B, livestock grazing would be managed in six pastures. These pastures would be delineated by existing highways and roads that are already fenced. Small amounts of fencing would need to be installed at each highway bridge. Under Alternative C, the riparian area would not be available for livestock grazing, and the increased water development proposed in this alternative would be used to

draw livestock away from the riparian areas. Fencing would also be installed to prohibit livestock from using the area. Under Alternative D, a small amount of fencing would be needed to keep livestock out of the SPRNCA.

The following assumption was applied:

- There would be a 1/4 acre of disturbance around each livestock water from livestock grazing based on observations of existing livestock concentration impacts.

	Alternative A	Alternative B	Alternative C	Alternative D
Number of livestock grazing waters	0	34	23	0
Acres of livestock water disturbance	0	9	6	0

- The locations of potential new fences to manage livestock grazing are based on areas available for livestock grazing, locations of existing fences, roads, and topography.

	Alternative A	Alternative B	Alternative C	Alternative D
Miles of fence	0.0	0.4	43.8	4.3

Long-Term Disturbance RFD Scenario

Campgrounds, recreation sites, planned trails, and livestock facilities together represent the RFD long-term surface disturbance areas, the total of which is provided below.

Developed Areas	Alternative A	Alternative B	Alternative C	Alternative D
Acres of permanent disturbance[1]	42	50	12	1

Source: BLM GIS 2017

[1]Campgrounds, recreation sites, planned trails, and livestock facilities overlap slightly in each alternative. The above acres are presented as totals without overlap.

Vegetation Treatment RFD Scenario

The vegetation treatment RFD scenario is based on the vegetation communities that are currently departed from the Historic Climax Plant Community (HCPC). This information is derived from on-the-ground fieldwork conducted by the Natural Resource Conservation Service (NRCS) in the Ecological Site Inventory. The Ecological Site Inventory took data on what key plant species are currently located on an ecological site. The BLM then compared that data to what key plant species should be on the ecological site and determined how far departed the vegetation community was from the HCPC. The BLM looked at the state and transition models to determine what method would have the highest likelihood of success for returning the departed community back to HCPC. The vegetation treatment RFD scenario is based on sites that are departed from the HCPC and the use of the appropriate tool to return that community to HCPC. Alternative D, which is the "light on the land" approach, assumes that only prescribed fire would be used as a vegetation treatment.

The BLM has not undertaken vegetation treatments in the past 10 years, and it is reasonable to assume that the BLM would not undertake any such treatments in the future under current management, as there are no established ecological objectives to guide such project design. Further, current management does not specifically direct the BLM to undertake such treatments. Treatments in the action alternatives

would further NCA legislative guidance to enhance conservation values and achieve the objectives of this plan.

Acres	Alternative A	Alternative B	Alternative C	Alternative D
Prescribed fire	0	17,070	17,070	17,070
Mechanical treatments	0	6,130	6,130	0
Herbicide treatments	0	11,040	11,040	0
Total[1,2]	**0**	**27,460**	**27,460**	**17,070**

Source: BLM GIS 2017

[1]Acres include private and state-administered land on the SPRNCA because the BLM foresees working with private and state partners on vegetation treatments.
[2]The BLM foresees multiple vegetation treatments in the same locations, that is, overlapping treatments; the totals displayed do not include the overlap.

Firebreak Treatments RFD Scenario

The general location and number of firebreaks would continue throughout the life of the plan as they have for the past approximately 15 years. These are authorized under the Gila District Hazardous Fuels Reduction EA (BLM 2017). All alternatives would have 610 firebreak acres, of which 580 acres are on BLM-administered lands.

Erosion Control Projects RFD Scenario

The potential project size was determined based on watershed condition and is reflective of priorities described for the RMP alternatives. Under all action alternatives, exclusive of Alternative A, there would be 5,040 acres of erosion control projects.

Recharge Enhancement Projects RFD Scenario

The potential project size was determined based on soil types that had the highest potential for infiltration. Under all action alternatives, exclusive of Alternative A, there would be 2,170 acres of recharge enhancement projects.

Removal of Man-made Structures RFD Scenario

The potential acreage was determined based on existing locations of man-made structures and stream channel condition. Under all action alternatives, exclusive of Alternative A, there would be 50 acres of man-made structures to be removed.

3.1.2 Cumulative Impacts

Cumulative impacts on the environment result from implementing any one of the RMP alternatives in combination with other reasonably foreseeable future actions (RFFAs) outside the scope of this plan, either in the planning area or outside of it. Cumulative impacts are disclosed because environmental conditions result from many different factors acting together. The total effect of any single action cannot be determined by considering it in isolation but must be determined by considering the likely result of that action in conjunction with many others.

Evaluating potential impacts considers incremental impacts that could occur from the proposed project, as well as impacts from past, present, and RFFAs. Management actions could be influenced by activities and conditions on adjacent public and non-public lands beyond the planning area boundary; therefore,

assessment data and information could span multiple scales, landownerships, and jurisdictions. These assessments involve determinations that often are complex and, to some degree, subjective.

Past, present, and RFFAs identified as having the greatest likelihood to generate potential cumulative impacts in the analysis area are displayed in **Table 3-1**. The applicable past, present, and RFFAs will be described in each resource section under the cumulative impacts analysis section.

Table 3-1
Past, Present, and Reasonably Foreseeable Future Actions

Actions	Acres of Disturbance
Past and Present Actions	
Existing ROWs on the SPRNCA	5,120
Charleston Road ROW corridor	210
Existing Routes on the SPRNCA	410
Existing development in the watershed[1]	36,280
Existing facilities on the SPRNCA	225
Past vegetation treatments in the watershed, in Chihuahuan desert scrub:	19,200
• Sands Ranch (10,000 acres)	
• Brunckow allotment (500 acres)	
• Babocomari allotment (2,000 acres)	
• Monzingo (1,200 acres)	
• Three Brothers allotment (500 acres)	
• Lucky Hills allotment (5,000 acres)	
Livestock grazing in the watershed	277,100
Reasonably Foreseeable Future Actions	
Housing developments	18,270
• Villages at Vigneto	
• Tribute	
• Ventana De Flores	
• Bella Vista Ranches	
Federal Communications Commission (FCC) Tower	1
Cochise Conservation and Recharge Network projects	13,510
Sands Ranch erosion control, maximum acreage	5,040
Fort Huachuca vegetation treatments	5,000

[1]Developed category from Landfire

The analysis area for analyzing cumulative impacts for many resources is the Upper San Pedro watershed, excluding Mexico (**Figure 3-1**).

3.2 RESOURCES

3.2.1 Air Quality

A quantitative resource assessment of air quality was considered nonessential and eliminated from detailed analysis. The planning area is void of extensive emission sources and represents a diminutive amount of attributable precursor sources of greenhouse gases. Activities such as prescribed fire, surface disturbance, livestock grazing, and motorized vehicle use will have minimal environmental impact on air resources in the planning area. Air quality was not raised as an issue throughout the public scoping process.

Air quality in the project area is regulated by the US Environmental Protection Agency (EPA) and the ADEQ. States may set their own ambient air quality standards, but standards must be as stringent as the NAAQS established by the EPA. Arizona has adopted the NAAQS to regulate air pollution in the state. Designated by the Clean Air Act, NAAQS specify limits of air pollutants for carbon monoxide, particulate matter (PM_{10} and $PM_{2.5}$), ozone, sulfur dioxide, lead, and nitrogen. If the levels of a criteria pollutant are higher than the NAAQS, a designation of "nonattainment" is assigned to the area. Areas that meet the NAAQS for criteria pollutants are designated as "attainment" areas.

The planning area is in attainment and unclassified for all NAAQS criteria pollutants. This designation is not anticipated to change, as no extensive emission sources exist or are proposed in the planning area. Any future actions permitted on the SPRNCA would be analyzed under NEPA and include consideration of impacts on air quality and mitigation measures to meet air quality standards.

Smoke emissions resulting from prescribed burning projects in the planning area are managed in compliance and by permit of ADEQ. This permitting process is to ensure mitigation measures are taken to reduce the impacts on public health, safety, and visibility from prescribed fire. These include actions to minimize fire emissions, exposure reduction procedures, a smoke dispersion evaluation, and an air quality-monitoring plan. Proposed burns are reviewed daily, and burns are approved or denied based on current climatic and air quality conditions.

3.2.2 Soil Resources

Affected Environment

The BLM manages soil conditions to support proper functioning of hydrologic, energy, and nutrient cycles. The BLM's goal is to minimize soil erosion and rehabilitate eroded areas to maintain and enhance watershed condition.

Current Conditions

Sensitive Soils

Sensitive soils are those with characteristics that make them more susceptible to impacts or that make them more difficult to restore or reclaim after disturbance than healthy soils. Sensitive soils in the planning area are located primarily on steep and moderate slopes and on some flatter areas based on underlying soil characteristics that are susceptible to increased erosion.

There are several basic types of erosion, classified primarily by rate and location; examples are accelerated erosion and rapid channel adjustments. Accelerated erosion includes sheet, rill, and gully erosion, which can lead to channel incision. Rapid channel adjustments are natural episodic changes in fluvial geomorphology, such as river channel meandering and widening. They are recognized as natural channel evolution, which occurs in the San Pedro River floodplains. Increased soil erosion not only affects soil thickness, quality, and ability to support vegetation, but it can affect wildlife habitat and vegetation communities.

Early ground and aerial photographs depict a wide, shallow San Pedro River in the first half of the twentieth century with virtually no riparian plant community to minimize bank erosion and channel migration. Bank erosion of the pre-entrenchment terrace is one source of fine sediment in the suspended load of the San Pedro River (Fogg et al. 2012).

Additionally, soils can be naturally susceptible to wind and rainfall erosion because of factors such as topography, vegetation type and density, and soil moisture regimes. Soils with similar properties have similar susceptibility to erosion by wind and rainfall (**Table 3-2,** and **Figures 2-1** and **2-2** [**Appendix A**]). The soils assigned to "High" are the most susceptible to erosion, and those assigned to "Low" are the least susceptible.

The NRCS interprets soil characteristics from soil surveys to create a relative potential erosion hazard for a map unit when used as a site for roads and trails, expressed as the rating class for the dominant component in the map unit, based on composition percentage of each map unit component. The susceptibility to erosion from roads and trails for the decision area is listed in **Table 3-3**.

Table 3-2
Soil Susceptibility to Wind and Rainfall Erosion

Wind Rating	Acres on BLM-Administered Lands	Rainfall Rating	Acres on BLM-Administered Lands
High	10,650	High	0
Moderate	20,830	Moderate	54,250
Low	24,510	Low	1,740
Total	**55,990**	**Total**	**55,990**

Source: BLM GIS 2017

Table 3-3
Relative Potential Erosion Hazard from Roads and Trails

Rating	Acres on BLM-Administered Lands
Severe	7,250
Moderate	26,790
Slight	8,650
Not Rated	13,300
Total	**55,990**

Source: BLM GIS 2017

Analysis Methods

The analysis area for analyzing impacts on soil resources is the Upper San Pedro watershed, excluding Mexico. Indicators of impacts on soils include the following:

- Acres of sensitive soils affected by surface-disturbing activities
- Acres of relative potential erosion hazard for soils affected by areas available to livestock grazing
- Acres of relative potential erosion hazard for soils affected by maintenance of existing routes
- Acre of relative potential erosion hazard for soils affected by prescribed fire

This analysis includes the following assumptions:

- As slopes approach 30 percent, the risk of soil instability following disturbance increases, particularly if cover, structure, permeability, or bulk density has been altered (Monsen et al. 2004). Only 1,160 acres (2 percent of the decision area) have steep slopes (38 percent slope grade) that would be affected by management actions. The remaining area has only a 12 percent slope grade or less (NRCS GIS 2014). Site-specific analyses, BMPs, and standard operating procedures (SOPs) would be used to minimize or avoid impacts on steep slopes (see **Appendix G**) and, therefore, steep slopes are not included in the analysis below for sensitive soils. Instead, analyses for sensitive soils will focus on soils with high and moderate ratings for susceptibility to wind erosion and on soils with a moderate rating for susceptibility to rainfall erosion.

- The NRCS web soil survey Erosion Hazard (Livestock: Off-Road, Off-Trail) interpretation that is being used for impacts from grazing relies on soils with ratings from slight to severe. This soil interpretation assumes that the activity would expose 50–75 percent of the soil surface by grazing, mining, or other kinds of disturbance.
- The NRCS web soil survey Erosion Hazard (recreational: Roads, Trails) interpretation that is being used for impacts from roads relies on soils with ratings from moderate to severe. The ratings are based on soil erosion factor K, slope, and content of rock fragments.
- Existing routes under Alternative A are termed designated routes under the action alternatives and cover the same areas.
- The NRCS web soil survey wind erosion interpretation that is being used for impacts from wind relies on 70 percent or more on vegetated soils.
- Roads and trails typically require a firm or well-compacted, well-drained travel way to allow use for the intended type of access. The areal extent of soil compaction would depend on the width of the travel way. Roads and trails tend to intercept and channelize surface runoff, typically leading to erosion along the travel way, at drainage crossings, and at runoff discharge points. Impacts on soils would be minimized by implementing erosion control/stabilization projects.
- Potential surface-disturbing activities on sensitive soils would result in greater erosion rates than if the disturbing activity were to occur on other nonsensitive soils.
- All potential surface-disturbing activities include mitigation, SOPs, and BMPs to reduce potential impacts on soil resources; these would be addressed at the site-specific project level and are not discussed in the analysis below.
- Cross-country travel by hikers and equestrians would be too dispersed and infrequent to have measurable impacts on soil erosion.
- In developed recreational sites, visitation would affect soils in the entire recreational site area (accounted for under recreational site footprint).

Alternatives Comparison Analysis

Sensitive Soils Affected by Potential Surface-Disturbing Activities

Potential surface-disturbing activities would involve erosion control projects, recharge enhancement projects, removal of man-made structures, new recreation sites, campgrounds, motorized travel, mechanical vegetation treatments (grubbing), and livestock concentration areas (a quarter-acre area around new livestock waters). The area of sensitive soil potentially affected by surface-disturbing activities for each alternative is listed in **Table 3-4**. Surface-disturbing activities can loosen soils, making soils more susceptible to compaction and wind and water erosion. Surface-disturbing activities can also remove or weaken vegetation that holds soil in place, making soil more susceptible to wind and water erosion. Because plants stabilize the soil, their loss increases the potential for soil erosion by wind and water erosion. The erosion of soil also diminishes soil productivity.

Mechanical grubbing would include driving over soils with heavy equipment, which could compact and dislodge sensitive soils and disturb vegetation. Motorized RMZs can result in compacting and dislodging of soils, as well as disturbance to vegetation. Since motorized vehicles are anticipated to be confined to existing routes, calculation of impacts on sensitive soils evaluated acreage of existing routes (see **Table 3-4**).

Table 3-4
Sensitive Soils Potentially Affected by Surface-Disturbing Activities

	Sensitive Soils, Alternative							
	A Acres	**A %**	**B Acres**	**B %**	**C Acres**	**C %**	**D Acres**	**D %**
Backcountry (motorized) RMZ	0	0	8,340	15	2,960	5	640	1
Administrative and public vehicle routes (142 miles total) within backcountry (motorized) RMZ, miles	0	0	45	31	17	12	3	4
Long-term RFD disturbance								
• Planned camping areas, routes, trails, or livestock waters	41	<1	49	<1	12	<1	1	<1
• Planned routes	8	<1	8	<1	8	<1	8	<1
Short-term RFD disturbance or restoration projects								
• Erosion control	0	0	5,030	8	5,030	8	5,030	8
• Herbicide or mechanical treatment	0	0	10,180	18	10,180	18	0	0
• Recharge enhancement	0	0	1,640	2	1,640	2	1,640	2
• Removal of man-made structures	0	0	50	<1	50	<1	50	<1

Source: BLM 2017

Note: Because the acreages can overlap, the acreages cannot be summed by alternative. Calculations are for the decision area.

Surface-disturbances that involve improving vegetation conditions or reducing erosion would improve soil conditions in the long term. For example, erosion control projects are designed to reduce erosion. Additionally, recharge enhancement projects are designed to increase groundwater supply. This would involve establishing appropriate vegetation and soil conditions in the long term. Furthermore, mechanical vegetation treatments over the long term would help establish vegetation that would help stabilize sensitive soils.

The BLM would continue to maintain and enhance the soils and watershed resources under Alternative A. Due to the area of disturbances listed in **Table 3-4**, sensitive soils under the action alternatives would potentially be primarily affected by motorized travel for recreation, livestock grazing, erosion control treatments, prescribed fire, and recharge enhancement projects when compared with Alternative A. All the action alternatives would increase the area of sensitive soils disturbed by motorized travel for recreation; however, Alternatives B and C would increase it the most. Only Alternative D would decrease the area of sensitive soils disturbed by livestock grazing, and Alternative B would increase it the most. All the action alternatives would increase by the same amount the area of sensitive soils disturbed by erosion control treatments, prescribed fire, and recharge enhancement projects.

The impacts can be short term or long term, depending on the type, frequency, and intensity of disturbance, the area disturbed, and the time it takes for plant communities to become reestablished. Vegetation that is not repeatedly disturbed would mostly have short-term impacts on soil from wind and water erosion until the vegetation recovers; however, soil recovery from compaction is slow in

areas without winter freezes, because no frost heaving occurs. Restoration projects, such as erosion control projects, that reestablish vegetation would have varying time frames for improving soil.

Under Alternatives B and C, the BLM would 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. Under Alternative D, the BLM would use predominantly natural processes, hand tools, or low-impact erosion control structures to control sheet, rill, and gully erosion in areas indicating accelerated erosion from lack of vegetation cover and soil erosivity. Although all action alternatives would have long-term impacts on improving soil stability, active restoration under Alternatives B and C would improve soil stability quicker than passive restoration under Alternative D.

Relative Potential Erosion Hazard for Soils Affected by Areas Available to Livestock Grazing

Livestock grazing would occur under all alternatives, except Alternative D. Soils susceptible to erosion in areas available for livestock grazing are in **Table 3-5**. Livestock grazing and installing structural range improvements can remove or weaken desirable plant communities that hold soil in place, making soil more susceptible to wind and water erosion (Hubbard et al. 2004). The impacts can be short term or long term, depending on the frequency and intensity of disturbance, the area disturbed, and the time it takes for plant communities to become reestablished.

Table 3-5
Relative Potential Erosion Hazard for Soils Affected by Livestock Grazing

	Available to Livestock Grazing							
	Alternative A		Alternative B		Alternative C		Alternative D	
Erosion Hazard (Off-Road, Off-Trail)	Acres	% Decision Area	Acres	% Decision Area	Acres	% Decision Area	Acres	% Decision Area
Severe	135	<1	1,260	2	240	<1	0	0
Slight	6,840	12	45,880	81	24,220	40	0	0
Not rated	0	0	20	<1	20	<1	0	0

Source: BLM GIS 2017; calculations are for the decision area.

Livestock grazing can compact soil by forming dense layers near the surface. In some cases, soil compaction aids in plant establishment and growth; however, too much compaction can decrease the rate of water infiltration and gas exchange. Decreased gas exchange rates can cause aeration problems and soil chemistry changes, and negatively affect root metabolism. All of these are stressing agents of vegetation, which is a key component of soil stabilization.

As soil compaction increases, the ability of soil to support vegetation diminishes. This is because the resulting increase in bulk density and change in soil structure (loss of porosity) inhibit root system growth and reduce water infiltration. As vegetation, water infiltration, and soil stabilizing crusts are diminished or disrupted, the surface water runoff rates increase, further accelerating the rates of water erosion.

Livestock hoof action can also improve soil health. Impacts can occur when grazing animals help incorporate seeds into soil surfaces. Soil surfaces can become pocked from animals' hoof marks, helping to trap seeds and moisture essential for establishing desirable vegetation. Pocking also can increase surface roughness in disturbed areas, slowing erosion associated with surface water runoff. The impacts

on soil resources from hoofs vary by soil characteristic, slope, aspect, site potential, and intensity and type of livestock use (for example, trailing versus extended grazing).

Grazing animals contribute to nutrient cycling in soils by depositing nutrient-rich urine and feces. Organic components of feces and urine from grazing animals can build soil organic matter, resulting in improved structural stability and increased water infiltration rates and water-holding capacity.

Alternatives B and C would increase livestock grazing in areas with soils that have a severe susceptibility to erosion from grazing. More than any alternative, Alternative B would increase livestock grazing in areas with soils that have a severe susceptibility to erosion. Also, Alternatives B and C would increase livestock grazing in areas with soils that have a slight susceptibility to erosion from grazing. Alternative D would have no impacts on soils susceptible to erosion from grazing, because livestock grazing would not occur under Alternative D.

Relative Potential Erosion Hazard for Soils Affected by Existing Routes

The use of existing routes, such as by motorized vehicles or hiking, would occur under all alternatives. Allowable uses would vary by alternative, but acres of disturbed area would be similar. Existing routes in areas with soils susceptible to erosion are in **Table 3-6**. Travel on existing routes can involve the removal or weakening of vegetation that holds soil in place. It can also involve surface disturbances that can compact soil or create surface disturbances that allow soil to be more susceptible to wind and water erosion, depending on the type of travel.

Table 3-6
Relative Potential Erosion Hazard for Soils Affected by Existing Routes and Planned Trail RFD Scenario

	Existing Routes		RFD Planned Routes	
Erosion Hazard (Roads, Trails)	**Acres**	**% Decision Area**	**Acres**	**% Decision Area**
Severe	40	<1	0	<1
Moderate	180	<1	+5	<1
Slight	133	<1	+2	<1
Not rated	1	<1	0	<1

Source: BLM GIS 2017

Existing routes would be maintained under all alternatives. The RFD planned routes are foreseeable under all alternatives as per the planned trail RFD scenario.

Under Alternative A, the BLM would continue to use existing routes in areas that are susceptible to erosion. The action alternatives would increase routes by 5 acres in areas that have a moderate susceptibility to erosion from routes and by 2 acres in areas that have a slight susceptibility to erosion from routes. This would increase the potential for erosion in a total of 7 acres (0.01 percent of the decision area). Project design measures, maintenance, or stabilization measures would minimize impacts. Again, impacts can be short or long term depending on disturbance and natural factors.

Under Alternatives B and C, all existing routes affecting watershed elements would be modified as necessary to restore watershed function and long-term health. Under Alternative D, the BLM would use natural processes or hand tools to minimize impacts from existing routes to watershed health. Although

all action alternatives would have long-term impacts on improving soil stability, active restoration under Alternatives B and C would improve soil stability quicker than passive restoration under Alternative D. Alternative A contains no direction for restoration actions.

Relative Potential Erosion Hazard for Soils Affected by Prescribed Fire

The use of prescribed fire would occur under all alternatives; however, the reasons for its use would vary by alternative. Prescribed fire use in areas with soils susceptible to erosion are in **Table 3-7**. Using prescribed fire can improve soil health where vegetation relies on fire to propagate. Prescribed fire can spread the seeds of certain vegetation, improving vegetation cover that provides soil stability in the long term. Prescribed fires can also establish conditions that support a natural fire regime. This would result in long-term benefits to soil health, because conditions for vegetation that holds soil in place would be more appropriate for the area; however, in the short term, prescribed fires also leave the ground surface bare and, therefore, more susceptible to erosion by wind and water. Erosion on burned areas typically declines in subsequent years as the site stabilizes, but the rate varies depending on burn or fire severity and vegetation recovery. Soil erosion rates after fires can vary for prescribed burns and wildfires (Robichaud et al. 2000).

All the action alternatives would increase the use of prescribed fire by the same amount in areas susceptible to erosion. Of greatest concern would be the areas with high and moderate susceptibility to erosion, which total 15,880 acres (28 percent of the decision area).

Table 3-7
Relative Potential Erosion Hazard for Soils Affected by Prescribed Fire, Vegetation Treatment RFD Scenario

	Alternative A		Alternative B		Alternative C		Alternative D	
Erosion Hazard (Fire)	Acres	% Decision Area	Acres	% Decision Area	Acres	% Decision Area	Acres	% Decision Area
High	0	0	5,860	10	5,860	10	5,860	10
Moderate	0	0	10,020	17	10,020	17	10,020	17
Low	0	0	830	1	830	1	830	1

Source: BLM GIS 2017; calculations are for the decision area.

Conclusions

Alternative D would have the fewest impacts on soils from livestock grazing because the decision area would be unavailable to grazing. It would have the fewest impacts on soils from motorized travel for recreation because it has the least amount of open area to motorized recreational use. Alternative B would have the most impacts on soils because of the greater amount of acreage allowed for livestock grazing and motorized vehicle use. All the action alternatives would increase impacts on soils by the same amount from erosion control projects, prescribed fire, and recharge enhancement projects. Active restoration under Alternatives B and C would improve soil stability quicker than passive restoration under Alternative D.

Cumulative Impacts

The analysis area for soil resources is the Upper San Pedro watershed, excluding Mexico. **Table 3-1** lists the past, present, and RFFAs and the number of acres associated with the actions, such as land development.

Past and present actions in the analysis area that have affected soil resources are recreation, livestock grazing, OHV travel, and management of natural resources. Similar to the alternatives, these actions have altered vegetation that holds soil in place, compacted soil from repeated or concentrated use, and created surface disturbances that degrade soil conditions. This has included areas with sensitive soils or soils susceptible to erosion.

Present and RFFAs involve maintaining and restoring soil conditions. Some of the recharge enhancement projects involve erosion control to reduce sediment yields, and vegetation and soil conditions may be maintained or improved with these projects. Vegetation treatments in **Table 3-1** have similar impacts in the long term on soil conditions by improving vegetation conditions.

Reasonably foreseeable actions or projects, as described in **Table 3-1**, can alter vegetation or create surface disturbances that can affect soil resources. Urban development would be a notable source of vegetation and soil disturbance because of the size of the area affected.

Under Alternative A, all BLM-administered lands would continue to be managed in a manner that minimizes impacts on soil resources. When combined with past, present, and RFFAs, Alternative A would continue to have cumulative impacts on soils. Most of these impacts would involve erosion and compaction associated with livestock grazing and motorized vehicle travel. The action alternatives would vary in their contribution to cumulative impacts on soils.

3.2.3 Water Resources

Affected Environment

This section focuses on surface water, water quality, and groundwater. The watershed is characterized by a large valley, flanked by a series of mountain ranges. It contains perennial, ephemeral, and intermittent streams.

Surface Water

The San Pedro River originates in desert grasslands near Cananea, Sonora, Mexico. It drains approximately 696 square miles before entering the United States near Palominas, Arizona, at the southern end of the SPRNCA. On the SPRNCA, the river comprises approximately 51 miles of perennial, intermittent, and ephemeral stream reaches (NRST 2012).

Base flows are the portion of flow in the river contributed from groundwater. Gaining stream reaches occur where groundwater gradients are high enough that groundwater is discharged as streamflow. Losing reaches occur where groundwater gradients are below the level of the streambed and streamflow acts to recharge the aquifer (Winter et al. 1998). Perennial reaches of river are typically associated with upstream gaining reach conditions, while intermittent and ephemeral reaches are associated with losing or disconnected reach conditions.

Large floods recharge the riverbanks and subsequently discharge slowly back to the river, providing a substantial water source, the influence of which varies between gaining and losing reaches. Groundwater contributions to base flows are highest in the perennial reaches, such as near Charleston, and lowest in intermittent reaches. (Baille et al. 2007; Kennedy and Gungle 2010).

Current Conditions

Leenhouts et al. (2006) characterized the San Pedro River on the SPRNCA into three condition classes: wet, intermediate, and dry. Wet conditions are associated with perennial reaches, intermediate with intermittent, and dry with intermittent/ephemeral. At the time the study was published, 39 percent of the stream corridor was considered wet, 55 percent was intermediate, and 6 percent was dry based on condition class assessment involving streamflow permanence, groundwater levels, and vegetation type.

Monitoring of surface water length and permanence along the San Pedro has occurred through annual wet-dry walks organized by The Nature Conservancy, USGS stream gages, and streamflow permanence cameras monitored by the Agricultural Research Service. Some reaches north of the Charleston Gage and near Palominas show declining trends in wetted stream length; however, Hereford reach is the only one that shows a statistically significant trend (upward) from this data (Turner and Ricter 2011; Gungle et al. 2016). The upward trend at the Hereford reach is likely the result of agricultural well retirement in the area.

The San Pedro River has experienced a decrease in base flow in both summer and winter seasons at the USGS gage at Charleston for the entire period of record (Gungle et al. 2016). Hereford and Betancourt (2009) note that peak flows have decreased since 1955, possibly because of increased vegetation cover in the upland watersheds and widening of the entrenched channel. Goodrich et al. (2008) suggest that decreases in runoff are more likely a result of changes in high-intensity rainfall events in at least one tributary watershed. Starting in 1965, source storms for annual peak floods shift from the convective monsoon season storms to tropical and winter storms (Hirshboeck 2009). Although riparian vegetation has increased since historical channel entrenchment (Webb et al. 2007), the normalized difference vegetation index (NVDI) from Landsat imagery indicates that changes in vegetation since 1984 are not sufficient to explain decreases in stream flows (Nguyen et al. 2014). Riparian plant communities are discussed further in **Section 3.2.4**.

Groundwater

Recharge to the regional aquifer occurs at the mountain front and in ephemeral channels. Younger Holocene alluvium deposits along the river corridor comprise the floodplain aquifer and receive groundwater inflows from the regional aquifer and recharge from flood flows. Discharge from the groundwater system occurs at springs, as base flow along the river, by consumption from riparian vegetation, and from well pumping.

Groundwater is the only source of potable water supply in the Upper San Pedro River basin. All water users, including military, industrial, commercial, agricultural, residential, and natural purposes, rely on groundwater withdrawals.

Current Conditions

A cone of depression has formed near well pumping areas near Fort Huachuca and Sierra Vista, and South of the border in Mexico. Regional aquifer levels in monitoring wells near Fort Huachuca are declining (Gungle et al. 2016), indicating expansion of the cone of depression. When groundwater withdrawals exceed aquifer storage, capture from stream flow occurs as the cone of depression expands (Freeze and Cherry 1979; Winter et al. 1998; Leake et al. 2008; Barlow and Leake 2012). Groundwater extraction in the Upper San Pedro Basin has captured water from the regional aquifer that would have contributed to the San Pedro River as base flows and riparian evapotranspiration (Corell et al. 1996).

Modeling by Pool and Dickinson (2007), updated by Lacher (2011, 2017), indicates that this capture will continue to increase in the future because current recharge, both natural and artificial, is not able to offset the groundwater pumping demand.

On the SPRNCA, the BLM manages activities that use groundwater from wells for administrative purposes, such as providing potable water at San Pedro House and Fairbank Historic Townsite. Although the amount used for administrative purposes is minimal when compared with the estimated quantities of water consumed by regional groundwater pumping and riparian evapotranspiration, changes in near-stream pumping can affect river conditions on much faster timescales than pumping occurring at greater distances. Conservation measures by Fort Huachuca, the City of Sierra Vista, and Cochise County have reduced per capita water usage. Continuation of basin-wide conservation measures and implementation of aquifer recharge projects are necessary for long-term sustainability of the water and riparian resources of the SPRNCA.

Water Quality

The San Pedro River's surface water quality is controlled by seasonal changes in runoff and underlying groundwater conditions. The quality of the groundwater is a function of the chemical makeup of the underground formation containing the water. Water temperature, the duration of contact with the rocks, and the rate of movement of the water affect the chemical, physical, and biological characteristic of groundwater.

The Clean Water Act (CWA) protects surface water quality through water quality standards and permits for the discharge of pollutants into navigable waters. The CWA is intended to achieve the broader goal of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters; see **Appendix B** for more information. In accordance with the CWA, the ADEQ is required to produce a section 305(b) water quality assessment and section 303(d) listing of threatened or impaired waters in the state every 2 years.

Current Conditions

Groundwater quality is best near the recharge zones. This is because the concentration of total dissolved solids increases with distance from the recharge zone. Groundwater that is near the recharge zone has not had time to dissolve soluble salts and minerals. Recharge zones are typically found in outcrop areas near the edge of the mountains. Generally, groundwater quality in the basin is found to be within EPA use standards and can act as a seasonal control on surface water quality (Brooks and Lohse 2009).

In the ADEQ 2016 Integrated 305(b) Assessment and 303(d) Listing report (ADEQ 2016), the San Pedro River within the NCA boundary was assessed in three reaches. The reach of the San Pedro River from the border of Mexico to Charleston is listed as category 5, impaired, for not attaining the water quality standards for dissolved oxygen, *E. coli*, and dissolved copper (from ADEQ 2010 assessment) for the designated uses of warm-water aquatic wildlife and full body contact (*E. coli* only). The reach from Charleston to Walnut Gulch is listed as category 2, attaining for some uses, and requires more sampling. The reach from the confluence of the Babocomari River to Dragoon wash is listed as category 5, impaired, for exceedances in *E. coli* for the full body contact designated uses.

E. coli levels are highest in samples taken during flood events, when turbidity is highest. This is attributed to runoff carrying excess amounts of *E. coli* laden sediment from the watershed. DNA tests of *E. coli* have shown that sources of *E. coli* are both human and bovine (Coronado Resource Conservation and Development 2013).

Dissolved oxygen levels are important water quality parameters for aquatic species survival. High water temperatures and low stream flows can cause low levels of dissolved oxygen in streams (see **Section 3.2.5**).

Current and historical mining operations near Bisbee, upstream in Mexico, and along the San Pedro are possible sources of the metal contaminants found in the San Pedro River (Brooks and Lohse 2009). The BLM is currently investigating the levels of heavy metal contaminates in soils near historic mining facilities along the SPRNCA.

Analysis Methods

The analysis area for analyzing impacts on water resources is the Upper San Pedro watershed. Indicators of impacts on water resources are the following:

- Changes to groundwater supply from pumping
- Acre-feet per year of groundwater use
- Changes to water quality from erosion
- Changes to groundwater supply from recharge enhancement projects
- Changes to groundwater supply from river channel improvements
- Changes to watershed function from human-made structures from historical land uses
- Changes to water resources from prescribed fire
- Acres of cottonwood/willow gallery affected by areas available to livestock grazing
- Changes to water quality from abandoned mine lands
- Miles of 303(d) streams across sensitive soils in areas that would allow surface-disturbing activities

This analysis includes the following assumptions:

- Projects that help restore watersheds, desirable vegetation communities, or wildlife habitats (including surface disturbance associated with these activities) would have long-term benefits on water resources.
- The degree of potential impact attributed to any one disturbance or series of disturbances would be influenced by several factors, including proximity to drainages and groundwater wells, location in the watershed, time and degree of disturbance, reclamation potential of the affected area, vegetation, precipitation, and mitigating actions applied to the disturbance.
- Fuels projects and prescribed fire that contribute to establishing a more natural fire regime would have long-term benefits on water resources.
- Riverine geomorphology treatments could occur anywhere in the San Pedro River.
- Disturbance of sensitive soils serves as an indicator to surface water quality, and this analysis will refer to the soils analysis to support conclusions regarding surface water quality.

Impacts Common to All Alternatives

There are no impacts on water resources that are common to all alternatives.

Alternatives Comparison Analysis

Changes to Groundwater Supply from Pumping

Groundwater is pumped to support various activities and purposes. When groundwater is pumped at a rate that exceeds the rate that groundwater is recharged, then the supply of groundwater decreases. This can leave less groundwater available to supply water to the base flow. Under Alternative A, the BLM would continue to conserve the groundwater resource while providing necessary support for other programs. Under all action alternatives, the BLM would not approve land use authorizations involving additional groundwater pumping on the SPRNCA, subject to valid existing rights. This would prevent new groundwater pumping from affecting the base flow. More specifically for Alternatives B and C, any pumping of groundwater for BLM-authorized actions would be designed to reduce impacts on base flows. This could include putting floats in troughs and seasonal restrictions on groundwater pumping. It could also include moving livestock to the uplands to prevent groundwater pumping from occurring right next to the river.

Although all the action alternatives would pump less groundwater, Alternative D would decrease the overall need for groundwater pumping, whereas Alternatives B and C would only minimize the amount of water that is pumped through water conservation measures. Consequently, Alternative D would have the greatest impact on improving base flow.

Acres-Feet Per Year of Groundwater Use

The use of groundwater can include the following activities: administrative use, wildlife use (drinking water and habitat), habitat restoration (for maintaining a limited number of off-channel aquatic habitats for threatened and endangered species recovery), livestock use, and emergency habitat augmentation. Groundwater pumping volumes are listed in **Table 3-8**. Alternative D is projected to use the least groundwater, 1.83 acre-feet per year less than Alternative A. Alternative B is projected to use the most groundwater, 24.34 acre-feet per year more than Alternative A.

Table 3-8
Water Use Estimates for the Decision Area

Projected Water Uses	Alternative A (acre-feet/year)	Alternative B (acre-feet/year)	Alternative C (acre-feet/year)	Alternative D (acre-feet/year)
San Pedro House Water System	0.57	1.11	0.44	0.44
Fairbank Water System	0.36	0.36	0.36	0.36
Whitehouse Well Pond	0.60	0.60	0.60	0.00
Livestock use	1.10	24.90	7.40	0.00
Private use of BLM wells[1]	15.00	15.00	15.00	15.00
Total	**17.63**	**41.97**	**23.80**	**15.80**

Source: BLM 2018

[1] This water use is under an existing authorized agreement, and the BLM is working to reduce this water use with the user.

Changes to Water Quality from Erosion

Section 3.2.2 describes how management actions and resource allocations can result in soil compaction. Compacted soil can decrease water infiltration, thereby affecting local subsurface water supplies. Compacted soil can also increase the rate of overland flow and, therefore, the amount of soil that is eroded and the volume of water that enters a stream. Increasing overland flow can also increase the transport of contaminants (such as feces or liquids from motorized vehicles) to streams, thereby degrading water quality.

Section 3.2.2 also describes how management actions and resource allocations can result in water erosion of soil. As water erodes soil, overland flow can carry sediment to streams, thereby degrading water quality by increasing turbidity in streams. It can also cause sedimentation in streams. Sedimentation and changes in the volume of overland flow entering a stream also alter stream morphology.

All alternatives would continue to manage for soil conditions that support proper functioning of hydrologic, energy, and nutrient cycles. The action alternatives would also implement erosion control projects on 5,030 acres (9 percent of the decision area). Because erosion control projects are designed to reduce erosion, they would maintain and improve water quality and stream conditions by minimizing the transport of sediment and contaminants to streams. Erosion control projects can also increase opportunities for water infiltration, thereby potentially increasing recharge of groundwater.

Changes to Groundwater Supply from Recharge Enhancement Projects

Natural recharge enhancement projects are designed to increase groundwater supply by increasing the residence time and infiltration rates of stormwater flows. The action alternatives would implement recharge enhancement projects on 2,170 acres (3 percent of the decision area). Under Alternatives B and C, the BLM would improve watershed health and prioritize treatments for recharge enhancements in ephemeral tributaries. Under Alternative D, the BLM would use natural processes, hand tools, and nonstructural features for recharge enhancement projects and to improve watershed health. Under all action alternatives, the BLM would monitor groundwater levels in monitoring wells near recharge enhancement projects. Based on evaluation of groundwater levels, the BLM may need to modify recharge enhancement projects closer to the river or implement different types of recharge enhancement.

Although all action alternatives would have long-term impacts on improving recharge, active restoration under Alternatives B and C would improve recharge conditions quicker than passive restoration under Alternative D. Recharge enhancements under Alternatives B and C would be larger in size and potentially recharge more water, where feasible, than the features in Alternative D. Alternative A contains no direction for recharge enhancement projects.

Changes to Groundwater Supply from River Channel Improvements

The goal of enhancing riverine geomorphology is to improve stream sinuosity to a level consistent with its stream type. Many factors, including past land uses, could have prevented a river from meandering. When a river has limited ability to move laterally on its floodplain, it is usually referred to as "confined." Confinement of the stream channel has multiple effects on riparian potential. Confined channels usually display lower sinuosity and higher gradients (hence greater stream energy) than adjacent upstream and downstream reaches. The limited floodplain environment also translates to low bank-storage capacity;

thus, these reaches have little ability to capture and store floodwater for later release as base flow. Finally, the generally narrow floodplain available outside the channel results in limited site potential for regeneration of natural communities. In other words, there is not much room for those communities to develop, and not much water storage to support such communities during drought or low-flow season (Fogg et al. 2012).

In addition to improving stream sinuosity, river channel improvements can also improve vegetation establishment in the floodplains. Vegetation during flood events reduces the rates at which water travels downstream and increases flood stage, allowing for more of the floodplain to be inundated for longer periods than it otherwise would.

Under Alternatives B and C, the BLM would enhance riverine geomorphology and bank recharge to protect base flow through riverine geomorphology enhancements where needed in San Pedro River segments (see **Appendix G** and **Appendix I**). The BLM would implement small structures and monitor channel slope, sinuosity, soil moisture, groundwater levels near treatments, and vegetation cover. Under Alternative D, riverine geomorphology enhancements would not be implemented in the main stem of the San Pedro River. Because the BLM would implement river channel improvements, such as enhancing riverine geomorphology and bank recharge, under Alternatives B and C, there would be an improvement in groundwater supply compared with Alternative A. Alternative D would be similar to Alternative A.

Changes to Watershed Function from Human-Made Structures from Historical Land Uses

Human-made structures on the SPRNCA include agricultural dikes and berms, railroad grades, and ditches and diversions. These can act as barriers that prevent surface water from flowing into streams, thereby reducing the volume of water in streams; however, they can also detain runoff, thereby allowing water to infiltrate and recharge groundwater. Under Alternatives B and C, the BLM would assess the human-made structures from historical land uses for hydrologic function, determine their level of impairment, and rehabilitate (either dismantle or alter) as necessary and within jurisdiction. Under Alternative D, no changes would be made to existing human-made structures. Alternatives B and C would involve more opportunities for improving watershed function by assessing and possibly altering the hydrologic function of human-made structures. Alternative D would be similar to Alternative A.

Changes to Water Resources from Prescribed Fire

Prescribed fire removes vegetation that holds soil in place, making soil more susceptible to water erosion. As water erodes soil, overland flow can carry sediment and ash to streams, thereby degrading water quality and increasing turbidity in streams. It can also cause sedimentation in streams. The loss of vegetation that uses water can also increase the amount of water flowing into streams. Sedimentation and changes in the volume of overland flow entering a stream can then alter stream morphology. These impacts on water quality and quantity are generally short term until vegetation is restored and would be minimized through implementation of SOPs and BMPs (see **Appendix G**).

In prescribed burn areas where shrub roots can reach the water table, prescribed burns could temporarily reduce groundwater consumption from those areas until vegetation returns. More importantly, establishing more appropriate vegetation after prescribed fire would improve overall watershed conditions and functions that affect the hydrologic cycle.

Prescribed fire would be used on 17,070 acres for each action alternative. The impacts on water quality and quantity from prescribed fire would only occur under the action alternatives, because Alternative A does not involve the use of prescribed fire.

Acres of Cottonwood/Willow Gallery Affected by Areas Available to Livestock Grazing

Depending on the season and intensity, livestock grazing in riparian areas has the potential to degrade water quality by reducing vegetation cover, affecting stream bank stability, and increasing nutrients and fecal coli-forms. Removal of streamside vegetation by foraging or trampling can expose soils, thus making them more susceptible to wind and water erosion. It can also reduce streamside shade coverage and thus increase water temperatures (Platts 1991). Water temperature is also inversely correlated to dissolved oxygen levels; thus, increases in water temperature would lead to decreases in dissolved oxygen. Hoof action from cattle on steep stream banks can add excess sediment to the stream channel, which can reduce vegetation cover, increase turbidity levels, and change channel morphology (Belsky 1999). Cattle urine and feces can add excess nutrients, which may cause excess aquatic plant growth that could also reduce dissolved oxygen levels and affect water quality. Livestock grazing would occur under all alternatives, except Alternative D.

Alternative B would increase livestock grazing in riparian areas the most, with the entire SPRNCA being open to grazing. Under Alternative C, grazing in riparian vegetation would occur in cottonwood/ willow communities along ephemeral tributaries to the San Pedro River, 0.1 percent of the decision area, to minimize livestock impacts on priority habitats. Alternative C and would have less impacts from grazing on water quality than Alternative A. Alternative D would improve water quality compared with Alternative A by eliminating livestock grazing within riparian areas.

Changes to Water Quality from Abandoned Mine Lands

There are numerous mine features on the SPRNCA that could potentially affect water quality. Mines commonly include features such as shafts, adits, pits, trenches, tunnels, waste rock dumps, tailings, and structures including, but not limited to, mills, buildings, headframes, hoists, and loading chutes. Management for all alternatives includes remediation of abandoned and inactive mine hazards to protect and enhance water quality. Remediating abandoned and inactive mine hazards under all alternatives would continue to include removing contaminants that degrade water quality when water encounters the contaminants during overland flow or during infiltration. These impacts would continue to be long term.

Miles of 303(d) Streams for Areas Containing Surface-Disturbing Activities with Sensitive Soils

On the SPRNCA, the San Pedro River is 51 miles, 34 miles of which are on the 303(d) list of impaired streams. Also, nearly all of the SPRNCA has sensitive soils that are susceptible to wind or rainfall erosion. Given these conditions, activities that disturb sensitive soils can affect impaired streams. **Section 3.2.2** describes how management actions and resource allocations can result in soil compaction and erosion of soil.

All alternatives would continue to manage for soil conditions that support proper functioning of hydrologic, energy, and nutrient cycles. Alternatives B and C would have 34 miles of impaired streams in areas with livestock grazing. Alternative B would have 6 miles of impaired streams in backcountry areas with motorized vehicles, and Alternatives C and D would have 1 mile of impaired streams in backcountry areas with motorized vehicles.

Recharge enhancement projects and prescribed fire can also improve watershed conditions and functions, as described above. Alternatives B and C would have 1 mile of impaired streams in areas with prescribed fire. All the action alternatives would have 1 mile of impaired streams in areas with recharge enhancement projects.

Conclusions

Alternative D would have the fewest impacts on reducing groundwater supply and degrading water quality. Alternative B would have the highest impact on water quality due to livestock grazing within and around surface water. Alternative C would have similar impacts on reducing groundwater supply and less water quality degradation than Alternative B due to reduction in livestock grazing areas. All of the action alternatives would have similar impacts on water quality and groundwater supply from erosion control projects, prescribed fire, and remediation of abandoned and inactive mine hazards. Active restoration under Alternatives B and C would improve recharge conditions quicker than passive restoration under Alternative D. Under Alternatives B and C, active restoration would be larger in size and potentially recharge more water, where feasible, than passive restoration in Alternative D. Alternative A contains no direction for restoration actions.

Cumulative Impacts

The analysis area for water resources is the Upper San Pedro watershed. **Table 3-1** lists the past, present, and RFFAs and the number of acres associated with the actions, such as land development.

Past and present actions in the analysis area that have affected water resources are recreation, livestock grazing, OHV travel, management of natural resources, groundwater pumping, urban development, and infrastructure development. These actions have altered overland flow, degraded water quality, and altered groundwater recharge, including areas with sensitive soils and impaired streams.

Historical railroad drainage crossing patterns routed three or more natural drainages and concentrated them into one. These concentrated flow-receiving drainages subsequently became deeply incised, and their contributing areas have since been eroding to match the incised grades.

Ranches in the analysis area have conducted vegetation restoration efforts to restore grasslands, thereby increasing the ability of the vegetation to hold soil in place, by reducing overland transport by surface water, and enhancing the infiltration of storm water runoff. Also, during the last 60 years, over 5,000 acres of lands at Ladd Ranch have been root-plowed or grubbed to enhance the infiltration of stormwater runoff.

Present and RFFAs involve maintaining and restoring watershed conditions and functions. Cochise Conservation and Recharge Network projects involve preserving base flows of the San Pedro River. Vegetation treatments in **Table 3-1** have similar impacts in the long term on hydrology by improving vegetation conditions.

RFFAs or projects, as described in **Table 3-1**, can alter vegetation, create surface disturbances, deposit feces in or near streams, or pump groundwater. For example, grazing on private lands in the analysis area is expected to slightly decrease because of urban development. Also, watershed improvement plans would continue to work toward improving water quality in impaired streams.

Urban development would be a notable source of vegetation and surface disturbance (which can affect water resources) because of the size of the area affected. Erosion and overland runoff from the tributary watersheds are expected to increase as vegetation decreases in response to land uses and urbanization. High sediment yields can overwhelm riparian communities and degrade water quality. Degradation of water resources would be highly dependent on the location and scale of RFFAs and actions that minimize or reclaim disturbances.

Water is also needed to support future urban developments, which will continue to increase groundwater pumping demand. According to Lacher (2017), simulated natural recharge and existing managed aquifer recharge are insufficient to meet the net pumping demand in the Sierra Vista subwatershed. This imbalance is proven by the fact that simulated riparian water decreases steadily throughout the simulation period. Conservation efforts over the past 15 years in the Sierra Vista subwatershed have pushed per-capita water use downward. Efforts to continue that trend and to increase near-stream managed aquifer recharge may further protect SPRNCA base flows in the future.

Under Alternative A, all BLM-administered lands would continue to be managed in a manner that would maintain water resources. When combined with past, present, and the RFFAs, Alternative A would continue to have cumulative impacts on water resources. Most of these impacts would involve altered overland flow, degraded water quality, and altered groundwater recharge associated with livestock grazing. The action alternatives would vary in their contribution to cumulative impacts on water resources. Alternative D would have the fewest cumulative impacts on water resources from livestock grazing because the decision area would be unavailable to grazing. Alternative B would have the highest cumulative impacts on water resources due to the availability of livestock grazing within and around surface water. Alternative C would have less cumulative impacts on water resources than Alternative B due to reduction in livestock grazing areas available.

All the action alternatives would increase cumulative impacts on water resources by the same amount from erosion control treatments, prescribed fire, and remediation of abandoned and inactive mine hazards. Active restoration under Alternatives B and C would improve recharge conditions quicker than passive restoration under Alternative D. Under Alternatives B and C, active restoration would be larger in size and potentially improve cumulative water resource impacts greater than passive restoration in Alternative D. Alternative A contains no direction for restoration actions.

3.2.4 Vegetation

Affected Environment

Vegetation serves multiple purposes on the landscape and provides many ecosystem services. It stabilizes soils, prevents erosion, takes up carbon dioxide, releases oxygen, contributes to species diversity, and provides habitat and food for animals and products for humans.

Ecological Sites

The SPRNCA is in the Madrean Archipelago EPA Level III Ecoregion (EPA 2011). This is a region of basins and ranges with medium to high local relief, typically 3,000 to 5,000 feet in elevation. Native vegetation in the region is mostly grama-tobosa shrub-steppe in the basins and oak-juniper woodlands on the ranges. The region has ecological significance as both a barrier to and a bridge between two major cordilleras of North America, the Rocky Mountains and the Sierra Madre Occidental. Its

exceptional species richness and endemism are also influenced by both western desert and midcontinent prairie biogeography.

Ecological site descriptions (ESDs) provide a system for comparing existing vegetation conditions to potential or desired future conditions. The BLM conducted an ecological site inventory for the SPRNCA in 2017. Ecological sites are shown on **Figure 3-2**.

Acres of vegetation communities on the SPRNCA are summarized in **Table 3-9**, displayed on **Figure 3-3**, and described in detail below. Other upland vegetation communities on the SPRNCA not shown in the table are agricultural fields and developed areas, together comprising less than 2 percent of the SPRNCA (BLM GIS 2017).

Table 3-9
Vegetation Communities

Vegetation Community	Acres	% of the SPRNCA
Upland Vegetation		
Chihuahuan desert scrub	33,080	
Semidesert grassland	7,270	
Total	40,350	72
Riparian Vegetation		
Fremont cottonwood-Goodding's willow	1,560	
Mesquite forest (bosque)	7,510	
Big sacaton grassland	3,250	
Total	12,320	22
Wetlands		
Interior marshland (ciénega)	20	
Wetlands (other than ciénega)	40	
Aquatic (open water)	200	
Total	260	<1
Xeric Riparian		
Sandy Wash	2,110	4

Source: BLM GIS 2017

State and Transition Models

State and transition models are the key component of ecological site descriptions, as they depict and organize information regarding the ecological dynamics of an ecological site. States are stable, long-term ecological conditions that are produced on a site due to the interactions of the biotic, physical, and disturbance factors. States are usually composed of several plant community phases, which vary based on species composition and production. Expression of community phases can be, and often are, dynamic on a particular ecological site location due to the interaction of all ecological factors. This interaction of ecological factors resulting in different plant community phases is termed community pathways.

Ecological sites will also display multiple states, with the change from one state to another being nonreversible without significant management inputs. Transitions are the drivers and mechanisms of changes between states, and the ESD will describe how these function. Management actions, such as

conservation practice implementation, grazing management, and other land use decisions, are a significant part of the described state and transition model.

The BLM determined the state of ecological sites by comparing species that were present in the ecological site against what should be present on the site based on the ESD. The HCPC represents the plant community that should be expressed on the site based on soil and climate. State 1 is a small departure from HCPC and state 4 is a large departure from HCPC.

The BLM uses PFC to determine the condition of riparian and wetland vegetation.

Upland Vegetation

Chihuahuan desert scrub

This vegetation type covers the largest area on the SPRNCA (approximately 33,080 acres; Makings 2006; BLM GIS 2017). Dominant shrub species are acacias, tarbush, and creosote. Other important plant species are ocotillo, soap tree yucca, and Palmer's century plant. These species all provide nectar for migrating birds and certain bat species (see **Section 3.2.5**). Other shrubs present are mariola, desert sumac, rosemallow, and shrubby xerophytic mesquites. **Table P-1, Appendix P,** describes HCPC and acres of this vegetation community in each ecological state.

Semidesert Grassland

Semidesert grassland is a priority habitat. Semidesert grassland (approximately 7,270 acres; BLM GIS 2017) once covered vast areas of the San Pedro River Valley, where now only remnants remain (Latta et al. 1999). This habitat is now associated with drainages in the Chihuahuan desert scrub. Native perennial grasses may include sideoats grama, blue grama, vine mesquite grass, tobosa grass, cane beardgrass, Arizona cottontop, and threeawns.

Small areas of semidesert grassland occur on the SPRNCA as "fingers," following drainages in the upper Chihuahuan desert scrub terrace; most are invaded with mesquite and broom snakeweed. **Table P-2, Appendix P** describes HCPC and acres of this vegetation community in each ecological state.

Riparian Vegetation

The SPRNCA was designated for its riparian values. Approximately 50.8 miles and 12,320 acres of riparian habitat occur on the SPRNCA. As shown in **Table 3-9**, approximately 1,560 acres are Fremont cottonwood-Goodding's willow forest, 7,510 acres are mesquite forest (bosque), and 3,250 acres are big sacaton grassland. These communities are further described below.

In 2012, the National Riparian Service Team (NRST) assessed the PFC for riparian areas of the San Pedro River on the SPRNCA (BLM 2012). PFC assessments describe the current riparian condition of individual reaches of the San Pedro River. The current conditions data then are compared with their potential, or highest, ecological status that could be attained in the current climate, given no political, social, or economic constraints. Because these conditions are not factored into the rating, the PFC assessment should not be confused with an estimate of the ecological status of a stream segment or wetland, based on the historical or current site potential.

Before the 1880s, the San Pedro River through much of the SPRNCA was an interior marsh (ciénega). Today it is evolving from a major period of channel incision, where it was transformed, into a high-

energy, confined river system. In addition to geomorphic changes, the climatic and hydrologic regimes that affected the river have also changed significantly and are not likely to revert to historical conditions within a management time scale; thus, the reach-based potentials in the NRST report (BLM 2012) describe the reaches as perennial, transitioning from perennial to intermittent, and intermittent, based on permanence of streamflow and associated vegetation communities.

Fremont Cottonwood-Goodding's Willow Forest

Riparian vegetation communities are a priority habitat, including the approximately 1,560 acres of Fremont cottonwood-Goodding's willow forest on the SPRNCA. The SPRNCA is recognized as the largest and best example of Fremont cottonwood-willow gallery riparian forest remaining in the southwestern United States. Less than 1 percent of the western United States is covered with riparian vegetation (Knopf et al. 1988). In 1846, a portion of the San Pedro River was described by the Johnston expedition as "covered with a dense growth of mesquite, cottonwood, and willow, through which it is hard to move without being unhorsed" (Bryan 1928). The higher diversity and productivity of the riparian zone, when compared with surrounding uplands, make these areas focal points for fish and wildlife habitat (see **Section 3.2.5**).

Across the region, key risk factors for this vegetation community are recreation (Saab 1998; Latta et al. 1999), altered surface hydrology (AZGFD 2012), vegetation clearing for agriculture or development, wood cutting, exotic plant species invasions, contaminants (Latta et al. 1999), improper cattle grazing (Latta et al. 1999; Krueper et al. 2003), and wildfire.

The condition of the Fremont cottonwood-Goodding's willow forest is described by its assessed PFC, as described under *Proper Functioning Conditioning Assessment—Riparian Areas*, below.

Mesquite Forest (Bosque)

Riparian vegetation communities are a priority habitat, including the approximately 7,510 acres of mesquite forest (bosque) on the SPRNCA. Mesquite forests, or bosques, historically represented one of the most abundant riparian communities in the southwestern United States but are now reduced to remnant status (Stromberg 1993). The SPRNCA contains some of these remnant bosques (Makings 2006) that were not removed during the historic mining and agricultural period for wood products or land clearing. An expedition in 1846 documented "the mesquite grows thick for a hundred yards, some of it being two feet in diameter but low in altitude" on the lower San Pedro River (Bryan 1928). **Table P-3, Appendix P** describes HCPC and acres of this vegetation community in each ecological state.

Big Sacaton Grassland

Riparian grasslands dominated by sacaton were once widely distributed in the intermountain basins of the Madrean Archipelago (Tiller et al. 2013). Big sacaton grasslands have declined historically in Arizona (Webb and Bock 1990) and currently occupy approximately 5 percent of their former range (Tiller et al. 2013). On the SPRNCA, approximately 3,250 acres of big sacaton grasslands are found in portions of the lower alluvial terrace near the San Pedro River that were not previously cleared for agriculture (Makings 2006). Other native, subdominant perennial grasses may include sideoats grama, blue grama, and vine mesquite grass.

Big sacaton grassland and mesquite forest (bosque) occur frequently on the SPRNCA, in conjunction with one another on similar soil types. Big sacaton grassland generally occurs where depth to the water

table is less than 20 feet (Tiller et al. 2013), while mesquite forest (bosque) may be present when the water table is deeper. On the SPRNCA, higher mesquite canopy cover is usually associated with lower big sacaton cover.

Big sacaton grasslands play a key role in maintaining streamside wetlands and riparian vegetation. Big sacaton grass (along with mesquite forest (bosque) occurring on river margins can prevent the formation or expansion of overflow channels during floods. They also hold water during and after floods, decreasing the rate at which floodwaters return to the main river channel.

Fire is generally beneficial to sacaton communities (Bock and Bock 1978). Fires in big sacaton grasslands are important in limiting shrub and mesquite invasion. **Table P-4, Appendix P** describes HCPC and acres of this vegetation community in each ecological state.

Wetland Vegetation

Interior Marshland (Ciénega)

Wetland vegetation communities are a priority habitat. On the SPRNCA, approximately 20 acres of interior marshland (ciénegas) occur along the Babocomari River, Lewis Springs, the ciénega complex south of Lewis Springs, narrow edges along the San Pedro River, Murray Springs, and at the St. David Ciénega. Interior marshland on the SPRNCA consists of areas of permanent to semipermanent freshwater. These are characterized by relatively shallow depths and extensive coverage of submergent and emergent plants, such as chairmaker's bulrush, clustered field sedge, wire rush, desert saltgrass, beaked spike rush, and cattail. Deergrass occurs in small areas at scattered locations. Much of this habitat type has diminished in size or has been lost entirely due to groundwater pumping and gully erosion.

The St. David Ciénega is one of the two substantial remaining ciénegas on the SPRNCA. It is in the northern portion of the SPRNCA, approximately 0.2 miles west of the San Pedro River. This rare example of southwestern wetland habitat is maintained by an artesian spring source (Martin 1979). The saturated soils of the ciénega result in an organic muck that precludes colonization of all but specialized organisms and some invasive plant species. These unique and specialized plant species do not compete well with introduced invasive plant species, such as tamarisk or Johnsongrass.

The other ciénega complex on the SPRNCA is south of Lewis Springs, where subsurface water is forced to the ground surface by underlying geology. The native alkali marsh aster, California loosestrife, and rare Arizona eryngo are found in this area.

The condition of interior marshland (ciénega) and other wetlands on the SPRNCA is described under *Proper Functioning Conditioning Assessment—Wetland Vegetation*, below. An additional 40 acres of wetland vegetation not classified as ciénegas occurs on the SPRNCA.

Aquatic (Open Water)

This community is a priority habitat. Approximately 200 acres of aquatic habitat (open water) on the SPRNCA occurs in riparian and wetland habitat types associated with springs, streams, rivers, and interior marshlands (ciénegas). These habitats are found at the following locations:

- Along the San Pedro and Babocomari Rivers

- Green Kingfisher and Black Phoebe Ponds
- The SV Ready Mix Detention Pond
- The Lewis (Government Draw), Murray, Horsethief, and Escapule Springs
- Other small, isolated springs, such as Contention and Ben Springs
- Artesian wells, such as Kolbe and Dunlavy

Xeric Riparian Vegetation

Sandy Wash (Xeric Riparian)

Approximately 2,110 acres of sandy wash (xeric riparian) communities are distributed throughout the SPRNCA. 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, although some permanent springs are in tributary washes, such as Contention, Ben, Horsethief, Murray, Lewis, and Escapule Springs.

Sandy wash (xeric riparian) habitat is generally more distinctive from surrounding vegetation. This is because of increased water availability, which results in different plant composition or structure, such as different plants, larger stature plants, and increased canopy cover. Common xeric riparian species are desert willow, Arizona walnut, littleleaf sumac, netleaf hackberry, and desert-thorn. These species, along with mesquite, may grow quite large along sandy washes because of increased availability of surface water and groundwater.

Proper Functioning Condition Assessment—Riparian Areas

The NRST (BLM 2012) findings provide evidence of improved physical function and ecological health of the San Pedro River on the SPRNCA since it was designated. This is largely due to the 1989 decision to end permitted livestock grazing along the river (BLM 2012); however, current conditions of groundwater overdraft and drought pose a significant risk and may lead to riparian degradation and loss.

In places, the San Pedro River is a complex of isolated or connected surface water pools, with little surface flow in June and early July. Results for 2012, the year the PFC assessment was conducted, were similar to other dry years, when approximately 23.6 miles (47 percent) of the stream length on the SPRNCA was wet.

The San Pedro River has low sinuosity, which has impaired stream and hydrologic function. Currently, the channel is straight, deep, narrow, and "locked" in this shape by existing riparian vegetation. A higher-sinuosity channel and associated lower-gradient stream would improve overall function. This would come about from longer flood retention times, higher flood elevations that inundate floodplains, greater sandbar development providing nursery substrates for tree seedlings and saplings, floodplain development, and a greater diversity of plant habitats.

Of the 51 miles of river assessed for PFC, the BLM determined that 27.4 miles (54 percent) were in PFC and rated the remaining 23.4 miles (46 percent) as functional at risk (FAR). The FAR reaches were further assigned an apparent trend: 8.9 miles showed an upward trend, 10.3 miles did not show an apparent trend, and 4.2 miles (the northernmost reach, below St. David's diversion) showed a downward trend. **Table 3-10** summarizes the riparian PFC assessment on the SPRNCA.

Table 3-10
Riparian PFC Assessment Summary

Functional Rating	Trend	Miles	Percent	Comments
PFC	Not evaluated	27.4	54	The PFC rating system does not take into account decreasing groundwater levels, which pose a severe risk to riparian health.
FAR	Upward	8.9	18	If groundwater continues to decline, the trend will be downward. Tree regeneration appears to be impaired by low base flows and steep banks.
	Static or not apparent	10.3	20	No comments provided.
	Downward	4.2	8	Largely due to declining flows.
Nonfunctional		0.0	0	All reaches show little sign of accelerated erosion.
Total		**50.8**	**100**	

Source: BLM 2012

The NRST (BLM 2012) also conducted a reach-by-reach PFC assessment on the SPRNCA, as summarized in **Table 3-11**. Only Reach J (4.2 miles) was rated FAR with a downward trend, which indicates that it requires management attention. The main factors limiting the ability of this reach to achieve PFC are the St. David's diversion, livestock grazing, and OHV use. Groundwater overdraft is another cause where the indicators change slowly and are subtle, such as reduced tree regeneration and vegetation stress in late spring. The PFC assessment was conducted in early spring before these indicators could be readily observed.

The NRST (BLM 2012) concluded that, because 72 percent of the river was determined to be in PFC or FAR with an upward trend (see **Table 3-11**), it has the attributes and processes in place to further improve.

Table 3-11
Riparian PFC Assessment by Reach, San Pedro River

Reach	Miles	Streamflow	Functional Rating	Trend on FAR
A (International border to south of Palominas)	6.1	Perennial[1]	FAR	N/A
B (Waters Road to Cottonwood)	12.0	Perennial	PFC	
C (Cottonwood to Escapule)	6.3	Perennial	PFC	
D (Escapule Wash Area)	1.4	Perennial	FAR	N/A
E (above Charleston Bridge to Charleston Hills)	3.8	Perennial	PFC	
F (Charleston Hills to Fairbank railroad trestle)	8.9	Perennial transitioning to intermittent	FAR	Upward
G (Fairbank railroad trestle to Tombstone gage)	1.0	Intermittent	PFC	
H (Tombstone gage to Contention)	2.8	Intermittent	FAR	N/A
I (Contention to St. David diversion)	4.3	Intermittent, with short perennial segments	PFC	
J (St. David diversion to Escalante Crossing)	4.2	Intermittent	FAR	Downward
Total	**50.8**			

Source: BLM 2012

[1]Intermittent with short perennial segments

The BLM also conducted PFC assessments for a subset of streams on the SPRNCA other than the San Pedro River: the Babocomari River, Horse Thief Draw, and Government Draw. Results of the assessments are summarized in **Table 3-12**. Ten additional reaches were not evaluated: Lewis Spring South, Escapule Wash, Murray Spring, Moson Spring, Meusel Spring, Frog Spring, Graveyard Gulch Spring, McDowell-Craig Spring, Ben's Spring, and Garden Canyon Spring.

Table 3-12
Riparian PFC Assessment by Reach, Other than the San Pedro River

Reach	Miles	Streamflow	Functional Rating	Trend on FAR
Babocomari River (upper)	0.3	Nearly entirely intermittent (small length perennial)	PFC	
Babocomari River (lower)	2.5	Nearly entirely intermittent (small length perennial)	FAR	Downward
Horse Thief Draw	N/A	Interrupted perennial	FAR	Downward
Government Draw (upper)	0.5	Interrupted perennial	FAR	Downward
Government Draw (lower)	0.2	Perennial	FAR	Downward

Source: BLM 2012

The Lower Babocomari River was rated FAR due to watershed and vegetation conditions. The assessment documented that bank and floodplain vegetation in the lower reach showed evidence of the following:

- There was disturbance from livestock trampling and overutilization of forage.
- Bank extensions had been trampled to the extent that plants and root mats were inadequate to support PFC.
- Cattle trailing appeared to have caused cut-off channels.
- Trampling had further loosened soil where cover was poor.
- Many young cottonwoods were in a shrubby form, indicating ongoing and heavy foraging.

Horse Thief Draw is augmented by water recharge from treated effluent. It was rated FAR due to vertical erosion (head-cutting) and other rapid channel adjustments, resulting from past erosional processes related to stream down-cutting.

Lower Government Draw was rated FAR due to watershed condition, groundwater development, dying cottonwood, little tree regeneration, and rapid channel adjustments, resulting from past erosional processes related to stream down-cutting. The Upper Government Draw is much wetter and has a robust riparian development; however, it rated FAR due primarily to vertical erosion (down-cutting), and it has many of the same risk factors as the lower reach.

Proper Functioning Condition Assessment—Wetland Vegetation

In 2013, the BLM conducted a PFC assessment in wetland areas on the SPRNCA. The assessment followed the standard lentic PFC protocol (Prichard et al. 2003). The assessment team did not have annual or seasonal hydrological data, as described in the protocol; instead, they used vegetation expression and plant community stability. The PFC assessment is summarized in **Table 3-13**.

Table 3-13
Wetland PFC Assessment

Wetland	Acres	Perennial or Seasonal	Functional Rating	Trend on FAR
St. David Ciénega	27.0	Perennial (partially seasonal)	FAR	Downward
Lewis Spring Wetland Complex	3.0	Perennial (partially seasonal)	FAR	Downward
Dunlavy Wetlands North (#1)	3.1	Artesian (perennial)	PFC	No trend
Dunlavy Wetlands Middle (#2)	3.4	Artesian (perennial)	PFC	No trend
Dunlavy Wetlands South (#3)	1.3	Artesian (perennial)	PFC	No trend
Kolbe Wetland	0.1	Artesian (perennial)	PFC	No trend
Little Joe Wetland	0.2	Not evaluated (newly restored wetland)	N/A	N/A
Little Lewis Spring (upper)	2.6	Perennial	FAR	Downward

Source: BLM 2017; BLM GIS 2017

The St. David Ciénega was rated FAR due to its apparent decline in spring (groundwater) discharge, its watershed and vegetation condition, and channel erosion on the southern outlet. Wetland indicator plants are transitioning to upland plants on some portions of the site. Head-cutting on the south side may drain the ciénega if it continues to travel north. The ciénega is filling with detritus from vegetation and potentially sediment from a highly degraded watershed surrounding the wetland, which has led to a reduction in open water. The historical fire regime has been curtailed, which has accelerated the rate at which vegetation fills open water with detritus. St. David Ciénega is classified as a RNA and ACEC (see **Section 3.4.1**).

The Lewis Springs wetland complex is a set of seeps and springs with a plant community unlike that of other wetlands on the SPRNCA. These wetlands were rated FAR. The functionality is tied to the discharge of seeps and springs, which appears to be declining.

The three Dunlavy Wetlands are fed by artesian springs, with relatively constant discharge. All three are in PFC and appear to be expanding in surface area. The wetlands were ponds at one time, but they have completely filled with vegetation and detritus and no longer have open water.

The Kolbe Wetland was rated PFC. It also has artesian flow and appears to have a relatively stable surface coverage; it is not expanding or contracting in size. USGS monitoring indicates no flow from the artesian well in the summer.

Little Joe Wetland relies on a natural spring. It was not evaluated but appears to be relatively stable and well vegetated, with few risk factors.

The perennial Little Lewis Spring was rated FAR for many of the same risk factors described for the Lewis Springs above. There are several small springs (e.g., Ben Spring and Frog Spring) located on the SPRNCA. PFC assessments were not conducted on these springs.

The distribution of aquatic and wetland plants depends on soil type, successional state, and the seasonal water gradient. Wetland and aquatic plant diversity in the assessment wetlands is relatively high.

Makings (2006) conducted a comprehensive inventory of wetland vegetation on the SPRNCA from 2000 to 2003 and recorded 61 native obligate aquatic and wetland species or facultative wetland species. Another 11 obligate aquatic and wetland species are not native to the basin. Makings noted ciénegas to have a small unique group of plant species (Makings 2006).

A notable plant species found in riverine and wetland habitats on the SPRNCA is the federally endangered Huachuca water umbel. See **Section 3.2.6** for a further discussion of special status species.

In the downstream portion of the SPRNCA, riparian forest is transitioning toward grassland-shrub communities, dominated by big sacaton and ash or big sacaton and tamarisk. Some floodplains show large, deep, secondary channels. These appear to result from poor vegetation density and loss of riparian forest vegetation capable of resisting erosion. Some tributaries to the San Pedro River, such as Government Draw and Little Lewis Springs, are experiencing nearly complete tree mortality in some reaches.

There are small areas where unauthorized livestock grazing along the San Pedro River has occurred, and in some sections, this unauthorized grazing is slowing riparian vegetation regeneration (BLM 2012). Recreation on the SPRNCA and its increasing numbers of hikers, equestrians, mountain bikers, and unauthorized OHV users are creating localized disturbance and impacts on riparian habitat (BLM 2012). Since designation, the SPRNCA has experienced varying levels of impacts on riparian habitat from border-related activities, including smuggling and related enforcement (BLM 2012).

Discharge from the City of Sierra Vista wastewater treatment plant is augmenting flows in Horse Thief Draw and Murray Spring. These flows in turn are causing aquatic, riparian, and wetland habitat to expand in these streams.

The San Pedro River channel sinuosity has changed little since the area was designated as an NCA. Without management of the meandering process, benefits that may ultimately increase perennial flows will not be realized for decades or longer (NRST 2012). Benefits generally include a lower river gradient, improved beaver dam longevity, longer flood retention time, increased groundwater recharge, greater riparian forest regeneration, and floodplain creation, as discussed under *Riverine Geomorphology Projects*.

Weeds

Noxious weed management is a high priority for the SPRNCA. The noxious weed control program has focused on early detection and control of new invasive plants. It also has focused on controlling or eradicating infestations, depending on the species and extent of infestation. Although a variety of terms are used to describe nonindigenous plants, this analysis focuses on two categories of plants, described below.

Noxious weeds and invasive plants (collectively referred to here as weeds) can create a variety of plant community changes. They do this by altering the floristic structure and composition of the community and by disrupting the key ecosystem processes that enable the community to function. At local scales, weeds can displace native plants due to their competitive and reproductive advantages. This degrades the community's biotic integrity. The loss of native plant diversity from weed invasions may lead to the loss of wildlife habitat and rangeland productivity and may increase the risk of extirpation of special status species. These extinctions may be flora that are unable to persist with weeds or faunal species that depend on displaced native plants for food or habitat.

Current Conditions

There are several different noxious weeds that occur on the SPRNCA. These include Russian knapweed, tree of heaven, giant reed, Coastal sandbur, Malta and yellow starthistle, bindweed, Bermuda grass, Lehmann lovegrass, Russian thistle, Bur bristle grass, Johnsongrass, Tamarisk, and puncturevine. See **Appendix Q** for additional information and observations of weed species on the SPRNCA.

Analysis Methods

Analysis Area

The analysis area for vegetation is the Hydrologic Unit Code (HUC) 8 watershed encompassing the SPRNCA: 15050202—Upper San Pedro. In most cases, effects of management carried out on the SPRNCA would be confined to the SPRNCA. In some cases, management carried out on the SPRNCA may have effects outside of the administrative boundary; these are discussed where applicable.

Alternative A priority habitats and acreages differ from the action alternatives pertaining to vegetation types and priority habitats. Habitat types for Alternative A were drawn from the Safford RMP, which combined several habitat types used for analysis in the action alternatives into "riparian." These included ciénega, Fremont cottonwood-Goodding's willow, mesquite forest (bosque), and big sacaton grassland. Under Alternative A, where habitats were not comparable, "N/A" was stated.

Assumptions

- Potential surface disturbance and vegetation effects caused by livestock grazing water infrastructure would be as follows: vegetation would be completely removed on ¼ of an acre centered around the waters, and forage would be reduced by 50 percent for ½ mile centered around the waters (Valentine 1947).
- The potential surface disturbance and vegetation effects from new recreation site infrastructure assumes that vegetation would be removed from the site's entire footprint.
- Firebreaks and other vegetation treatments would not entail complete vegetation removal. Vegetation would be temporarily, completely removed in the footprint of erosion control projects.
- Vegetation and erosion control treatments would be designed to return the ecological sites in which they were carried out to HCPC.
- In vegetation communities where livestock grazing would be allowed, livestock would utilize 30 percent of the perennial grass component (Holechek 1988).

Indicators

Indicators of impacts on vegetation are the following:

- The acres of vegetation communities affected by surface disturbance or firebreaks
- The potential for weed establishment and spread as indicated by amount of surface disturbance
- The potential for management actions to move vegetation communities toward HCPC or PFC, as applicable, as indicated by the amount of vegetation communities affected by vegetation treatments and acres of livestock grazing allotments departed from ecological site that are available for livestock grazing

Impacts Common to All Alternatives

There are no impacts common to all alternatives.

Alternatives Comparison Analysis

Potential Surface Disturbance from Development/Facilities

Developing infrastructure and facilities for livestock grazing, new recreation sites, campgrounds, and planned trails (BLM 1995) would directly affect vegetation communities. Direct effects would come about by removing vegetation in a discrete project footprint and along trails and other existing travel routes.

Table 3-14 summarizes the amount of vegetation communities that would be directly affected by infrastructure and facility development under each alternative.

Table 3-14
Vegetation Potentially Affected by Long-Term Reasonably Foreseeable Disturbance

	Acres Affected, by Alternative[1]			
Vegetation Community (Total Acres)	**A**	**B**	**C**	**D**
Chihuahuan desert scrub (33,080 acres)	28	33	4	0
Semidesert grassland (7,270 acres)	2	3	3	1
Fremont cottonwood-Goodding's willow (1,560 acres)	0	<1	0	0
Mesquite forest (bosque; 7,510 acres)	10	11	4	<1
Big sacaton grassland (3,250 acres)	<1	<1	0	0
Interior marshland (ciénega; 20 acres)	0	<1	0	0
Wetlands (40 acres)	0	0	0	0
Aquatic (open water; 200 acres)	0	0	0	0
Sandy wash (xeric riparian; 2,110 acres)	<1	<1	<1	0
Total	**41**	**49**	**12**	**1**

Source: BLM GIS 2017

[1] Long-term reasonably foreseeable disturbance includes potential planned camping areas, routes, trails, or livestock waters.

As shown in **Table 3-14**, Alternative B would remove the most acres of vegetation, while Alternative D would remove the least.

Firebreaks

Creating and maintaining firebreaks on the SPRNCA has the potential to directly and indirectly affect vegetation communities. Direct impacts would come about as select vegetation in the firebreak is removed to reduce fuel loadings and fuel continuity. Treatments would not remove all vegetation in the firebreak; generally, perennial grasses and shrub root crowns would be left in place, allowing for regrowth and necessitating firebreak maintenance after several growing seasons.

Indirectly, creating and maintaining firebreaks can alter vegetation community characteristics, including species composition and density. For example, reducing shrub density may encourage herbaceous plant growth, resulting in increased perennial grass cover in the firebreak.

Creating and maintaining firebreaks may increase the potential for weed establishment and spread. This could come about because vehicles and equipment used during treatments can transport weed seeds

(DiTomaso 2000; Davies and Sheley 2007). Weeds may be more likely to become established in the openings created by firebreaks, and the linear nature of the breaks themselves can facilitate weed spread (Merriam 2006; Keeley 2006). This effect would be more likely to occur if existing weed infestations were present in the firebreak location.

Because of potential vegetation community alteration and increased weed establishment and spread, firebreak treatments may move vegetation communities away from HCPC, depending on the initial vegetation state and HCPC characteristics. These effects may be less pronounced under Alternative D than under the other alternatives, which would employ "light on the land" vegetation treatment methods (see *Vegetation Treatments*, below).

Existing anthropogenic barriers (e.g., roads and other rights-of-way) and natural barriers (e.g., sparsely vegetated ridgetops) would be used as firebreaks to the extent possible and where feasible, reducing the magnitude of impacts on vegetation communities under all alternatives.

Vegetation Treatments

Vegetation treatments are projects undertaken to move the vegetation community toward desired conditions. These types of projects include, but are not limited to, erosion control projects, mechanical and chemical vegetation treatments, and prescribed fire treatments as described in the RFD for vegetation treatments in **Section 3.1**.

Table 3-15 summarizes the amount of vegetation communities that would be affected by vegetation treatments under each alternative. As shown in the table, vegetation treatment acres would be the same under all action alternatives except for Alternative D, which would have about 64 percent fewer acres of treatments.

Table 3-15
Vegetation Potentially Affected by Vegetation Treatments RFD

	Acres Affected, by Alternative[1]			
Vegetation Community (Total Acres)	**A**	**B**	**C**	**D**
Chihuahuan desert scrub (33,080 acres)	0	20,040	20,040	15,850
Semidesert grassland (7,270 acres)	0	3,010	3,010	660
Fremont cottonwood-Goodding's willow (1,560 acres)	0	80	80	0
Mesquite forest (bosque; 7,510 acres)	0	1,520	1,520	30
Big sacaton grassland (3,250 acres)	0	1,020	1,020	10
Interior marshland (ciénega; 20 acres)	0	<1	<1	<1
Wetlands (40 acres)	0	6	6	<1
Aquatic (open water; 200 acres)	0	2	2	0
Sandy wash (xeric riparian; 2,110 acres)	0	390	390	150
Total	**0**	**26,284**	**26,284**	**16,700**

Source: BLM GIS 2017

[1]The BLM foresees multiple vegetation treatments in the same locations, that is, overlapping treatments; the totals displayed do not include the overlap.

Vegetation treatment projects would have varying levels of direct impacts on the vegetation where they were carried out (e.g., directly removing vegetation during erosion control projects). Vegetation community composition would be altered from pretreatment conditions, generally due to removal of

target vegetation species or components to move vegetation toward desired conditions. Treatment areas would generally have reduced vegetation cover for several growing seasons, temporarily increasing the potential for erosion and runoff. Effects of certain types of treatments are briefly summarized below.

Prescribed fire would directly remove vegetation by burning. This treatment type would be used in fire-adapted vegetation communities, such as big sacaton grasslands, helping stimulate and rejuvenate these areas. Prescribed fire would also reduce fuel loadings, helping reduce the chances for large-scale, catastrophic wildfire in all vegetation communities on the SPRNCA.

In mechanical and chemical treatments, vegetation would be directly removed using hand tools and/or heavy machinery, or herbicides, respectively. Not all vegetation would be removed in treatment areas; instead, vegetation would be selectively removed based on the ecological site and treatment objectives. Indirectly, potential surface disturbance associated with subsequently authorized mechanical treatments could increase weed establishment and spread, and chemical treatments could affect nontarget vegetation from herbicide drift or accidental spills (see *Invasive Plant and Noxious Weed Management*, below).

Vegetation treatments would help return the ecological sites in which they were carried out to HCPC or move the ecological state toward HCPC. This would be the case when treatments were carried out in Chihuahuan desert scrub, semidesert grassland, mesquite forest (bosque), and big sacaton grassland; these communities have HCPC defined (see the state and transition models for these vegetation communities, above).

Similarly, where vegetation treatments were carried out in Fremont cottonwood-Goodding's willow forest, interior marshland (ciénega), and sandy wash (xeric riparian) areas, treatments would move communities toward PFC or improve function of reaches at PFC toward stream reach potential (Prichard et al. 1988).

In general, the broadest array of tools for vegetation management would be available under Alternatives B and C, whereas under Alternative D, management would primarily focus on use of natural processes, hand tools, and prescribed fire. More acres of vegetation treatments would be carried out under Alternatives B and C than under Alternative D; therefore, the potential for impacts on vegetation would be greatest under Alternatives A, B, and C; however, deleterious impacts from vegetation treatments would be short term with long-term impacts being beneficial.

Riverine Geomorphology Projects

Projects would be carried out under Alternatives B and C to enhance riverine geomorphology by inducing channel meander. These projects would have indirect effects on riparian vegetation. Effects would come about from vegetation loss on the "outside" curve of meanders as the channel meander migrates into riparian vegetation on the floodplain. At the same time, newly developed point bars on the "inside" curve of meanders would provide new substrate for riparian tree establishment and growth.

Over several seasons, riverine geomorphology projects would result in increased meander frequency and width, decreased channel gradient, reduced channel confinement, reduced flood velocity, increased floodplain inundation duration, increased groundwater recharge, increased resilience, and other riparian system function improvements (Simpson 2007; Kline and Cahoon 2010; Fogg et al. 2012). As a result,

riverine geomorphology projects would move riparian vegetation communities toward PFC or improve the function of reaches at PFC toward stream reach potential (Prichard et al. 1988).

Riverine geomorphology projects would not adversely affect ciénegas in the short term because they would not be carried out near these off-channel wetland areas. In the long term, induced channel meanders may eventually be cut off as the system meanders farther. This would increase the potential for new ciénega development in these areas.

Because riverine geomorphology projects would not be conducted under Alternatives A or D, there would be no impacts on vegetation from such projects under those alternatives.

Invasive Plant and Noxious Weed Management

Invasive plant and noxious weed management would have varying levels of direct and indirect impacts under the alternatives, as described below.

The BLM would use integrated pest management projects to remove target invasive plants and noxious weeds under Alternatives A, B, and C. Direct impacts would come about as target invasive plants or noxious weeds were directly removed through various means (e.g., mechanical, prescribed fire, and chemical treatments as described in *Vegetation Treatments*, above). Direct impacts could also come about if nontarget vegetation were incidentally removed during treatments, for example through inadvertent trampling or crushing by workers or vehicles.

Chemical treatments could also result in impacts on nontarget vegetation. These could come about through herbicide drift, runoff, accidental spills, or other means, as described in the Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States PEIS (BLM 2007). The potential for these impacts would be reduced because the BLM would follow SOPs during herbicide treatments, as summarized in Appendix B, Herbicide Use SOPs, in the PEIS. Representative SOPs would be taking measures to reduce or prevent drift, selecting appropriate herbicide application methods, and using an herbicide-free buffer zone when using herbicides not labeled for aquatic use near wetland and riparian areas.

Impacts on nontarget vegetation may be reduced in magnitude under Alternative D, which emphasizes using hand tools for invasive plant and noxious weed management; however, emphasizing this treatment method may slow treatment progress or be ineffective against certain weed species. In these cases, movement toward HCPC and/or PFC would be slowed or not achieved, respectively.

Under Alternatives B, C, and D, the BLM would treat invasive salt cedar between Fairbank and Land Corral, helping move riparian vegetation in these areas toward PFC and/or improve function of reaches at PFC toward stream reach potential (Prichard et al. 1988).

Open to Livestock Grazing

Livestock grazing management would have direct and indirect impacts on the vegetation communities that are open to livestock grazing. Impacts from livestock grazing, described below, would likely be greatest under Alternative B, which includes the most total acres of the SPRNCA open to livestock grazing (55,990 acres). No livestock grazing would be allowed under Alternative D.

Impacts would also be more pronounced where livestock grazing was allowed in areas that are departed from HCPC[1]. **Table 3-16** summarizes the ecological state of open and closed areas in each livestock grazing allotment (see **Figure 3-4** for livestock grazing allotment boundaries).

Table 3-16
Livestock Grazing and Ecological Departure by Allotment

Alt.	Ecological State	Unallotted		Babocomari		Brunckow Hill		Lucky Hills		Three Brothers	
		Open	Closed	Open	Closed	Open	Closed	Open	Closed	Open	Closed
A	HCPC	-	6,100	300	-	-	-	690	-	-	-
	1	-	2,280	3	-	-	-	-	-	-	-
	2	-	19,240	350	-	980	-	620	-	1,330	-
	3	-	2,310	-	-	-	-	-	-	-	-
	4	-	4,520	-	-	10	-	350	-	700	-
	ND[1]	-	14,220	1,190	-	130	-	70	-	240	-
B	HCPC	6,100	-	300	-	-	-	690	-	-	-
	1	2,280	-	3	-	-	-	-	-	-	-
	2	19,240	-	350	-	980	-	620	-	1,330	-
	3	2,310	-	-	-	-	-	-	-	-	-
	4	4,520	-	-	-	10	-	350	-	700	-
	ND[1]	14,220	-	1,190	-	130	-	70	-	240	-
C	HCPC	1,700	4,410	300	-	-	-	690	-	-	-
	1	410	1,870	3	-	-	-	-	-	-	-
	2	10,140	9,100	350	-	980	-	620	-	1,330	-
	3	340	1,980	-	-	-	-	-	-	-	-
	4	890	3,630	-	-	10	-	350	-	700	-
	ND[1]	5,080	8,380	1,190	-	130	-	70	-	240	-
D	HCPC	-	6,100	-	300	-	-	-	690	-	-
	1	-	2,280	-	3	-	-	-	-	-	-
	2	-	19,240	-	350	-	980	-	620	-	1,330
	3	-	2,310	-	-	-	-	-	-	-	-
	4	-	4,520	-	-	-	10	-	350	-	700
	ND[1]	-	14,220	-	1,190	-	130	-	70	-	240

Source: BLM GIS 2017

[1] No ecological state data available

Livestock grazing can directly affect vegetation communities by causing changes in vegetation structure. Fleischner (1994) summarizes numerous effects on Arizona plant communities, including decreases in perennial grass cover and species richness in upland communities and reduced herbaceous cover in riparian communities. As discussed in the analysis assumptions, where allowed, livestock grazing would reduce (utilize) perennial cover by approximately 30 percent (Holechek 1988).

In upland communities that are highly departed from HCPC, even low utilization may cause adverse impacts on vegetation (Bestelmeyer 2006; Sasaki et al. 2009; Searle et al. 2009). As a result, these areas would continue to move away from HCPC without management intervention, use of BMPs, and adaptive management. Alternative B would open approximately 6,830 acres of ecological state 3 and 4 vegetation

[1] Historic climax plant community (HCPC) represents the plant community that should be expressed on the site based on soil and climate. State 1 is a small departure from HCPC and state 4 is a large departure from HCPC.

communities in unallotted areas to livestock grazing. Also, under Alternatives A, B, and C, relatively large areas in ecological state 4 would be open to grazing in the Lucky Hills and Three Brothers allotments. Vegetation treatments, BMPs, and adaptive management would be used to minimize and reduce adverse impacts on vegetation.

Conversely, resting areas in poor land health from livestock grazing would help increase land health and move vegetation communities toward HCPC or PFC. This would increase resilience to impacts from livestock grazing. No livestock grazing would be allowed under Alternative D, meaning there would be no impact from livestock grazing under this alternative.

Livestock can also directly affect individual plants through herbivory, and trampling, which can indirectly affect plant productivity and community composition. These effects would generally move communities away from HCPC or PFC. Livestock can facilitate weed establishment and spread (Hobbs and Huenneke 1992; Loeser et al. 2007), which can further alter vegetation community structure and move communities away from HCPC or PFC. These impacts may be greatest under Alternative B, which includes the most acres open to livestock grazing.

Livestock grazing may affect riparian vegetation communities more than upland communities. Livestock preferentially use riparian areas for succulent forage, water, and shade. Livestock congregating in riparian areas can trample streambanks, widen channels, collapse undercut banks, and reduce riparian vegetation cover. In turn, this can lead to increased runoff, sedimentation, water turbidity, and temperatures (Belsky et al. 1999). This can result in reduced stream function, moving these areas away from PFC.

Fugitive dust generated during livestock grazing management actions, such as trailing, can settle on vegetation, having direct and indirect effects on affected vegetation communities. Please see **Section 3.3.1** for a discussion of fugitive dust effects.

Conclusions

Management direction would result in impacts on vegetation under all alternatives. Development under all alternatives from the campgrounds, recreation sites, and water developments for livestock would directly remove less than 0.01 percent of vegetation in the decision area; disturbance would have little influence on overall vegetation condition there.

Vegetation treatments, firebreak maintenance, and invasive plant and noxious weed management would have greater influence on moving vegetation communities toward desired conditions. The alternatives that incorporate the most active management and the broadest array of tools (e.g., heavy equipment, prescribed fire, and herbicides) would have the greatest influence on moving vegetation communities toward desired conditions. This would generally be the case under Alternatives B and C. Conversely, the additional surface disturbance associated with active management would increase the potential for weed establishment and spread more than other alternatives.

Alternatives B and C would also have the greatest influence on moving wetland and riparian areas toward PFC. These alternatives incorporate riverine geomorphology projects, which would not be done under Alternatives A and D.

Where allowed, livestock grazing management impacts would be most intense in areas that are departed from HCPC. Alternative B includes the most acres open to livestock grazing, including approximately

6,830 acres of ecological state 3 and 4 vegetation communities in unallotted areas. Also, under Alternatives A, B, and C, relatively large areas in ecological state 4 would be open to grazing in the Lucky Hills and Three Brothers allotments.

Cumulative Impacts

The quantity and quality of water available are important influences on the presence and composition of vegetation communities; therefore, the analysis area for vegetation cumulative impacts is the HUC 8 watershed surrounding the SPRNCA: 15050202—Upper San Pedro, which encompasses the context for impacts occurring on and off the SPRNCA. Past actions that have affected vegetation in the cumulative impacts analysis area are human-caused surface disturbances, altered hydrological regimes, and vegetation management in the San Pedro River that have contributed to current ecological conditions.

Human-caused surface disturbances in the watershed would come about from anticipated urban growth, such as the Villages at Vigneto, Tribute, Ventana De Flores, and Bella Vista developments (see **Table 3-1**). These developments would occupy approximately 18,270 acres; most vegetation in these areas would be removed. Cochise Conservation Recharge Network groundwater recharge sites (13,510 acres) would similarly remove vegetation in the recharge site footprints. These projects would add to the current 36,500 acres of developed areas in the watershed. Additional surface disturbance would increase the potential for weed establishment and spread in the watershed, especially if disturbance were to occur within existing weed infestations.

Riparian and wetland vegetation in the San Pedro River has been affected by past development and hydrological alterations in the watershed; vegetation has been affected by resulting increases in channel incision, reduced channel meandering, and changes in the timing and intensity of flows (NRST 2012). Departed ecological conditions in surrounding uplands from past land management practices have further contributed to effects. While continued development in the watershed may exacerbate effects, moving wetland and riparian vegetation further from PFC, effects may be somewhat offset by planned groundwater recharge sites.

Vegetation would continue to be affected by vegetation management projects in the watershed. Specifically, Sands Ranch, Ladd Ranch, and Brookline Ranch have conducted range improvement projects to improve livestock forage; other vegetation treatments have been carried out at Fort Huachuca and in livestock grazing allotments on the SPRNCA (see **Table 3-1**). Depending on management objectives, treatments have altered the vegetation condition, and moved vegetation communities where they were carried out toward or away from HCPC.

Contributions to cumulative impacts on vegetation from BLM management on the SPRNCA would occur under all alternatives to varying degrees. Development under all alternatives would directly remove less than 0.01 percent of vegetation on the SPRNCA; this management would have little contribution to cumulative impacts.

Vegetation treatments conducted by the BLM would have greater cumulative impacts, because treatments would be conducted over a larger area of the SPRNCA and be designed to move vegetation communities toward desired conditions. Contributions to cumulative impacts would be greatest under Alternatives B and C, which incorporate the largest treatment areas, use the broadest array of

management tools, and incorporate riverine geomorphology projects that would improve riparian vegetation condition.

3.2.5 Fish and Wildlife

Affected Environment

The BLM manages habitat for fish and wildlife on public lands, including the SPRNCA. The AZGFD manages wildlife populations. The AZGFD administers hunting, including permitting, bag limit identification, and population tracking. Throughout the state, AZGFD's program management is based on animals present in game management units (GMUs). The SPRNCA forms the boundary between three GMUs (portions of 34B, 35A, and 30B).

Through its State Wildlife Action Plan (SWAP), the AZGFD identifies species of greatest conservation need (SGCN) and their habitats based on eight criteria for population vulnerability (AZGFD 2012). The SWAP provides a comprehensive vision for managing wildlife and wildlife habitats in Arizona. The BLM considered information in the SWAP in this planning effort.

The 1988 Final EIS and San Pedro Riparian Management Plan identified priority wildlife species that occur on the SPRNCA. At the time the plan was written, the habitats on or near the SPRNCA supported 303 avian species, 84 mammals, and 41 herptiles (reptiles and amphibians). The Safford RMP (BLM 1991) identified the following priority habitats and species: riparian and aquatic habitats (including wetlands) and associated species, desert grasslands, mule deer, and Gould's turkey.

Priority Habitats

Recent inventories have identified seven habitats on the SPRNCA that are considered priority: Fremont cottonwood-Goodding's willow forest, mesquite forest (bosque), big sacaton grasslands, Chihuahuan desert scrub, semidesert grasslands, sandy washes (xeric riparian), and interior marshlands (ciénegas). Species of wildlife on the SPRNCA are associated with one or more of these priority habitats; representative species and their habitat associations are listed in **Table 3-17**. The associations shown in this table should be referred to as a crosswalk for the impact analysis, as any impacts on vegetation communities will ultimately affect the wildlife species that depend on these habitats. For detailed descriptions of the vegetation communities that occur in these priority habitats, refer to **Section 3.2.4**.

Table 3-17
Wildlife Species and Associated Priority Habitats on the SPRNCA

Representative Species[1]	Priority Habitat	Acres	% of SPRNCA
	Upland vegetation	**40,310**	**72**
• Mule deer • Lesser long-nosed bat	Chihuahuan desert scrub	33,070	
• Grassland birds (botteri's sparrow)	Semidesert grassland	7,240	
	Riparian (total)[2]	**12,320**	**22**
• Yellow-billed cuckoo • Southwestern willow flycatcher • Northern gray hawk	Fremont cottonwood-Goodding's willow	1,560	
• Arizona Botteri's sparrow • Javelina	Big sacaton grassland	3,250	

Table 3-17
Wildlife Species and Associated Priority Habitats on the SPRNCA

Representative Species[1]	Priority Habitat	Acres	% of SPRNCA
• Lucy's warbler • Bewick's wren	Mesquite forest (bosque)	7,510	
	Wetlands	**260**	**<1**
• Arizona tree frog • Lowland leopard frog • Northern Mexican garter snake • Chiricahua leopard frog • Marsh-dependent birds	Interior marshland (ciénega)	20	
• Arizona tree frog • Lowland leopard frog • Northern Mexican garter snake • Chiricahua leopard frog • Marsh-dependent birds	Wetlands (other than ciénega)	40	
• Gila topminnow • Desert pupfish • Longfin dace • Desert sucker • Beaver	Aquatic (open water)	200	
	Xeric Riparian	**2,110**	4
• Gambel's quail	Sandy wash	2,110	

Source: BLM GIS 2017

[1]Scientific names of species are included in **Appendix J**.
[2]Under Alternative A, riparian priority habitat includes areas of interior marshland (ciénega), Fremont cottonwood–Goodding's willow, mesquite forest (bosque), and big sacaton grassland.

Terrestrial Wildlife

Sandy washes provide important wildlife movement corridors between surrounding uplands and mountains. There are at least twelve washes from the Huachuca Mountains to the San Pedro River that promote genetic connectivity for San Pedro River wildlife: Memorial, Hunter, Carr, Miller, Ramsey, Slaughterhouse, Blacktail, Babocomari, Gardner, Huachuca, Soldier's, and Woodcutter's (Hass 2000).

Game Species

The SPRNCA provides suitable habitat for both large and small game species, including Gould's turkey, Coues whitetail deer, mule deer, javelina, mountain lion, scaled quail, Gambel's quail, desert cottontail, and black-tailed jackrabbit (**Table 3-17**).

Migratory Birds

The San Pedro River is one of only four major north–south migratory bird corridors of the southwestern United States, along with the Rio Grande, Santa Cruz, and Colorado Rivers. The Global Important Bird Area designation was bestowed to recognize the river's importance to millions of migrating neotropical birds and many rare breeding birds, such as Bell's vireo (National Audubon Society 2018).

The SPRNCA is home to approximately 100 species of breeding birds and provides habitat for an additional 250 species of migrant and wintering birds (BLM 2017). This is because of the permanent

water source of the river and the various niches and food sources provided by the diversity of habitat on the SPRNCA. The highest avian species richness and density on the SPRNCA occur in the riparian habitat (Krueper and Corman 1988).

The BLM used the Bird of Conservation Concern, Sierra Madre Occidental Bird Conservation Region 34 (USFWS 2008) to identify the following priority migratory bird species in the planning area: Virginia rail, least bittern, black hawk, western burrowing owl, varried Bunting, Bell's vireo, Lucy's warbler, yellow warbler, rufous-winged sparrow, grasshopper sparrow, canyon towhee, and Botteri's sparrow. Migratory bird species that are federally listed or are BLM sensitive species are discussed in more detail in **Section 3.2.6**.

Non-Game Wildlife

Small rodents on the SGCN list documented by Duncan (1989) on the SPRNCA are the rock pocket mouse, northern and southern grasshopper mouse, plains harvest mouse, and yellow-nosed cotton rat. Banner-tailed kangaroo rat and tawny-bellied cotton rat occur on range maps for the SPRNCA area (Reid 2006), and there is appropriate grassland habitat for these species. Harris's antelope squirrel has been documented on the SPRNCA in grass-mixed scrub habitat near Charleston and Boquillas (Duncan 1989). Rodents are important as material processors in the ecosystem and as a prey base for carnivorous animals.

The American beaver was reintroduced on the SPRNCA, after having been extirpated by fur trappers more than a century ago (Bailey 1971). Beavers were reintroduced in 1999, 2000, and 2002 (Fredlake 2004); by 2008, the estimated beaver population on the SPRNCA was at least 100, based on about 20 colonies with 33 dams (Radke 2014).

Species on the SGCN list, such as Allen's big-eared bat, cave myotis, and Townsend's big-eared bat, may use mines for summer roosts, while Arizona myotis may use mines for winter roosts. Surveys of mines in the Charleston-Brunckow area on the SPRNCA in 2007 and 2008 indicated at least 14 mine features that were potential bat habitat (Wolf 2008).

Reptiles

Forty-nine native and six nonnative reptile species have been documented on the SPRNCA (aquatic reptiles and amphibians are discussed under *Aquatic Wildlife*). Of the lizards on the SGCN list that occur on the SPRNCA, canyon spotted whiptail occurs only in specific localities and in small numbers (BLM 1988). Habitat for canyon spotted whiptails on the SPRNCA consists of semidesert grassland and sandy washes. The regal horned lizard has been documented in Chihuahuan desert scrub habitat on the SPRNCA (BLM 1988). Gila monsters are observed in Chihuahuan desert scrub and semidesert grassland on the SPRNCA; they usually overwinter in south-facing rocky hillsides (Brennan and Holycross 2006).

Snakes on the SGCN list that have been documented on the SPRNCA include the Sonoran coral snake, which was documented in semidesert grassland, rocky areas, and areas with mesquite, while habitat for the Yaqui black-headed snake occurs in areas with mesquite and rocky areas (BLM 1988). The Sonoran whipsnake is more common and may be found in semidesert grassland (Brennan and Holycross 2006) and in Chihuahuan desert scrub and rocky areas on the SPRNCA (BLM 1988). The massasauga appears to be extirpated in the southern San Pedro Valley (Brennan and Holycross 2006).

Aquatic Wildlife

Priority Habitats

Priority habitats for aquatic wildlife include aquatic lentic and lotic systems. Aquatic habitat on the SPRNCA occurs in both riparian and wetland habitat types associated with springs, streams, rivers, and ciénegas along the San Pedro and Babocomari Rivers; at Green Kingfisher and Black Phoebe Ponds; at the SV Ready Mix Detention Pond; at Lewis (Government Draw), Murray, Horsethief, and Escapule Springs; at small isolated springs, such as Contention and Ben Springs; and at artesian wells, such as Kolbe and Dunlavy.

Invertebrates

Invertebrates provide essential ecological roles in ecosystem stabilization, energy and nutrient transfer, trophic structure maintenance, pollination, and habitats for other organisms (BLM 2017). During aquatic macroinvertebrate sampling, 39 distinguishable benthic (bottom-dwelling) macroinvertebrate species were collected from the San Pedro River and 22 from the Babocomari River (Miller 2006).

Currently absent and recently documented mollusks of the upper San Pedro River Valley are listed in Haynes and Huckell (2007). Approximately nine terrestrial and five aquatic native mollusks may occur in the upper San Pedro River (Haynes and Huckell 2007), but it is unknown if any native mollusks occur currently at Murray Springs or other wetlands on the SPRNCA.

Nonnative crayfish species have been introduced to the San Pedro River. Native fairy shrimp do occur in the San Pedro River and in ephemeral pools caused by summer precipitation, but the specific species is unknown (BLM 2017). *Hyalella azteca*, a common crustacean in Arizona, likely inhabits waters on the SPRNCA. It has wide ecological tolerance, suitable for desert aquatic ecosystems.

Fish

Of the 13 native fish species that occurred historically in the upper San Pedro River, two remain, the longfin dace and desert sucker. Both species are listed as SGCN. Two more species, desert pupfish and Gila topminnow, have been reintroduced into Murray Spring, Horse Thief Draw, Ben Spring, and Little Joe Wetland.

The native fish species lost from the SPRNCA are the Colorado pike minnow, loach minnow, spikedace, roundtail chub, Gila chub, speckled dace, razorback sucker, flannel-mouth sucker, and Sonora sucker.

There is habitat available for all life stages of the native species evaluated, given sufficient flow in the system (Miller 2006). Most of the current perennial stream is centered about the Charleston reach. The Palominas and Tombstone reaches contain the native longfin dace. This species is the most tolerant of poor flow conditions and can quickly colonize after water returns. This is because these fish can survive in an isolated pool habitat in otherwise dry reaches with a high temperature and low dissolved oxygen, and rapidly recolonize these intermittent reaches following onset of summer rainy season.

High-gradient riffles are the most abundant type of riffle along the Lewis Creek stretch of the San Pedro River, which extends nearly to the Charleston Bridge (a distance of 4.25 miles), and provide suitable habitat for desert sucker and loach minnow. The reach from the Charleston Bridge to Government Draw supports populations of both longfin dace and desert sucker and would likely support loach minnow and spikedace as well (BLM 2017).

Amphibians

Of the ten amphibian species that occurred historically on the upper San Pedro River, nine remain (see Appendix C in the Analysis of the Management Situation [BLM 2017] for the SPRNCA amphibian and reptile list), and three are listed as SGCN. See **Section 3.2.6** for federally listed and proposed (Tier A), candidate, and BLM sensitive species.

Lowland leopard frogs may still occur in isolated locations with shallow water and where bullfrogs are not present, such as Dunlavy Wetlands. Although rare, the Sonoran Desert toad has been documented on the SPRNCA at Fairbank (Corman 1988); however, it was not documented in surveys during 2013 on the SPRNCA. Habitat for the Sonoran Desert toad includes Chihuahuan desert scrub and semidesert grassland.

Aquatic Reptiles

The Sonora mud turtle occurs throughout the SPRNCA, in the permanent water reaches of the San Pedro and Babocomari Rivers, in intermittent reaches of the San Pedro River where pools remain before monsoon season, and in isolated springs. Several exotic turtle species have been recently introduced on the SPRNCA, including painted, red-eared, spiny softshell, and false map turtles. It is unknown how competition with nonnative species may affect Sonora mud turtles. Habitat for aquatic reptiles such as the northern Mexican garter snake and checkered garter snake is generally suitable in the river reaches that support fish and amphibians, as described above, but the potential for supporting populations is limited by bullfrog predation. Although the northern Mexican garter snake is thought to be extirpated from the SPRNCA, designated critical habitat for this species exists on the SPRNCA, and the USFWS has observations of northern Mexican garter snake from the SPRNCA (USFWS 2014).

Analysis Methods

Potential effects of decisions and management actions to species, populations, and habitats were identified by reviewing the best available science and utilizing qualitative and quantitative data related to impact indicators. A metric (e.g., acres or miles) was selected whenever possible to best reflect the scale and magnitude of these effects. A GIS dataset and overlays of resources and resource uses were used to quantify effects when available.

The analysis area for fish and wildlife is the HUC 8 watershed encompassing the SPRNCA: 15050202—Upper San Pedro.

Indicators of impacts on fish and wildlife include the following:

- Acres of priority habitats
- Miles of fence in priority habitats
- Number of xeric riparian corridors that are crossed by fences

Assumptions for the analysis of impacts on fish and wildlife are as follows:

- A quarter-acre area of bare ground, removal of vegetation, centered around livestock waters would occur.
- A half-mile area centered around livestock waters would reduce forage by 50 percent.

- A 5-foot buffer around livestock fences would be affected.
- A half-mile buffer around routes inside of the motorized RMZs would be affected.
- Xeric riparian areas serve as wildlife movement corridors.
- Wildlife assemblages are associated with priority habitats; impacts on these habitats translate to impacts on fish and wildlife species.

Impacts Common to All Alternatives

There are no impacts common to all alternatives.

Alternatives Comparison Analysis

Surface Disturbance from Development/Facilities

Potential surface disturbances would mainly occur because of livestock grazing infrastructure and construction of new recreation sites, campgrounds, and planned trails. These actions would have direct impacts on vegetation, and therefore priority habitats for fish and wildlife species. Development of infrastructure and facilities would create discrete footprints that would be clear of vegetation, causing impacts to occur in localized areas.

In addition to direct habitat loss, recreation facilities, campgrounds, and trails would attract an increasing number of hikers, equestrians, mountain bikers, and authorized OHV users, which would create localized disturbance and degrade surrounding habitat (BLM 2012). For example, trampling of vegetation compacts soil, decreases its porosity, and increases erosion (Coleand Landres 1995 in Block 1997). Disturbance can also alter competitive, symbiotic, and predator-prey relationships. Depending on their tolerance of humans, some species would be affected more than others and experience decreases in vigor, productivity, or survival. These effects would ultimately affect abundance, distribution, and population viability (Anderson 1995; Knight and Cole 1995b in Block 1997). **Table 3-18** compares the potential area of direct surface disturbance across the four alternatives.

Table 3-18
Fish and Wildlife Habitat Potentially Affected by Long-Term Reasonably Foreseeable Disturbance

	Acres Affected, by Alternative[1]			
Priority Habitat	**A[1]**	**B**	**C**	**D**
Chihuahuan desert scrub	N/A	33	4	0
Semidesert grassland	2	3	3	1
Fremont cottonwood-Goodding's willow	N/A	<1	0	0
Mesquite forest (bosque)	N/A	11	4	<1
Big sacaton grassland	N/A	<1	<1	0
Riparian (Alt. A)	11	N/A	N/A	N/A
Interior marshland (ciénega)	N/A	0	0	0
Wetlands	0	<1	0	0
Sandy wash (xeric riparian)	N/A	<1	<1	0
Total	**13**	**49**	**12**	**1**

Source: BLM GIS 2017

[1]The priority habitat groupings under Alternative A were grouped according to the Safford RMP objectives (BLM 1989).

Healthy and sustainable wildlife populations generally are supported by a diverse mix of plant communities for forage, cover, and other specific habitat requirements. Clearing of vegetation to create

livestock infrastructure, recreation facilities, campgrounds, and trails would therefore result in a loss of wildlife habitat and reduce species' access to cover, forage, and breeding grounds. Reductions in habitat could cause species ranges to overlap and potentially increase interspecific competition. For example, Coues whitetail deer are encroaching into what was once mule deer habitat (Baker 1984), while the latter species is being displaced due to habitat loss and fragmentation (Heffelfinger et al. 2006). Infrastructures and facilities would be permanent structures and impacts would last if they remain in place.

Altering Vegetation to Change the Vegetation Community

Management for vegetation would involve the use of vegetation treatments, erosion control projects, and other management tools to alter vegetation with the goal of changing the vegetation community. Treatments would have direct impacts on vegetation, mainly through loss of vegetation, and therefore loss of priority habitats for wildlife. For a detailed description of the effects of vegetation treatments on vegetation communities, soils, and water, see **Sections 3.2.4**, **3.2.2**, and **3.2.3**.

Treatments such as mechanical vegetation removal and prescribed fire would have direct impacts on wildlife priority habitats by removing or damaging vegetation and on individual species through injury or mortality (e.g., through unintentional crushing or burning). Likewise, erosion control and recharge enhancement projects would temporarily reduce habitat acres by removing vegetation on riverbanks, thereby creating bare areas that do not serve as wildlife habitat. They also would temporarily disturb aquatic species (e.g., through installation of monitoring wells), causing habitat avoidance. Impacts from these treatments would last from the time the treatments are carried out until the vegetation community recovers. Vegetation treatments would likely occur intermittently over the life of the plan based on necessity (**Table 3-19**).

Table 3-19
Fish and Wildlife Priority Habitat Potentially Affected by Vegetation Treatments RFD

	Acres Affected, by Alternative[2]			
Priority Habitat	**A[1]**	**B**	**C**	**D**
Chihuahuan desert scrub	0	20,040	20,040	15,850
Semidesert grassland	0	3,010	3,010	660
Fremont cottonwood-Goodding's willow	0	80	80	0
Big Sacaton grassland	0	1,020	1,020	30
Mesquite forest (bosque)	0	1,520	1,520	10
Riparian (Alt. A)	0	N/A	N/A	N/A
Interior marshland (ciénega)	0	0	0	
Wetlands	0	10	10	<10
Aquatic (open water)	0	<10	<10	0
Sandy wash (xeric riparian)	0	390	390	150
Total	**0**	**26,060**	**26,060**	**16,700**

Source: BLM GIS 2017

[1]The priority habitat groupings under Alternative A were grouped according to the Safford RMP objectives (BLM 1989).
[2]The BLM foresees multiple vegetation treatments in the same locations, that is, overlapping treatments; the totals displayed do not include the overlap.

Over time, the vegetation treatments described above would restore the vegetation community and indirectly benefit fish and wildlife by improving habitat conditions and increasing the acres of priority habitats. Vegetation initially removed by the treatment methods would come back as healthy, diverse,

and resilient communities (with no or few invasive species such as tamarisk). Wetland function would be restored, and water quality would be improved (from reduced erosion); this would increase the extent and condition of riparian–wetland areas, which are important habitats for many wildlife species, including migratory bird, fish, and amphibian species.

The use of prescribed fire to set back succession of emergent marshlands and mimic the natural disturbance regime would help increase endemic organisms that are adapted to large flood events, such as marsh-dependent birds (Conway et al. 2010). Fire influences wildlife habitat patterns and populations in wetlands by increasing the availability and palatability of plants for herbivores, regulating insect populations, controlling the scale of the total vegetative mosaic, and regulating macroinvertebrate and small-fish populations (Lugo 1995).

The broadest array of tools for vegetation management would be available under Alternatives B and C, whereas under Alternative D, management would primarily focus on use of natural processes, hand tools, and prescribed fire; therefore, the potential for impacts on fish and wildlife habitat would be greatest under Alternatives B and C, including initial habitat loss from use of treatments that are potentially invasive to the land (e.g., use of heavy machinery for vegetation removal) and a greater potential for increased habitat quality (e.g., from more effective removal of invasive species).

Altering the Riparian Community from Riparian Vegetation Treatments

Alternatives B and C include riverine geomorphology enhancement that would be achieved by installing soft structures, such as vegetation or posts, in streams to increase meandering and sinuosity. This could potentially initially reduce riparian and aquatic priority habitats by altering the vegetation community through loss of older trees and inducing erosion and deposition on the opposite channel. Species associated with these habitats, including many migratory birds and fish (see **Table 3-17**), would experience reduced habitat quantity and quality, while others would benefit from dense stands because of tree regeneration (e.g., southwestern willow flycatcher); however, the projects would be carried out in phases, and effects would be monitored to reduce biological impacts.

Over time, riparian habitat function would improve through increased overbank flooding with shallow aquifer recharge, improved surface flow permanence, increased tree generation along point bars, increased nursery habitat inside meanders, and other riparian system function improvements (Simpson 2007; Kline and Cahoon 2010; Fogg et al. 2012). These features would increase the availability of habitat acres and features, such as breeding and foraging areas for many fish, amphibians, and migratory bird species. The creation of open water surrounded by emergent vegetation would provide habitat for breeding waterfowl and shore birds. Increased riparian vegetation would improve habitat for southwestern native fish species (e.g., spikedace and loach minnow), many of which are less tolerant to increased stream temperature than previously thought (Carveth et al. 2006).

The increased potential for new interior marshland (ciénega) development in areas where induced channel meanders are cut off would beneficially affect species associated with the ciénega priority habitat, such as marsh-dependent birds, by increasing acres of habitat availability.

Sections 3.2.4, **3.2.2**, and **3.2.3** provide a detailed discussion of how vegetation, soils, and waters, which provide habitat for fish and wildlife, would be affected by riparian vegetation treatments.

Grazing

Livestock grazing could have a direct impact on the quality of wildlife habitat by causing changes in vegetation structure. For example, grazing reduces herbaceous vegetation, which provides cover and forage for a variety of birds, reptiles, small and large mammals, game species, and other wildlife. Livestock could also spread weeds, which would degrade habitats and result in reduced habitat effectiveness. Livestock also could degrade riparian areas and affect streambank stability, which would affect riparian-dependent wildlife, aquatic, and fish species. Changes in streamside vegetation could affect water temperature, while animal waste could elevate nutrient levels, thereby reducing water quality. In addition, trampling of amphibians and other aquatic organisms by cattle would result in a loss of eggs or direct mortality. The extent of these impacts correlates to the acres open to grazing under each alternative (**Table 3-20**).

Riparian habitats could be affected the most by livestock grazing because livestock disproportionately use these areas for forage, water, and shade. Excessive grazing can alter channel structure and riparian composition, leading to degraded stream functionality. For example, trampling of streambanks can cause stream widening, collapse of undercut banks, reduced riparian vegetation, increased surface runoff, and soil erosion, which would ultimately degrade water quality (through excess nutrients and sedimentation) and elevate instream temperatures (through reduced vegetation cover; Belsky et al. 1999).

Table 3-20
Acres of Potential Fish and Wildlife Habitat Open to Grazing

Priority Habitat	Alternative A[1]	Alternative B	Alternative C	Alternative D
Chihuahuan desert scrub	N/A	33,070	19,470	0
Semidesert grassland	680	7,240	4,020	0
Fremont cottonwood-Goodding's willow	N/A	1,560	110	0
Big sacaton grassland	N/A	3,250	480	0
Mesquite forest (bosque)	N/A	7,520	1,130	0
Riparian (Alt. A)	180	N/A	N/A	N/A
Interior marshland (ciénega)	N/A	10	0	0
Wetlands	0	40	<10	0
Aquatic (open water)	N/A	200	<1	0
Sandy wash (xeric riparian)	N/A	2,100	830	0
Total	**860**	**55,000**	**26,040**	**0**

Source: BLM GIS 2017

[1]The priority habitat groupings under Alternative A were grouped according to the Safford RMP objectives (BLM 1989).

In addition, grazing in riparian zones can negatively affect vegetation vigor, community structure, and species composition, which would reduce the quality of habitat for riparian-dependent species and the availability of habitat features such as forage, cover, and nesting areas. Heavily grazed areas have fewer native and stabilizing plant species, and instead support invasive vegetation that do not provide adequate bank stabilization and habitat features for wildlife (Gross 2013). In areas where grazing is properly managed, impacts would be limited (Smith 2014).

Livestock grazing can directly affect fish and amphibian species (e.g., the Chiricahua leopard frog) by facilitating dispersal of nonnative predators through the construction of stock tanks; trampling of egg masses, tadpoles, and frogs; deterioration of streambanks, causing erosion and sedimentation; elimination of undercut banks that provide cover for amphibians; loss of wetland and riparian vegetation

and backwater pools, which provide nursery habitat for fish; and spread of disease (USFWS 2002; Belsky et al. 1999; Ohmart 1995; Hendrickson and Minckley 1985; Arizona State University 1979; Jancovich et al. 1997 in USFS 2015).

Migratory birds would experience habitat loss or degradation from grazing of livestock in riparian areas, which many migrating birds use as a stopover on their migration routes. Reduced vegetation structure and diversity, alterations in the vegetation community, and reduced habitat connectivity would limit the availability of nesting areas, forage, and cover for many bird species.

Livestock grazing can affect mammalian habitat if it reduces herbaceous plant cover and density, decreases plant litter, and alters the plant species composition and structure of riparian habitats. Not all impacts of livestock stock tanks result in negative impacts on wildlife; some support the development of riparian and wetland habitats. These habitats provide important stopover habitat and critical water sources supporting a wide range of wildlife species.

Livestock grazing has the potential to change both food and cover available to deer (Heffelfinger et al. 2006) and other wildlife species. The could lead to direct competition between native ungulates and cattle for browse and forbs during periods of drought (Ockenfels et al. 1991). Whitetail deer may avoid sites with high cattle utilization (Brown 1984), and reproductive success may be lower in areas with high cattle stocking rates (Smith 1984). Cattle also compete with mule deer for forage, particularly at high stocking rates and during years of low precipitation (Kie et al. 1991).

Grazing can also increase dust deposition onto vegetation, which may reduce photosynthesis, respiration, and transpiration, and facilitate the penetration of phytotoxic gaseous pollutants (Farmer 1991); this would decrease the palatability of forage for many wildlife species, such as mule deer, which feed on upland forbs.

Firebreaks

Constructing and maintaining firebreaks directly degrades and removes wildlife habitat characteristics (e.g., cover and forage) through vegetation removal and can indirectly degrade habitat by promoting weed establishment if an area is already occupied by a particular weed. These impacts would last as long as the firebreaks are in place; however, firebreaks are typically constructed on areas that are already sparsely vegetated and often use man-made or natural barriers when possible. Otherwise, trees are limbed and grass is mowed. Over time, firebreaks would reduce habitat loss to wildfire, resulting in an overall increase in acres of priority habitats available to wildlife. This benefit would likely outweigh the short-term loss of priority habitat due to construction of firebreaks. See **Table 3-21** for acres of priority habitats affected by firebreaks under each alternative.

Human Disturbance/Noise from Recreation Concentration Areas

Each alternative would allow for some measure of recreation according to RMZs, which would primarily affect wildlife species through noise-induced disturbance. Activities allowed within primitive RMZs would cause the least noise and disturbance to wildlife because activities are mainly nonmotorized and include walking, hiking, equestrian riding, wildlife viewing in a remote setting, viewing natural scenery, hunting, and camping. Activities permitted within backcountry RMZs would generally cause relatively lower levels of disturbance to wildlife than rural RMZs because they would increase access to remote areas and motorized vehicle use.

Table 3-21
Potential Fish and Wildlife Habitat Affected by Reasonably Foreseeable Firebreak Treatments

Priority Habitat	Acres Affected, by Alternative			
	A[1]	B	C	D
Chihuahuan desert scrub	N/A	120	130	130
Semidesert grassland	7	10	10	10
Fremont cottonwood-Goodding's willow	N/A	10	10	10
Mesquite forest (bosque)	N/A	140	150	150
Big sacaton grassland	N/A	190	200	200
Riparian (Alt A)	345	N/A	N/A	N/A
Interior marshland (ciénega)	N/A	0	0	0
Wetlands	0	0	0	0
Aquatic (open water)	N/A	<1	<1	<1
Sandy wash (xeric riparian)	N/A	10	10	10
Total	352	480	480	480

Source: BLM GIS 2017

[1]The priority habitat groupings under Alternative A were grouped according to the Safford RMP objectives (BLM 1989).

In general, habitat disturbance from noise emitted by recreational uses and activities would be minimal due to the nature and type of recreational use the SPRNCA attracts (e.g., bird-watching, hiking, fishing, and camping). Some activities (concentrated use areas) emit noticeable sound but would be limited to localized areas. In terrestrial systems, the impacts of anthropogenic noise on wildlife include behavioral change, masking of sounds important to survival and reproduction, stress and associated physiological responses, startling, interference with mating, and population declines (Slabbekoorn and Ripmeester 2008; Barber et al. 2009; Blickley and Patricelli 2010). Chronic and frequent noise inhibits the ability of wildlife to detect important sounds, whereas intermittent and unpredictable noise is often perceived as a threat (Francis and Barber 2013). The former would result from activities such as motorized vehicle use and would continue as long as motorized routes are in use; the latter would be caused by construction of recreation facilities, which would typically occur during the day, and would continue until construction activities have been completed.

Hampering of vital life history functions (e.g., mate attraction, predator detection, and territory defense) due to acoustic interference can have direct negative consequences on species' fitness (Slabbekoorn and Ripmeester 2008). The magnitude of the impact depends on the frequency of the noise and that to which a particular species is attuned; impacts from noise disproportionately affects those species for whom the frequency of noise interferes with the frequency of their calls (Coffin 2007).

Noise can also affect mammals through auditory damage to mammals. Studies have shown that kangaroo rats experienced inner ear bleeding when subjected to OHV noise (Berry 1980; Bury 1980 in Ouren et al. 2007).

Noise from Heavy Equipment

Similar to the construction of recreation activities, activities that involve the use of heavy machinery (e.g., from erosion control projects, mechanical vegetation treatments, and firebreak construction) would affect wildlife through intermittent noise. Unpredictable noise is often perceived as a threat (Francis and Barber 2013) and would cause disturbance to wildlife, startling and flight responses, physiological stress, and displacement or habitat avoidance. These impacts would typically occur during

the day, when projects or treatments take place, and would be intermittent even throughout the day. Noise levels would depend on the type of equipment being used. The tolerance of wildlife to noise levels would be species specific. For some species, noise is the best predictor of occupancy within otherwise suitable habitat.

Reintroductions and Augmentations of Non-Special Status Species

Reintroductions and augmentations of non-special status wildlife species would have positive impacts for these species by increasing the area and thus potential for self-sustaining populations. Reintroductions could have potential unintended negative impacts on other fish and wildlife species if introduced species are predators of or compete for resources with existing wildlife species. The non-special status species identified for reintroduction, transplantation, or augmentation under each alternative are shown in **Table 3-22**.

Table 3-22
Non-special Status Species Identified for Reintroduction, Transplantation, or Augmentation

Alternative A	Alternatives B and C	Alternative D
Only special status species identified	Fish: Any of the non-special status species found in the system as historically based on changes in habitat suitability over time Reptiles and amphibians: Arizona tree frog, lowland leopard frog Birds: Turkey (Meleagris) Mammals: Beaver, mule deer, and American pronghorn	Only special status species identified

Source: BLM GIS 2017

Reintroductions, transplantations, or augmentations would occur in the habitats with which the identified species are associated. Ultimately, the area affected by reintroductions and augmentations of terrestrial species would include the entire SPRNCA, as individuals would be able to disperse and use different areas according to their life history needs. The area affected by reintroductions and augmentations of aquatic species would be limited to the aquatic system into which they are added.

See **Section 3.2.6** for a discussion of impacts from the reintroduction of special status species.

Fence Installation

The installation of fences from new areas open to livestock grazing could affect wildlife by causing habitat fragmentation and interfering with movement patterns. Impacts could last the length of construction and be localized to the immediate area where fences are installed; however, implementation of SOPs and BMPs, which include the use of wildlife-friendly fencing, would minimize impacts on wildlife. **Table 3-23** shows acres of priority habitat types that could be affected under each alternative.

Wildlife often use sandy wash (xeric riparian) areas as movement corridors, and therefore fences in these areas could have the greatest impacts on wildlife movement. The greatest number of sandy wash (xeric riparian) areas crossed by existing and planned fences would occur under Alternative C (with nine crossings) with the next highest being five crossings with Alternatives A and B.

Table 3-23
Fish and Wildlife Habitat Potentially Affected by Reasonably Foreseeable Livestock Grazing Infrastructure (Fence Installation)

	Acres Affected, by Alternative[1, 2]			
Priority Habitat	**A[1]**	**B**	**C**	**D**
Chihuahuan desert scrub	N/A	0.0	23.1	1.8
Semidesert grassland	0	0.0	5.1	0.7
Fremont cottonwood-Goodding's willow	N/A	0.2	0.4	<0.1
Mesquite forest (bosque)	N/A	<0.1	10.5	<0.1
Bid sacaton grassland	N/A	<0.1	4.2	0
Riparian (Alt A)	0	N/A	N/A	N/A
Interior marshland (ciénega)	N/A	0	0	0
Wetlands	0	0	<0.1	0
Aquatic (open water)	N/A	<0.1	0	0
Sandy wash (xeric riparian)	N/A	0	0.8	0
Total	**0**	**0.3**	**44.2**	**2.7**

Source: BLM GIS 2017

[1] The priority habitat groupings under Alternative A were grouped according to the Safford RMP objectives (BLM 1989).
[2] RFD miles of fence by alternative were buffered by 5 feet to estimate impacts.

Conclusions

Under all alternatives, surface disturbance from development, facilities, and livestock infrastructure would affect less than 0.1 percent of total acres of priority habitats in the planning area; this management would have little influence on the overall availability of priority habitats. Potential acres of surface disturbance would be greatest under Alternative B. Alternative D has the potential for the least disturbance to priority habitats, which would increase the acres of habitat available to wildlife species. Potential impacts under all alternatives would be mitigated by project design and BMPs (**Appendix G**).

Potential acres of priority habitats affected by anthropogenic noise could be greatest under Alternatives B and C, affecting wildlife on about 20 percent of the SPRNCA. Wildlife in these areas would be affected through interference with communication, increased stress levels, and displacement or habitat avoidance.

Potential acres of wildlife habitats affected by firebreaks would be similar across all action alternatives; however, because actions under Alternative D would be "light on the land," the magnitude of impacts would be lower under this alternative. Overall increases in priority habitat features due to reduced wildfire would likely outweigh wildlife habitat loss.

Alternatives B and C would take a more active approach to vegetation management and would affect the greatest area of priority habitats. Risks to wildlife and their habitats would be greater due to the use of tools such as mechanical and chemical vegetation treatments, but the potential for long-term improvements to priority habitats would be greater and improvements would occur more quickly. Alternative D places greater emphasis on passive restoration than the other alternatives. Vegetation treatments under Alternative D would affect about 64 percent fewer acres of priority habitats (see **Table 3-19**). Although passive restoration is often considered a critical first step in successful restoration of degraded areas since anthropogenic activities that are causing degradation or preventing recovery are halted, recovery of vegetation, and thus priority habitats for fish and wildlife, through passive management is expected to take longer than under active management, where treatments such

as seeding with native species, establishing intermediate vegetation to control erosion, and use of pre-emergent herbicides to prevent weed establishment would be expected to promote faster recovery (BLM 2007). Also, Alternatives B and C incorporate riverine geomorphology projects, and thus would also have the greatest influence on improving wetland and riparian areas and would benefit species associated with these priority habitats.

Potential acres of priority habitats affected by livestock grazing would be greatest under Alternative B, which would allow grazing across the entire SPRNCA. The areas affected could experience changes in vegetation structure and loss of wildlife habitat characteristics such as nesting habitat, forage, and cover. Under Alternative C, grazing would be allowed in approximately half the SPRNCA, with the majority occurring on upland vegetation with a relatively small area of riparian priority habitats open to grazing located in ephemeral tributaries in the uplands. Grazing would follow the Arizona Standards for Rangeland Health and Guidelines for Grazing Administration (BLM 1997), which would limit impacts. Under Alternative D, no acres of priority habitats would be open to grazing, and wildlife habitat would therefore be unaffected.

Miles of fencing would be greatest under Alternative C. Alternative B would have minimal potential impacts due to only 0.4 miles of fencing installation projected. The greatest number of sandy washes (xeric riparian) crossed by existing and planned fences would occur under Alternative C. Impacts on wildlife could include loss of original habitat, reduction in habitat patch size, and increasing isolation of habitat patches. Installation of wildlife-friendly fencing and implementing SOPs and BMPs would reduce these impacts on wildlife (**Appendix G**).

Cumulative Impacts

The cumulative impacts analysis area is the same as the analysis area used to determine the context of direct and indirect effects (i.e., the Upper San Pedro River watershed). Past and reasonably foreseeable surface disturbances to priority habitats were estimated based on Southwest ReGap data (developed category) and include development, the communications tower, and recharge sites. In addition, existing disturbance from ROWs, routes, campground facilities, and livestock grazing infrastructure were considered.

Impacts from habitat loss due to development outside the SPRNCA would accumulate with impacts due to disturbance of habitats on the SPRNCA. Cumulative impacts would affect less than 5 percent of individual priority habitat types on the Upper San Pedro watershed, which equates to 3 percent of total habitats combined (**Table 3-24**). This would likely have a small impact on wildlife associated with habitat loss and degradation.

Urbanization and development directly influences wildlife populations and communities by altering ecosystem processes, habitat, or food supply (Block 1997). Development in the region surrounding the SPRNCA will place new demands on undeveloped land to meet human-related needs, such as urbanization, agriculture, and recreation. As a result, more wildlife will be lost or displaced as lands are converted to uses that do not support historic species or numbers of wildlife, and it is likely that many displaced animals will perish. It is also possible that loss of habitat could lead to the extirpation of species, although the provisions of the ESA should minimize this risk. Most habitat loss would occur on privately owned lands (BLM 2007).

Table 3-24
Cumulative Impacts on Wildlife Habitat

Priority Habitat	Acres of Priority Habitat in Watershed	Past and Present Actions (acres)[1]	Reasonably Foreseeable Actions (acres)	Cumulative Impact (acres)	Cumulative % of Priority Habitat in the Watershed
Chihuahuan desert scrub	571,130	N/A	19,390	19,390	3
Semidesert grassland	315,590	480	6,200	6,680	2
Fremont cottonwood-Goodding's willow	6,180	N/A	270	270	4
Big sacaton grassland	N/A	N/A	N/A	N/A	N/A
Mesquite forest (bosque)	N/A	N/A	N/A	N/A	N/A
Riparian (Alt. A)	N/A	2,360	N/A	2,360	N/A
Interior marshland (ciénega)	N/A	N/A	N/A	N/A	N/A
Wetlands	N/A	20	N/A	20	N/A
Aquatic (open water)	N/A	N/A	N/A	N/A	N/A
Sandy wash (xeric riparian)	370	N/A	<10	<10	3
Total[2]	**893,270**	**2,860**	**25,870**	**28,730**	**3**

Source: BLM GIS 2017

[1]Existing disturbance from ROWs, routes, campground facilities, and livestock grazing facilities, on critical habitat
[2]Cumulative acres of all critical habitats in the watershed

Development affects big game species, such as Coues white-tailed deer, by directly affecting their home range, habitat, and resources. Some habitat has been converted to intensive farming or urban/residential use and provides little or no habitat for grassland birds. See Appendix F of the Madrean Archipelago Rapid Ecological Assessment (BLM 2014) for detailed information on the impacts of development and other land uses on wildlife species and assemblages.

Short-term effects (e.g., vegetation removal) from vegetation treatments on the SPRNCA would accumulate with impacts from vegetation treatments outside the SPRNCA (BLM 2007); however, overall long-term improvements in the ecosystem health and wildlife habitat with success and maintenance of treatments would offset short-term losses. Over the long term, treatments should restore native vegetation and natural fire regimes, and benefit ecosystem health and wildlife and their habitats.

Stream flow has a strong influence on the population dynamics of native fishes in the San Pedro River, and cumulative impacts that affect discharge on a regional level (Colorado River System) and the local watershed level should be considered. Eight years of sampling at four sites in the upper San Pedro River indicated that discharge during the year prior to sampling influenced the abundance of fish at the sites; in general, abundance of all fish species at all sites decreased after years with lower flows and increased after years with higher flows (Stefferud and Stefferud 1998). The persistence of fish species is dependent on perennial surface flows that remain continuous in a few reaches during a substantial portion of the year, and a hydrograph that continues to reflect rainfall runoff and groundwater discharge (Stefferud and Stefferud 1998). See **Section 3.2.3** for a description of the cumulative impacts on water resources on the SPRNCA.

3.2.6 Special Status Species

Affected Environment

The BLM is responsible for assisting the USFWS with actions that support the recovery of threatened and endangered species (Section 7[a]1 of the ESA). Federal regulations direct federal agencies to carry out conservation programs for listed species under the federal ESA (50 CFR 402.01). Conservation is "...to use all methods and procedures that are necessary to bring any endangered species or threatened species to the point at which the measures pursuant to this Act are no longer necessary."

The following federally listed threatened, endangered, and proposed species occur or have the potential to occur on the SPRNCA: Huachuca water umbel and critical habitat, Chiricahua leopard frog, desert pupfish, Gila topminnow, northern Mexican garter snake and proposed critical habitat, southwestern willow flycatcher, yellow-billed cuckoo and proposed critical habitat, jaguar, and ocelot (**Figure 3-5**). See **Appendix R** for a full list of federally listed threatened, endangered, and proposed species, designated and proposed critical habitat, priority habitat associations, and occurrence information.

Primary constituent elements (PCEs) are specific elements of physical or biological features that provide for a species' life history processes and are essential to the conservation of the species**.** Critical habitat is a specific geographic area(s) that is essential for the conservation of a threatened or endangered species; only areas that contain a species' PCEs are considered critical habitat. Critical habitat may include an area that is not currently occupied by the species but that may be required for its recovery. **Appendix S** lists the PCEs for critical habitats of federally listed species that occur on the SPRNCA. Threatened, endangered, and proposed species that do not have critical habitat on the SPRNCA are still associated with priority habitats as shown in **Appendix R**; these species are dependent on the ongoing existence and quality of these habitats.

BLM Sensitive Species

In addition to federally listed species, BLM sensitive species that may occur on the SPRNCA include two plants, two fish, one amphibian, two reptiles, eight birds, six bats, and one mammal (BLM 2017). See **Appendix R** for more information on the occurrences and associated priority habitats for these BLM sensitive species.

State Directors shall designate species within their respective states as BLM sensitive for native species found on BLM-administered lands for which the BLM has the capability to significantly affect the conservation status of the species through management. It is in the BLM's interest to undertake conservation actions for such species before listing is warranted. It is also in the public's interest for the BLM to undertake conservation actions that improve the status of such species so that their Bureau sensitive recognition is no longer warranted. Although Section 7 consultation is not required for special status species, when the BLM engages in the planning process, it shall address BLM sensitive species and their habitats in land use plans and the associated NEPA document.

Analysis Methods

Potential effects of decisions and management actions on species, populations, and habitats were identified by reviewing the best available science and utilizing qualitative and quantitative data related to impact indicators. A metric (e.g., acres or miles) was selected whenever possible to best reflect the scale and magnitude of these effects. A GIS dataset and overlays of resources and resource uses were used to quantify effects when available.

The analysis area for special status species is the HUC 8 watershed encompassing the SPRNCA: 15050202—Upper San Pedro.

Indicators of impacts on special status species include the following:

- Acres of critical habitat or priority habitat
- Acres of area proposed for reintroductions
- Changes in habitat toward or away from PCEs based on actions that might disturb or improve habitat conditions

Assumptions for the analysis of impacts on special status species are as follows:

- A quarter-acre area of bare ground, removal of vegetation, centered around livestock waters would occur.
- A half-mile buffer around routes inside of motorized RMZs would be affected.
- Special status species are associated with critical habitats or priority habitats; impacts on these habitats translate to impacts on special status species.

Impacts Common to All Alternatives

Firebreaks

Constructing and maintaining firebreaks could directly degrade and remove special status species habitat and habitat characteristics (for species with critical habitats and those associated with priority habitats) through vegetation removal, and existing fuel breaks do not provide habitat for special status species. Under all alternatives, existing fuel breaks would be maintained, and the acres of proposed and final critical habitat affected by firebreaks would remain the same under each alternative. See **Section 3.2.5** for the acres of priority habitats that would be affected by firebreaks.

Maintaining firebreaks within riparian woodlands could break up patches of nesting habitat for the yellow-billed cuckoo, causing habitat conditions to move away from critical habitat PCEs (**Appendix S**). As this species requires above-average canopy closure and large, contiguous patches of mixed willow-cottonwood vegetation and/or mesquite-thorn forest vegetation (USFWS 2014b), vegetation removal and weed spread would also move habitat conditions away from PCEs. Firebreaks could also decrease habitat connectivity for sensitive status species such as the jaguar and ocelot, which require large patches of unfragmented habitat over which to travel. These impacts would last as long as the firebreaks are in place.

Over time, firebreaks would reduce habitat loss to wildfire, resulting in an overall increase in vegetation and acres of critical and/or priority habitats available to special status species. Where these impacts occur within riparian habitats, conditions would trend toward PCEs for the yellow-billed cuckoo, Huachuca water umbel, and Northern Mexican garter snake. This benefit would likely outweigh the loss of habitat due to construction of firebreaks.

Alternatives Comparison Analysis

Surface Disturbance from Development/Facilities

Surface disturbances due to livestock grazing infrastructure, construction of new recreation sites and campgrounds, and planned trails would directly affect vegetation by creating discrete footprints clear of vegetation and would therefore have impacts on critical habitats for special status species (**Table 3-25**).

Table 3-25
Acres of Potential Disturbance to Proposed and Designated Critical Habitats by Reasonably Foreseeable New Development/Facilities

Critical Habitat	Alternative A	Alternative B	Alternative C	Alternative D
Yellow-billed cuckoo	12	14	6	1
Huachuca water umbel	0	0	0	0
Northern Mexican garter snake	7	8	0	0
Total	**19**	**22**	**6**	**1**

Source: BLM GIS 2017

Surface disturbances from development of recreation facilities would also affect priority habitats and vegetation communities with which special status species are associated, as described in **Sections 3.2.5** and **3.2.4**.

Livestock infrastructure, recreation facilities, campgrounds, and trails that are constructed within riparian habitats would result in a loss of riparian vegetation, causing habitat conditions to trend away from PCEs for the yellow-billed cuckoo, Huachuca water umbel, and Northern Mexican garter snake critical habitats, which are all dependent on the presence of riparian plant communities to some extent (**Table S-1** [**Appendix S**]). Increased human presence due to the use of these facilities would also affect special status species and critical habitats by creating localized disturbance and degrading surrounding habitat.

Altering Vegetation to Change the Vegetation Community

Management for vegetation would involve the use of vegetation treatments, erosion control projects, and other management tools to alter vegetation with the goal of changing the vegetation community. Treatments would have direct impacts on vegetation, mainly loss of vegetation, which would move habitat conditions away from PCEs (**Table 3-26**). For a detailed description of the effects of vegetation treatments on vegetation communities, soils, and water, see **Sections 3.2.4**, **3.2.2**, and **3.2.3**.

Table 3-26
Acres Proposed and Designated Critical Habitats Affected by Reasonably Foreseeable Vegetation Treatments

Critical Habitat	Alternative A	Alternative B	Alternative C	Alternative D
Yellow-billed cuckoo	1,500	1,500	1,500	330
Huachuca water umbel	10	10	10	0
Northern Mexican garter snake	990	990	990	100
Total	**2,500**	**2,500**	**2,500**	**430**

Source: BLM GIS 2017

Treatments, such as mechanical or chemical vegetation removal and prescribed fire, would remove or damage vegetation, and therefore decrease the acres of critical habitats when treatments occur within

these areas. PCEs for yellow-billed cuckoo, Huachuca water umbel, and Northern Mexican garter snake critical habitats depend on the existence of riparian vegetation communities (**Appendix S**); therefore, vegetation removal for erosion control and recharge enhancement projects would also reduce critical habitat acres and would move habitat conditions away from PCEs for these species. Impacts from these treatments would last from the time the treatments are carried out until the vegetation communities recover. Vegetation treatments would likely occur intermittently over the life of the plan based on necessity.

The vegetation treatments described above would eventually restore vegetation communities and indirectly benefit special status species by increasing the acres of critical habitats and moving conditions toward PCEs. Vegetation initially removed by the treatments would return as healthy, diverse, and resilient communities dominated by native species. Because the suitability of habitat for the yellow-billed cuckoo decreases as the proportion of salt cedar (tamarisk spp.) increases (USFWS 2014b), a reduction in invasive species would move habitat conditions toward PCEs. Likewise, the Huachuca water umbel depends on a riparian plant community with no or low density of nonnative species (USFWS 1999), and thus treatments to restore native vegetation increase the existence of PCEs for this species.

Over time, vegetation treatments would restore wetland function and improve water quality (from reduced erosion); this would cause habitat conditions to trend toward PCEs for the Northern Mexican garter snake, which requires water quality that supports a native amphibian prey base as well as sufficient riparian structural characteristics (**Appendix R**).

Vegetation treatments would also affect priority habitats with which special status species are associated, as described in **Section 3.2.5**.

Altering the Riparian Community from Riparian Vegetation Treatments

Enhancement of riverine geomorphology would be achieved under Alternatives B and C through installation of soft structures, such as vegetation or posts, in streams to increase meandering and sinuosity. **Sections 3.2.4**, **3.2.2**, and **3.2.3** provide a detailed discussion of how vegetation, soils, and waters, which provide habitat for special status species, would be affected by riparian vegetation treatments. Impacts on riparian and aquatic habitats and associated species would occur as described in **Section 3.2.5**.

Riparian habitat loss and degradation threaten riparian-dependent special status species such as the yellow-billed cuckoo, Huachuca water umbel, and Northern Mexican garter snake (USFWS 1999, 2014a, 2014b). The conversion of existing native habitats to monotypic stands of nonnative vegetation reduces the suitability of riparian habitat for the yellow-billed cuckoo (USFWS 2014b). Alleviation of these threats through increased riparian habitat functionality and changes in riparian vegetation communities over time would move habitat conditions toward PCEs shown in **Table S-1** (**Appendix S**), which include dynamic river processes (yellow-billed cuckoo), perennial base flows (yellow-billed cuckoo, Huachuca water umbel, and Northern Mexican garter snake critical habitats), and riparian plant communities (yellow-billed cuckoo, Huachuca water umbel, and Northern Mexican garter snake critical habitats).

A healthy riparian zone with substantial herbaceous cover is an effective buffer for filtering sediment and pollutants before they can reach the stream (USFS 2015); improvements in water quality due to riparian

treatments would improve habitat quality for special status fish species such as the desert pupfish and Gila topminnow.

Grazing

Livestock grazing would directly affect PCEs of critical habitats and the quality of priority habitats by causing changes in vegetation structure, such as reduced herbaceous vegetation and increased spread of weeds. Livestock may also degrade riparian areas and affect streambank stability, which would move habitat conditions away from PCEs for the yellow-billed cuckoo, Huachuca water umbel, and Northern Mexican garter snake. Changes in streamside vegetation could affect water temperature, and animal waste could elevate nutrient levels, thereby reducing water quality. Trampling of amphibians and other aquatic species by cattle can result in a loss of eggs or direct mortality and reduced prey base for some special status species such as the Northern Mexican garter snake. The extent of these impacts correlates to the acres open to grazing under each alternative (**Table 3-27** and **Figures 3-6** and **3-7**).

Table 3-27
Acres Proposed and Designated Critical Habitats Affected by Grazing

Critical Habitat	Alternative A	Alternative B	Alternative C	Alternative D
Huachuca water umbel	0	480	0	0
Northern Mexican garter snake	380	6,600	780	0
Yellow-billed cuckoo	80	10,200	890	0
Total	**460**	**17,280**	**1,670**	**0**

Source: BLM GIS 2017, FWS GIS 2017

Special status species that are associated with riparian habitats have the greatest potential to be affected by livestock grazing because livestock tend to congregate near water sources. Southwestern willow flycatchers, for example, nest in dense riparian vegetation that is generally taller than 9.8–13.1 feet, depending on elevation and vegetation types, with a high percentage of canopy cover, and often along rivers, streams, swamps, seeps, irrigation ditches, or other wetlands (USFWS 1995). Livestock grazing in potential flycatcher habitat can affect flycatcher recovery by preventing the growth and development of woody riparian plant species and/or slowing progression toward suitable habitat. Improper livestock grazing in suitable habitat may not allow for retention of vegetative characteristics needed for flycatcher nesting (USFS 2015).

Aquatic habits for federally listed fish species such as the desert pupfish and Gila topminnow would be adversely affected by livestock grazing in riparian areas. Impacts would include degradation of the stream channel and/or modification of the floodplain and riparian vegetation communities (USFS 2015). Although desert pupfish and Gila topminnow are tolerant of a wide range of environmental conditions, they may still be adversely affected by these activities. These impacts occur at all levels of cattle presence in riparian zones, regardless of season, but increase as the number of livestock and length of time the cattle are present increase; therefore, the magnitude of the effects would depend on local site conditions and the extent that livestock use riparian areas (USFS 2015). In addition, facilitation of dispersal of nonnative predators through the construction of stock tanks, trampling, deterioration of streambanks causing erosion and sedimentation, elimination of undercut banks, loss of wetland and riparian vegetation and backwater pools, and spread of disease could decrease habitat quality for fish and amphibian species such as the Chiricahua leopard frog (USFWS 2002; Belsky et al. 1999; Ohmart 1995; Hendrickson and Minckley 1985; Arizona State University 1979; Jancovich et al. 1997 in USFS 2015).

Improper livestock grazing in areas with bat food plants may adversely affect special status bat species, such as the lesser long-nosed bat, by decreasing food resources and therefore availability of suitable habitat. Concentrated livestock can result in trampling or herbivory of young agaves and cacti, soil compaction, erosion, alteration of plant community species composition and abundance, and changes in the natural fire regime (USFS 2015), all of which would decrease habitat suitability for nectar-feeding bats; however, the 5-year review of the status of the lesser long-nosed bat indicated that livestock grazing is probably not as significant of an effect on lesser long-nosed bat forage availability as previously thought and that livestock grazing carried out under a grazing system that maintains good to excellent range conditions and properly functioning riparian systems would likely not result in take of this species (USFWS 2007).

Livestock grazing can affect the Huachuca water umbel and critical habitat through trampling, grazing, degradation of bank stability, alterations to stream hydrology, and dewatering of spring developments. Plants can probably withstand light use levels during the dormant season (USFWS 1997). Cattle generally do not eat water umbel because the leaves are too close to the ground, but they can trample plants. 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). Light trampling also may keep other plant densities low, providing favorable microsites for the Huachuca water umbel. In overgrazed areas, stream head-cutting can threaten interior marshlands (ciénegas) where the umbel occurs (USFWS 2015).

Noise and Human Disturbance from RMZs

Each alternative would allow for some measure of recreation according to RMZs, which would primarily affect special status species through noise-induced disturbance. Impacts would be the same as those described for non-special status wildlife species (see **Section 3.2.5**); however, special status species may experience increased sensitivity to disturbances as populations are already compromised.

The tolerance of wildlife to noise levels would be species specific. For some species, such as the yellow-billed cuckoo, noise is the strongest predictor of occupancy within otherwise suitable habitat. Yellow-billed cuckoos, for example, were 35–55 percent less abundant in noisy (i.e., areas with sustained low-frequency noise such as from heavy machinery) relative to quieter areas (Goodwin 2009 in BOR 2011). Although some species can adapt their vocalizations to compensate for noise to some extent (Barber 2009), yellow-billed cuckoos have a low and narrow vocalization frequency and likely cannot increase the amplitude or alter the frequency of their calls in response to noise (Goodwin 2009 in BOR 2011).

Species Reintroductions and Augmentations

Reintroductions and augmentations of special status species would have positive impacts for these species by providing them the opportunity to establish self-sustaining populations. The special status species identified for reintroduction, transplantation, or augmentation under each alternative are shown in **Table 3-28**.

Reintroductions, transplantations, or augmentations would occur in the critical and/or priority habitats with which the identified species are associated. Ultimately, the area affected by reintroductions and augmentations of terrestrial species would include the entire SPRNCA, as individuals would be able to disperse and use different areas according to their life history needs, whereas the area affected by

Table 3-28
Special Status Species Identified for Reintroduction, Transplantation, or Augmentation

Alternative A	Alternatives B and C	Alternative D
Birds: Aplomado falcon Fish: Woundfin	Fish: Gila topminnow, desert pupfish, spikedace, loach minnow, roundtail chub, Gila chub, razorback sucker, or any of the other species found in the system as historically based on changes in habitat suitability over time Reptiles and amphibians: Chiricahua leopard frog, northern Mexican garter snake Birds: Aplomado falcon Plants: Huachuca water umbel, Canelo Hills ladies' tresses, Wright's marsh thistle, Arizona giant sedge, and Arizona eryngo	Fish: Gila topminnow, loach minnow, spikedace Reptiles and amphibians: Chiricahua leopard frog, northern Mexican garter snake, Plants: Huachuca water umbel

Source: BLM GIS 2017

reintroductions and augmentations of aquatic species would be limited to the aquatic system into which they are added. Reintroduction and augmentation of special status aquatic species would occur in off-channel habitats where these native species can be isolated from the nonnative aquatic species. This would increase the likelihood for introduced native species to establish self-sustaining populations by precluding predation from exotic predators such as bullfrogs and black bullheads.

Table 3-29 lists the acres of existing aquatic sites that have been reintroduced with special status species and acres of aquatic sites with potential for habitat enhancement and reintroductions, which would remain the same under all alternatives.

Table 3-29
Areas Having Received or Areas Identified for Reintroduction, Transplantation, or Augmentation

Aquatic Sites that have Received One or More Special Status Species	Approximate Size (Acres)	Aquatic Sites Identified for Reintroduction, Transplantation, or Augmentation	Approximate Size (Acres)
Murray Spring	0.25	San Pedro River	7,580
Horse Thief Spring	0.25	Babocomari River	720
Ben's Spring	0.25	St. David Ciénega (Two Ciénegas Spring)	0.25
Frog Spring	0.25	Flowing Well (near Curtis Well)	0.25
Little Joe Wetland (Spring)	0.25	Curtis Well	0.25
		White House Wetland (Artesian Well)	0.25
		Government Draw (Lewis Spr. No.1)	0.25
		Kingfisher Pond	0.25
		Phoebe Pond	0.25
		Dunlavy Artesian Wetland (Well No. 2)	0.25
		Dunlavy Artesian Wetland (Well No. 3)	0.25
		Dunlavy Artesian Wetland (Well No. 1)	0.25
		Kolbe Artesian Wetland (=McDowell-Craig Farm Well South)	0.25
Total	**1.25**	**Total**	**8,300**

Source: BLM GIS 2017

Nonnative, invasive species such as the green sunfish, bullfrog, and western mosquitofish have been introduced since the early twentieth century, and are extremely detrimental to special status fishes, amphibians, and reptiles. They can individually and in combination eliminate populations that would otherwise be viable or even robust (BLM 2017). A focus on control for nonnative, invasive aquatic species would occur under Alternatives B–D, which would increase the area of suitable habitat for reintroduced or augmented aquatic special status species and the potential to maintain self-sustaining populations.

Conclusions

Acres of critical habitats affected by vegetation treatments would be greatest under Alternatives A–C. Under Alternatives A–C, about 2 percent of critical habitat for the Huachuca water umbel and 15 percent of critical habitat for both the Northern Mexican garter snake and yellow-billed cuckoo would be affected by vegetation treatments. Despite short-term losses in vegetation and disturbance to species, vegetation treatments are expected to move habitat conditions toward PCEs by reducing the occurrence of nonnative vegetation.

Acres of critical habitats affected by livestock grazing would be greatest under Alternative B. One hundred percent of critical habitats for the yellow-billed cuckoo, Huachuca water umbel, and Northern Mexican garter snake would be affected, causing conditions to trend away from PCEs due to changes in vegetation structure and loss of nesting habitat, forage, and cover. Under Alternative C, grazing would affect less than 1 percent of critical habitat for the Huachuca water umbel and about 10 percent of critical habitats for both the Northern Mexican garter snake and yellow-billed cuckoo. Under Alternative D, no acres of critical habitats would be open to grazing, and habitat conditions would therefore be unaffected; areas that were previously open to grazing would trend back toward PCEs as vegetation communities recover.

Alternatives B and C identify the greatest number of species for reintroduction, transplantation, or augmentation. These alternatives provide potential for the greatest number of species to establish self-sustaining populations.

Cumulative Impacts

The analysis area for cumulative impacts is the HUC 8 watershed encompassing the SPRNCA: 15050202—Upper San Pedro. Aquatic habits for federally listed aquatic species, such as the desert pupfish and Gila topminnow, would be adversely affected by activities that alter the flow regime (i.e., water quality, quantity, intensity, and duration), degrade the stream channel, or modify the floodplain and riparian vegetation structure and diversity. Groundwater demands are expected to reduce surface water flow in several water systems, including the Babocomari River and San Pedro River, over the next several decades, which historically or currently support northern Mexican garter snake populations (USFWS 2014a). If surface flow is lost entirely from additional stress caused by drought induced by projected climate change in the Southwest, local or regional extirpations of this species would likely occur (USFWS 2014a). Refer to **Section 3.2.3** for a detailed description of the impacts of cumulative actions on water resources.

Vegetation treatments that occur outside the SPRNCA may improve habitat for special status species. This would have positive impacts on species that occur on the SPRNCA, as mobile individuals may use habitats both on the SPRNCA and in nearby areas. As described in **Section 3.2.5**, vegetation

treatments will have short-term negative impacts on priority habitats and associated species but long-term positive impacts through improved ecological function and habitats. For special status wildlife species that have specific requirements for habitat structure (e.g., the southwestern willow flycatcher occurs in riparian areas with dense growths of deciduous shrubs and trees [USFWS 1995]), vegetation treatments that control weed infestations would likely provide a long-term benefit by moving habitat toward PCEs (BLM 2007).

As described in **Section 3.2.5**, impacts from habitat loss due to development outside the SPRNCA would accumulate with impacts due to disturbance of habitats on the SPRNCA. For example, habitat modification and livestock management are expected to affect Chiricahua leopard frog populations by causing habitat degradation (increased soil erosion on slopes/siltation, silt removal in stock tanks, reduced water, etc.), conversion of natural habitats to stock tanks, contamination of water in habitats, and increased habitat fragmentation (Crist 2014). Although no acres of Chiricahua leopard frog critical habitat would be affected, riparian and wetland priority habitats used by this and other species would be affected, as summarized in **Section 3.2.5**.

Critical habitats for threatened and endangered species would not be affected by development outside the SPRNCA. Past and present actions, including disturbance from ROWs, routes, campground facilities, and livestock grazing facilities, would affect about 20 percent of total critical habitat for the Huachuca water-umbel, causing habitat to move away from PCEs and watershed degradation (**Table 3-30**).

Table 3-30
Cumulative Impacts on Proposed and Final Critical Habitats on the Upper San Pedro Watershed

Federally Listed Species	Acres of Habitat in the Watershed	Past and Present Actions (acres)[1]	Reasonably Foreseeable Actions (acres)	Cumulative Impact (acres)	Cumulative Percentage of Habitat in the Watershed
Chiricahua leopard frog	1	N/A	0	0	0
Huachuca water-umbel	570	100	0	100	18
Northern Mexican garter snake	15,160	1,450	0	1,450	10
Yellow-billed cuckoo	16,500	2,310	0	2,310	14
Total	**32,230**	**3,860**	**0**	**3,860**	**12[2]**

Source: BLM GIS 2017

[1]Existing disturbance from ROWs, routes, campground facilities, and livestock grazing facilities
[2]Cumulative acres of all critical habitats in the watershed

3.2.7 Wildland Fire and Fuels Management

Affected Environment

Wildland fire is a general term describing any nonstructural fire that occurs in the vegetation or natural fuels. Wildland fires are categorized by two types: wildfires, which are unplanned or planned ignitions that have been declared wildfires, and prescribed fires, which are planned ignitions.

Current Conditions

The SPRNCA planning area has a history of fire from naturally occurring fires as well as human-caused incidents. The historical fire occurrence and role of naturally occurring fire depends on vegetation type and ecosystem components.

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. This reduction in grasses may result in decreased potential for fire ignition and spread, due to a lack of fine fuels. Within areas that still contain enough herbaceous cover to carry fire, with the added shrub and tree overstory, fire behavior characteristics, such as flame lengths, rates of spread, and severity, may be increased. Changing climate conditions may also affect fire occurrence, size, and intensity. Current conditions and trends for vegetation communities in the planning area are further described in **Section 3.2.4**.

Fire History

Between 1997 and 2017, the SPRNCA had 117 wildfires that burned 5,509 acres. Approximately 74.5 percent of acres burned were because of human-caused fires, and 25.5 percent were caused by lightning. **Table 3-31** displays information on reported fires between 1997 and 2017.

Fire and Fuels Management

WUI refers to the zone of transition between unoccupied land and human development. These lands and communities next to and surrounded by wildlands are often at increased risk for wildfire. Hazardous fuels treatments are designed to reduce fuels loading and/or fuel arrangement and meet resource objectives in WUI areas and non-WUI areas.

Table 3-31
Wildfire Acres by Cause 1997–2017

Fire Cause	Acres	Percentage of Total
Natural-lightning	1,403	25.5
Human-campfire	116	2.1
Human-smoking	9	0.2
Human-arson	59	1.1
Human-equipment	1	<0.0
Human-miscellaneous	3,921	71.2
Total	**5,509**	**100.0**

Source: BLM GIS 2017

The potential urban expansion of WUI areas adjacent to the SPRNCA may increase the need for fuels treatment projects. **Figure 3-8** (**Appendix A**) shows the proximity of WUI areas to the SPRNCA. The WUI areas in these figures, totaling 483,209 acres, are a compilation of WUI areas identified in the Upper San Pedro CWPP, Palominas CWPP, Bisbee CWPP, and the Cochise County CWPP.

The Cochise County CWPP provided an analysis of cumulative risk of occurrence of unwanted wildland fire in the San Pedro watershed (see **Figure 3-9**). This analysis is based on current vegetation conditions (fuel hazards), wildfire ignitions, wildfire occurrence, and identified values at risk (e.g., WUI, infrastructure, and resource values). On BLM-administered lands on the SPRNCA, there are 26,600

acres rated as low risk, 24,970 acres rated at moderate risk, and 1,370 acres rated at high risk of impact due to wildfire events. The acres of risk by vegetation type are shown in **Table 3-32**.

Table 3-32
Wildfire Fire Risk by Vegetation Community

Vegetation Community	Low Risk	Moderate Risk	High Risk
Chihuahuan desert scrub	19,870	12,680	520
Semidesert grassland	4,000	3,120	130
Upland Vegetation (Total)	*23,870*	*15,800*	*650*
Fremont cottonwood-Goodding's willow	0	910	70
Mesquite forest (bosque)	2,780	4,380	350
Big sacaton grassland	1,140	2,010	100
Riparian Vegetation (Total)	*3,920*	*7,300*	*520*
Wetlands (Total)	*9*	*30*	*10*
Xeric Riparian (Total)	*1,000*	*1,050*	*50*
Agriculture	120	590	110
Developed	30	70	10
Other (Total)	*150*	*660*	*120*
Total	**28,950**	**24,840**	**1,350**

Source: BLM GIS 2017

As discussed above, much of the SPRNCA has shifted from grass-dominated to shrub- and tree-dominated ecosystems, affecting fire behavior and risk levels, particularly in upland habitat.

In the planning area, to minimize wildland fire risk, mechanical, prescribed fire, and fuels treatments are undertaken. These measures are done with the assistance of federal, state, county, city, private, and local partners, as outlined in local CWPPs. The Gila District Fire Management Program (BLM 2010) mechanically treated 4,515 acres on the SPRNCA from 1998 through 2017, an average of 226 acres per year, and completed 3,815 acres of prescribed fire treatments (an average of 190 acres per year) in the same time frame. Mechanical treatments include mowing, chainsaw thinning, weed whacking, and mastication treatments. These mechanical treatments were implemented as firebreaks.

Prescribed fire has also been used as a fuels treatment in the SPRNCA planning area. The Gila District Fire Management Program completed fifteen burn plans on the SPRNCA, consisting of 56 treatment units covering 7,754 acres, between 1998 and 2007. Twenty-nine of those treatment units were treated with prescribed fire (broadcast and pile) for 3,815 acres, from 1998 through 2009. Prescribed fire treatments have not been used since 2010 on the SPRNCA.

Analysis Methods

The analysis area for wildland fire management is the San Pedro watershed. Proposed BLM actions would be limited to the SPRNCA planning area.

Indicators of impacts on wildland fire and fuels management include the following:

- Size (acres burned) from wildland fire (size of potential fires may be affected by vegetation management, and acres where vegetation is removed due to ground disturbing activities)

- Potential for wildland fire to affect identified values at risk (i.e., WUI, threatened and endangered habitat, cultural resources, and infrastructure; measured by acres of firebreaks and suppression priorities)

The analysis is based on the following assumptions:

- Prescribed fire frequency and size would be similar to what has been implemented in the past.
- Maintenance of firebreaks would be similar to what has been implemented in the past.
- Recreational access presents a negligible risk to fire starts.

Impacts Common to All Alternatives

Vegetation treatments on the SPRNCA would primarily be designed to return the ecological sites in which they were carried out to HCPC. For prominent vegetation types in the planning area, such as semidesert grassland, this would be achieved by removal of encroaching shrubs. Inadequate fine fuel is the most common constraint on fire spread in dessert grasslands (Humphrey 1963; McPherson 1995). Removal of shrub communities in favor of grasslands could therefore result in long-term increases in fine fuels, which may increase the potential for fire spread and increased fire size.

As discussed in the CWPP (Cochise County 2014), the impacts of vegetation treatments would vary with precipitation. Moist periods may increase fire frequency, intensity, and size in desert and grassland habitats because of increased production of annual grasses and forbs and increased annual growth of perennial grasses and shrubs (Fire Regime Condition Class Interagency Working Group 2005). The potential for larger fires may therefore increase in the planning area following years with above-average precipitation, independent of vegetation management decisions.

Livestock grazing may reduce the level of fine fuel loads, thereby 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.

Creating and maintaining firebreaks to modify fuel characteristics (i.e., rates of spread and fire line intensity levels) would result in smaller, less intense fires and greater protection for values at risk and public safety. This may provide a level of protection for identified values at risk and improve safety aspects during wildland fire events. In addition to firebreaks, developed areas, such as trailheads and roads, would represent additional areas of permanently removed fuels, which could further reduce the potential for the spread of fire.

Under all alternatives, fire suppression priorities and fuels treatments would focus on protecting values at risk. The WUI would have the highest priority level for suppression efforts due to potential to human safety and property. Other values at risk, such as riparian areas, cottonwood willow habitat, and threatened and endangered species habitat, would have secondary priority.

Alternatives Comparison Analysis

Acres of treatments proposed by vegetation type are shown in **Table 3-15** in **Section 3.2.4**. Under Alternative A, vegetation management would be conducted on a site-specific basis and is not specified at the RMP level. In Alternatives B and C, the emphasis on treatments would occur in Chihuahua desert

scrub and semidesert grassland habitat (88 percent of total treatments in Alternatives B and C), potentially increasing fine fuels on the SPRNCA and increasing potential for fire spread and increased fire size. Treatments are proposed in areas currently at low or moderate level of fire risk (based on Cochise County CWPP data). The proposed level of treatment would be reduced under Alternative D, resulting in decreased changes to fine fuel levels. Acres proposed for vegetation treatment by CWPP wildfire risk category are summarized in **Table 3-33**.

Table 3-33
Vegetation Treatment RFD Scenario by Wildfire Risk

Fire Risk	Alternative A Acres	Alternative B Acres	Alternative C Acres	Alternative D Acres
Low	0	14,120	14,120	10,360
Moderate	0	11,650	11,650	6,270
High	0	520	520	170

Source: Cochise County 2016 and BLM GIS 2017

Most proposed vegetation treatments in the planning area would be likely to occur in areas identified as low or moderate risk for wildfires, as defined in the Cochise County CWPP.

Firebreaks would be maintained in approximately 580 acres on BLM-administered lands in the planning area across all alternatives, reducing the potential for fire spread and providing protection for values at risk. Although the proposed acres for firebreaks are the same across all alternatives, the ability to maintain effective firebreaks may be reduced under Alternative D, where only hand treatments are permitted, as compared with Alternatives A–C, which allow biological, chemical, mechanical, and prescribed fire treatment methods.

Disturbed areas would act as additional firebreaks. Long-term disturbed, developed areas would represent site-specific reductions in fuels and reduced potential for fire spread. The total acres of disturbed areas and related impacts would be highest under Alternative B and lowest under Alternative D. Impacts would be limited across alternatives due to minimal acres of disturbance (less than 50 acres under all alternatives).

Conclusions

Vegetation treatment activities over the life of the plan are anticipated to occur on up to 27,460 acres (49 percent of the planning area). Treatment in these areas may result in an increase in fine fuels and thereby increase the potential for fire spread and increased fire size. The level of treatment would be highest under Alternatives B and C, and reduced under Alternative D, where limitations on treatment methods would be imposed. Changes to the permitted level of livestock grazing could also contribute to changes in fine fuel levels, contributing to a decrease in fuels in Alternatives B and C, and an increase in D, where the SPRNCA is unavailable to grazing. Overall, while vegetation treatments and grazing could affect fine fuels, total fine fuel levels and associated fire size in the San Pedro watershed would continue to vary based on climate and precipitation levels.

Fire suppression to protect values at risk, with an emphasis on the WUI, would be applied under all alternatives. Protection would be decreased under Alternative A, where the SPRNCA is not managed for full suppression. The ability to apply standard suppression methods would also be restricted in areas where wilderness characteristics are to be protected under Alternative D. Indirect, low-impact strategies and tactics would be applied, which would lead to a high probability of allowing a greater

number of acres to burn in these areas. Similarly, fuels treatments (fuel breaks) would provide some protection for values at risk across all alternatives. Impacts would be reduced under Alternative D where limitations on treatment methods would be imposed. Overall, values at risk in the San Pedro watershed would be protected by fuels treatment and suppression, with the greatest level of protection under Alternatives B and C, and a decreased level under Alternative D due to limitations on methods of treatment, and Alternative A, due to lack of full suppression.

Cumulative Impacts

Cumulative impacts could result from activities changing the level of fuels, or the amount and nature of values at risk in the San Pedro watershed.

Vegetation management activities conducted in and around the planning area, such as at Fort Huachuca and area ranches, could change fuel loads and affect fire size. The level of impacts would depend on the nature of the vegetation treatment, with those resulting in an increase in fine fuels having potential to result in increased fire size. Contributions to cumulative impacts from the SPRNCA from vegetation management would occur under Alternatives B–D, with the greatest level of contributions from Alternatives B and C, where the largest acres are proposed for vegetation restoration treatments. Fuel loads would continue to be affected by precipitation levels across the analysis area.

CWPP Wildfire Risk data, based on vegetation conditions and values at risk in the San Pedro watershed, identifies 495,970 acres with low risk, 515,210 with moderate risk, and 30,390 acres with high risk. Fuels reduction treatments (firebreaks) on the SPRNCA proposed across all alternatives would contribute to a reduced level of risk in WUI zones and other values at risk for the San Pedro watershed as whole. This would occur due to reducing fuel levels and the potential for fire spread from BLM-administered lands to lands of other ownership or from the WUI to BLM-administered lands. An estimated 610 acres of firebreaks would be maintained on the SPRNCA, including the 580 acres on BLM-administered lands. As discussed previously, contributions to the reduction in risk could be less under Alternative D, due to only permitting use of hand tools.

Management on the SPRNCA to suppress fires would contribute to the protection of values at risk on planning area lands under all alternatives, but at a slightly reduced level under Alternative A due to a lack of suppression as a priority for all lands, as shown in **Table 3-33**.

The level of use in the planning area and the level of potential development next to the planning area may affect identified values at risk for suppression. Potential increases in urban development adjacent to and recreational impacts on the SPRNCA planning area would expand the values at risk to be protected as well as increase the potential for human-caused ignitions. In the whole watershed, it is estimated that there are currently 36,280 developed acres. An additional 28,880 acres are predicted based on RFFAs. Most of the proposed development in the RFFA consists of planned residential or municipal development. Wildfire protection plans developed in local communities may decrease this risk in these communities.

Some developed areas (i.e., ROWs and roads) may act as de facto fuel breaks and thereby reduce the potential for fire spread and size of fires. The cumulative contribution to total disturbed areas from development on the SPRNCA would be minimal across all alternatives.

3.2.8 Cultural Resources

This section discusses cultural resources and potential impacts from proposed management actions on the SPRNCA. For the purpose of this RMP/EIS, cultural resources are subdivided into two sections: *Archaeological and Historic Resources*, and *Native American Concerns*. For each of these categories, the BLM's SOPs and BMPs (**Appendix G**) may apply based on different laws, regulations, and executive orders, and programmatic agreements (**Appendix B**); however, the BLM's myriad of consultation and compliance efforts are often identified and coordinated through NEPA and NHPA reviews.

Affected Environment

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 Manual 8110, Identifying and Evaluating Cultural Resources).

Cultural resources are fragile and irreplaceable; they are subject not only to natural forces of change, but also to the effect of increasing demands placed on them for public, educational, and recreational purposes, or for scientific and experimental uses, in addition to their unique traditional cultural or religious importance. The condition of cultural resources in the planning area varies considerably because of the diversity of the terrain, geomorphology, access, visibility, and past and current land-use patterns.

BLM objectives encourage responsible use of cultural resources, ensuring that they will be available for appropriate uses by present and future generations. This is accomplished by continuing to identify and evaluate cultural resources and administering them in accordance with existing laws, regulations, and guidelines. Agencies are not required to preserve all historic properties,[2] but the regulatory review and compliance process must be 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.

Following identification, significance is determined by evaluating the resource against the NRHP criteria. For this, a site, district, building, structure, or object must meet at least one of four criteria, in that they:

(A) Are associated with events that have made a significant contribution to the broad patterns of history

(B) Are associated with the lives of persons significant in the past

(C) Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic value; or represent a significant and distinguishable entity whose components may lack individual distinction

(D) Have yielded, or may be likely to yield, information important in prehistory or history

[2] 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.

In addition to meeting one or more of these significance criteria, historic properties must also have integrity of "location, design, setting, materials, workmanship, feeling, and association" to convey significance.

Archaeological and Historic Resources

The planning area has been occupied with varying levels of intensity for more than 12,000 years. The complexity and variety of cultural resources are influenced by the unique qualities of the San Pedro River as a desert riparian area, where successive episodes of cultural confluence and conflict have existed throughout time. The planning area is situated at the intersection of multiple distinct prehistoric "cultural zones" known as the Hohokam, Salado, Mogollon, Casas Grandes, Rio Sonora, and Trincheras traditions (**Figure 3-10**); and where cultural conflict and convergence occurred among the Spanish and local indigenous groups, including the Sobaípuri (O'odham) and Apache; in addition to exhibiting historic-to-modern geopolitical characteristics of the US-Mexico Borderlands.

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 period are referred to as "Ethnohistoric" (alternatively, "Protohistoric"). Sites that demonstrate use by more than one cultural group or multiple, distinct periods of use/occupation are referred to as "multicomponent."

Through the scientific study of archaeological and historic resources, the story of human adaptation and technological change can be told. Archaeologists simplify descriptions of temporal and cultural associations by naming time periods that roughly correspond to distinctive cultural attributes and traditions, as evidenced by stylistic characteristics of artifact assemblages and features, or as understood through documented historical events (see **Table 3-34**).

Across the region, four general time periods are used to describe specific eras of human history as defined by unique cultural adaptations or events; these broad periods, along with their local significance and research potential, are summarized as follows:

- Paleoindian (prior to 8000 BC). Archaeologists refer to the earliest hunters and gatherers as Paleoindians. Paleoindian sites are scarce and often poorly preserved. Scientific excavation of Paleoindian sites exhibiting Clovis tool technology has occurred at the Murray Springs Clovis Site and the Lehner Mammoth-Kill Site. These sites have significant scientific value for environmental information and their potential for studying subsistence strategies in the planning area. Another research consideration is that sites may not be excavated to a depth that would produce cultural materials from this time period. Excavating sites past levels interpreted as "culturally sterile" could produce new information.
- Archaic (8000 BC to AD 1). The beginning of this period coincides with the last extinctions of megafauna at a time when vegetation communities were radically adapting to climate change. It is seen as a transition from a mobile hunting subsistence style to a semi-sedentary hunting and gathering lifeway. Archaic sites in the planning area exhibit a western or desert tradition referred to as the Cochise Culture. The late Archaic, or Early Agricultural period, has remained a research focus to better understand the timing and local adaptations that occurred during the

Table 3-34
Regional Cultural Influences and Comparative Chronology

Year	Chronological Periods		Tucson Basin[1]	Upper and Middle San Pedro River Valley[2]	San Simon and Safford Basin[3]	
AD 1900 AD 1800 AD 1700 AD 1600 AD 1500	Ethnohistoric and Historic		Sobaípuri, Tohono O'odham, Yaqui, Spanish, Mexican, and Euro-American	Sobaípuri, Tohono O'odham, Apache, Spanish, Mexican, and Euro-American	Apache, Yavapai, Spanish, Mexican, and Euro-American	
AD 1400 AD 1300	Formative	Classic	Tucson	Babocomari/Huachuca	Mogollon Pueblo	Safford
AD 1200			Tanque Verde	Tanque Verde		Bylas/Goat Hill
AD 1100		Sedentary	Late Rincon	Pre-Classic		Eden
			Middle Rincon			
AD 1000			Early Rincon			Two Dog
AD 900		Colonial	Rillito	Early Formative	Late Pithouse	Talkali
AD 800			Cañada del Oro			
AD 700		Pioneer	Snaketown			Pinaleño
			Tortolita			
AD 600		Early Ceramic	Late Agua Caliente			Dos Cabezas
AD 500					Early Pithouse	Peñasco
AD 400 AD 300			Early Agua Caliente			
AD 200						
AD 100					Whitlock	
100 BC	Archaic	Early Agricultural/ Late Archaic	Late Ciénega	Late Archaic		
500 BC			Early Ciénega		Archaic	
1000 BC			San Pedro/unnamed			
2000 BC		Middle	Chiricahua	Middle Archaic		
3000 BC 5000 BC			Occupation gap (?)			
7000 BC		Early	Sulphur Springs	Early Archaic		
9000 BC 10,000 BC	Paleoindian					

[1] Adapted from Dean (1991) and Mabry (2000)
[2] Adapted from Vanderpot (2013)
[3] Adapted from Haury (1936) and Neuzil and Woodson (2014)

significant transition to maize (corn) agriculture. More Archaic sites need to be mapped and excavated to identify and analyze habitation structures and settlement patterns, and collect dating and subsistence information. Like Paleoindian sites, investigation of Archaic sites needs to be rooted in an understanding of the local depositional contexts. Sites and features may be surficial or deeply buried.

- Formative (AD 1 to AD 1450). The Formative period in most areas of the Southwest represents a broad cultural shift to subsistence agriculture and a sedentary lifestyle. The Formative period

marks the development of several distinctive cultural traditions—such as the Hohokam, Salado, and Mogollon—each of which exhibit increasing complexity in material culture and social organization through specialized tools, trade goods, and public architecture. Because the SPRNCA is in an area of cultural confluence, Formative period sites offer a unique opportunity to study cultural identity, influence, exchange, and socioeconomic networks among the region's inhabitants.

- Ethnohistoric and Historic (AD 1450 to AD 1960). This era marks the transition from the late prehistoric through initial contact among indigenous and European explorers, the Spanish *Entrada* and missionization period, and subsequent Euro-American settlement. These sites are important for their research potential, but are perhaps more important for developing management considerations to protect their potential to provide important heritage connections for the living descendants of the Sobaípuri (O'odham) and Apache—who are known to have traditionally occupied the area—in addition to recognizing the Spanish, Mexican, Euro-American, and Chinese-American influences that contributed to the development and diversity of the modern community experienced today.

Concurrent with the preparation of this RMP/EIS, the BLM prepared a preliminary Class I (existing information) assessment of the planning area. Data reviewed were obtained from BLM TFO cultural program files, in addition to online cultural resource databases, including *AZSite* (2017), Arizona's statewide cultural resource inventory, and the National Register of Historic Places Digital Asset Management System and NPGallery (2017). The last, comprehensive Class I overview of the planning area was completed in 1986 (see Bronitsky and Merritt 1986); many identification, evaluation, and excavation projects have occurred since, thereby warranting a revised cultural context study. Most cultural resources are—and will likely continue to be—identified and evaluated through a reactive and compliance-driven process to assess potential impacts from other land-use activities.

Background research shows that approximately 25,786 acres of the SPRNCA—roughly 46 percent of the planning area—have been inventoried for cultural resources, resulting in documentation of 286 individual archaeological and historic sites. Of the documented cultural sites, approximately half are prehistoric (n=143), with multicomponent sites being the next most common site type (n=48; see **Table 3-35**). For BLM's management and compliance purposes, 276 sites are considered historic properties (as defined by the NHPA) with 111 sites evaluated as NRHP-eligible, 162 sites that are unknown or unevaluated, and 3 sites formally listed on the NRHP.

Table 3-35
SPRNCA Archaeological and Historic Resources Summary Data

Site Type	NRHP Listed	NRHP Eligible	Not Eligible	Unknown / Unevaluated	*Total*
Prehistoric	2	35	5	101	**143**
Ethnohistoric	--	1	--	2	**3**
Historic	--	24	4	20	**48**
Multicomponent	1	51	1	6	**59**
Unknown	--	--	--	33	**33**
Total	**3**	**111**	**10**	**162**	**286**

The three NRHP-listed sites are Presidio de Santa Cruz de Terrenate, Murray Springs Clovis Site, and Lehner Mammoth-Kill Site. Additionally, the latter two are designated as National Historic Landmarks

(NHLs) that are also significant as paleontological localities, as discussed in **Section 3.2.9**. NHLs are places where nationally significant historical events occurred, are associated with prominent Americans, represent those pivotal ideas that shaped the nation, teach about the past, or are premier examples of design or construction (36 CFR 65).

Documented prehistoric sites include artifact scatters, temporary and extended-use camps, hunting/kill/butchering sites, mixed-use processing locales, villages, rock shelters, rock art, and trails. Known historic-age resources include camps, mining and milling towns, railroads, Spanish-American *presidios* (military settlements) and missions, American military training sites, ranching and homesteading sites, roads, trails, and cemeteries.

Based on available data, more than 620 cultural sites may exist on the SPRNCA, of which at least 40 percent (approximately 250) would likely be evaluated as NRHP-eligible. Future inventory and assessment should focus on previously unsurveyed areas and sites lacking formal evaluation to enhance data quality and improve the archaeological and historical record of the planning area.

Native American Concerns

Several acts and orders require the federal government to carefully consider the traditional and religious values of Native American culture and lifeways to ensure, to the greatest degree possible, that access to sacred sites, treatment of human remains, the possession of sacred items, conduct of traditional religious practices, and the preservation of important cultural properties are not unduly infringed on (see **Appendices B** and **G**). In some cases, these concerns are directly related to historic properties and/or archaeological resources, such as those considered under Section 106 of the NHPA. Likewise, elements of the landscape without archaeological or human-material remains also may be involved. There are often intangible cultural values that are not readily captured as part of a cultural resources discussion that are nonetheless part of the Native American cultural landscape.

Native American tribes or individuals may identify places as TCPs and/or sacred sites. These designations are not interchangeable nor synonymous, and a location or feature could be a TCP and sacred site simultaneously. TCPs are defined by the National Park Service as NRHP-eligible places because of their associations with the cultural practices and beliefs rooted in a community's history and that are important to maintaining the continuity of a community's traditional lifeways (Parker 1993; Parker and King 1990). As defined in EO 13007, sacred sites are, "any specific discrete, narrowly delineated location...identified by an Indian tribe, or an Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe…has informed the agency of the existence of such a site."

Places with potential traditional cultural importance to local claimant tribes may include:

- Locations and/or topographic features associated with deities
- Locations and/or topographic features associated with traditional beliefs such as tribal and human origins, oral/tribal histories, traditional songs, and religious and ceremonial practices with past or present significance and use
- Ancestral habitation sites
- Ancestral burial sites and roadside memorials

- Animal burials
- Shrines and trails
- Water sources and related features such as rivers, springs, cupules, and *tinajas*
- Gathering and processing sites for clay, minerals, and plant materials
- Petroglyph and pictograph sites
- Calendrical sites

The San Pedro River Riparian Management Plan (BLM 1989) does not contain any specific guidance related to Native American concerns or tribal interests, and no tribal consultation was documented for the prior planning effort. Consultation with local tribes between 1989 and 1995 was not well documented; however, programmatic and project-specific consultations through meetings and workgroups, letters, phone calls, and site visits have occurred more frequently since 2000 to identify potential TCPs, sacred sites, or other areas of importance to Native Americans.

Information presented through consultations, evaluation of archaeological and ethnographic data, and in historical documents serves to demonstrate that the planning area is part of several tribes' traditional use areas, ancestral homelands, or cultural landscapes (c.f.; Ferguson and Colwell-Chanthaphonh 2006). Currently, no specific locations on the SPRNCA have been identified as TCPs or sacred sites, but the Hopi Tribe has indicated they regard the archaeological sites of their ancestors as "footprints" and TCPs (Kuwanwisiwma [Hopi] to Bellew [BLM], December 26, 2012).

Additional, Native American concerns and the federal-tribal relationship are further addressed in **Section 3.5.1**.

Analysis Methods

Direct and indirect effects on cultural resources may result from any ground-disturbing activity or alteration to 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 effect[3] on historic properties or to documented areas of cultural importance to Native American or other communities.

BLM undertakings would be subject to cultural resources review and compliance with Section 106 of the NHPA before site-specific projects are authorized and, as such, this analysis provides a broad overview of estimated potential effects. The BLM must first consider avoidance of adverse effects; however, other measures may be considered to eliminate, minimize, or mitigate impacts as provided in **Appendix G**.

It is important to note that for cultural resources, an adverse effect does not necessarily translate to a significant impact under NEPA definitions (40 CFR 1508.27). In conducting NEPA analyses, potential cultural resources impacts can be mitigated through a variety of measures, including data recovery. While the BLM may implement data recovery when other options are not feasible, this action serves to

[3] 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.

preserve site information in the form of documentation and recovered artifacts to the extent that technology and budgets allow.

The BLM's compliance with Section 106 of the NHPA typically eliminates significant impacts on cultural resources that may result from federal undertakings such as construction and/or use of ROWs, recreation site development, prescribed fire, vegetation treatments, and special recreation permitting or construction of range improvements; however, cultural resources inventory and mitigation strategies—such as archaeological data recovery—also pose potential impacts on cultural resources. Although archaeological investigation may contribute to the identification, preservation, protection, and/or scientific knowledge of cultural resources, data recovery methods are inherently destructive and would prevent future research at the affected locations. Moreover, data recovery or mitigation methods may not be preferred by Native American tribes or other interested parties.

Indicators of impacts on cultural resources include the following:

- The extent of ground-disturbing activities and their potential for affecting known or unknown cultural resources, or areas of importance to Native American or other communities
- The extent to which an action changes the potential for erosion or other natural processes that could affect cultural resources. Natural processes, such as erosion or weathering, will degrade the integrity of many types of cultural resources over time. Human visitation, recreation, vehicle use, livestock grazing, fire, trampling, and other activities also can increase the rate of deterioration through related natural processes.
- The extent to which an action alters the setting (including visual and audible factors) where such factors are relevant to certain types of cultural resources
- The extent to which an action alters the availability of cultural resources for appropriate uses, including Native American access to traditional use sites and areas

For this analysis, effects on cultural resources would be significant if historic properties—or cultural resources allocated to any use category where long-term preservation is an objective—were damaged, destroyed, or removed from federal protections without appropriate consideration or mitigation. This analysis also assumes the following:

- Human occupation of North America over the last 12,000+ years has left its mark on all landforms. The attributes by which a site's significance is evaluated may be manifest on the surface, slightly obscured by soil deposits, or deeply buried.
- Current conditions are based on a preliminary Class I (existing information) cultural resources assessment of the SPRNCA. Although existing records provide some insight into the potential for cultural resources in the planning area, data from past inventories are geographically biased toward project-oriented undertakings and do not always predict where and how many resources may exist in unsurveyed or unexcavated areas.
- Ultimately, the number of sites that could be affected depends on the degree, nature, depth, and quantity of ground-disturbing activities and/or landscape modifications, and the specific cultural sensitivity of an implementation area. Based on current SPRNCA inventory data, this analysis—for both the planning area and analysis area—uses an estimated cultural site density of 0.011 per acre, of which roughly 40 percent would be considered historic properties.

- Cultural resources inventory and assessment would continue into the foreseeable future. Data acquired through these evaluations would contribute to the accumulated knowledge and understanding of the archaeological and historical records.
- There may be areas of importance to contemporary Native Americans that are not readily identifiable outside of those communities.
- Because cultural resources are nonrenewable, direct impacts are long term and likely permanent. In some cases, indirect impacts on the setting or access related to cultural uses can be temporary and short term, such as during a construction project in an adjacent area, vegetation treatment, or a prescribed fire.

Direct and Indirect Impacts

The analysis area used to analyze these impacts is the planning area. Direct impacts may result from both natural events and human activities that can damage cultural resources. Indirect impacts are not always as obvious or immediate and may include off-site impacts such as alteration of setting; accelerated erosion due to increased traffic, livestock concentration, loss or changes in vegetation, and changes in water flows; in addition to increased visitation to sites that were not previously accessible or adequately prepared for public use.

Actions to protect other resource values and/or restrict surface development typically provide at least some incidental protection to cultural resources that are susceptible to ground disturbances or erosional damage. Many vegetation management actions would reduce the potential for erosion, maintain and improve soil health, maintain or restore historic setting(s), and protect plant resources that may be important to Native American communities. Some water sources and features also may be important to Native American communities; actions to protect or restore such features and their associated native plant communities could serve to sustain or improve traditional uses.

Conversely, the installation or alteration of water control or soil retention features could affect cultural resources through ground disturbances and changes in water course or erosional patterns. Furthermore, because some extant water control and soil retention features are cultural resources, alteration of those that qualify as historic properties could constitute an adverse effect. Mechanical, biological, and chemical treatments could also permanently affect cultural resources through displacement, breakage, alteration of soil chemistry, and/or application of chemical residues, and temporarily restrict access to use areas during treatments.

Fire treatments and fire management activities also may involve ground disturbances that can directly affect cultural resources and authorized uses, where present. High-severity fires can damage certain types of artifacts, features, and structures; however, fire can also serve to expose previously undiscovered sites, allowing for their study and subsequent protection. Newly exposed locations can also be susceptible to erosion, vandalism, and unauthorized collecting.

Direct and indirect impacts on cultural resources from climate variation may occur from increased wildfire, including increases in their size, frequency, and intensity; more severe and frequent flooding and erosion; and changes in habitat distribution and water availability. Wildfire could result in direct disturbance or loss of historic properties and other cultural resources by destroying or modifying historic structures, rock art, site features, artifacts, and cultural use areas. Flooding and erosion would

likewise affect the physical integrity of structures and archaeological sites. Changes in habitat distribution and water availability also could affect Native American traditional use values.

As the primary method by which direct impacts may occur to cultural resources, the estimated acreage of potential surface disturbing activities from proposed management actions is provided by alternative in **Table 3-36**. Aggregate surface disturbances could include mechanical and prescribed fire vegetation treatments; recharge enhancements and wetland restoration work; planned routes; and recreational areas such as trailheads and campgrounds. Although vegetation treatments and other surface disturbances could be pursued on a case-by-case basis under Alternative A (i.e., selection of Alternative A would not preclude such activities), Alternative A management actions pose no new, specified vegetation treatments and, therefore, result in no planned or currently measurable impacts on cultural resources.

Table 3-36
Estimated Potential Impacts on Cultural Resource Sites and Historic Properties[1] from Reasonably Foreseeable Surface Disturbances[2] per Alternative

	Existing (5,790 acres)	Alternative A (40 acres)	Alternative B (22,690 acres)	Alternative C (22,680 acres)	Alternative D (22,660 acres)
Cultural Sites	64	1	250	250	250
Historic Properties	26	1	100	100	100

Sources: BLM GIS 2017; BLM GIS 2017; AZSite 2017

[1]Rounded up to the nearest whole number
[2]Rounded to the nearest 10 acres

The table presents the maximum potential, reasonably foreseeable disturbance that could occur from implementing each of the alternatives over the life of the plan. The numbers indicate the sites at potential risk from such disturbances; however, this does not mean that these sites would be disturbed. Again, specific projects would be required to complete compliance review prior to implementation with the goal of avoiding adverse effects on historic properties.

Other common ways that cultural resources are subject to direct and indirect impacts is by new construction, vehicular activity, and vandalism or looting. Cultural sites located near existing or new motorized travel routes tend to be subject to accelerated rates of vandalism. Studies indicate a "critical distance from roads" of approximately 400 to 800 meters (1,312 to 2,625 feet) for which archaeological sites are considered at an increased risk for vandalism and looting (c.f.; Nickens et al. 1981; Honeycutt and Fetterman 1985; Ahlstrom et al. 1992). To that end, the BLM is currently developing a Programmatic Agreement to specifically address efforts to identify, evaluate, and mitigate potential cultural resources impacts that may result from travel management and route designations. Future assessments will follow the stipulated Travel Management Programmatic Agreement process to analyze and address potential route-specific (direct) and planning area-wide (indirect/cumulative) effects.

Table 3-37 presents the estimated potential risk to cultural sites from increased motorized public access over the life of each alternative. Recreational uses under Alternatives C and D emphasize primitive and backcountry nonmotorized activities, thereby posing less potential public use and/or access to cultural resources than Alternatives A and B.

Table 3-37
Estimated Potential Risk to Cultural Resource Sites and Historic Properties[1] from Public Motorized Access[2] per Alternative

	Alternative A (23,800 acres)	Alternative B (27,460 acres)	Alternative C (14,690 acres)	Alternative D (12,390 acres)
Cultural Sites	262	302	162	137
Historic Properties	105	121	65	55

Sources: BLM GIS 2017; AZSite 2017

[1]Rounded up to the nearest whole number
[2]Based on miles of existing and proposed motorized routes with a buffer of 800 meters to account for potential public access

Activities such as low-impact recreation and dispersed grazing generally result in only minor surface disturbances with limited potential for direct effects to cultural resources. Past studies 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). Direct impacts where concentrated activities occur may include trampling, chiseling, and churning of site soils, cultural features and artifacts, artifact breakage, and impacts from standing, leaning, or rubbing against historic structures or other aboveground cultural features such as rock art. Indirect impacts may include accelerated erosion and gullying, subsequent exposure, and increased potential for illegal artifact collection and/or vandalism. In accordance with BLM policies and procedures, such potential impacts would be addressed at a project-specific level.

Livestock grazing strategies differ greatly among the alternatives (**Table 3-38**). Alternative B would allow for grazing across the entire planning area, thereby posing impacts on all extant cultural sites. Alternative C also poses a greater potential for impacts than Alternatives A or D, but a reduced potential from Alternative B. Likewise, grazing authorizations under Alternative C would be restricted to the upland portions of the SPRNCA. Under Alternative D, the SPRNCA would be closed to grazing and, therefore, potential livestock impacts on cultural resources would be eliminated.

Table 3-38
Estimated Maximum Potential Impacts on Cultural Resource Sites and Historic Properties[1] per Grazing Alternative

	Alternative A (7,030 acres)	Alternative B (55,990 acres)	Alternative C (26,450 acres)	Alternative D (None)
Cultural Sites	78	620	294	0
Historic Properties	31	250	118	0

Source: BLM GIS 2017; AZSite 2017

[1]Rounded up to the nearest whole number

Because the SPRNCA is withdrawn from mineral entry and excluded from new utility-scale energy projects, there would be no new impacts on cultural resources from these kinds of activities. The use and maintenance of existing roads, trails, rights-of-way, and associated infrastructure can, however, cause direct and indirect impacts on cultural resources through ground disturbances, erosion, and alteration of the viewshed.

Cultural landscapes, viewsheds, and natural or cultural features are important elements of many traditional-use sites and historic properties. Impacts from visual, auditory, or atmospheric intrusions on the setting can range from short term and temporary to long term and permanent. For example, construction activities would generally constitute a short-term impact, while new facility construction could result in the long-term or permanent juxtaposition of modern and historical elements. Potential direct and indirect impacts could be reduced where objectives aim to preserve or retain scenic qualities. **Table 3-39** provides the maximum potential impacts on historic properties within the planning area based on proposed VRM classifications per alternative.

Table 3-39
Visual Resource Management Classifications with Maximum Potential Historic Property[1]
Setting Preservation/Modification

	VRM Class I	VRM Class II	VRM Class III	VRM Class IV
	PRESERVATION >>>>>>>>>>>>>>>> MODIFICATION			
Alternative A	2,170 acres	19,170 acres	22,530 acres	12,120 acres
Historic Properties	10	85	<100>	<54>
Alternative B	0 acres	25,040 acres	30,950 acres	0 acres
Historic Properties	--	110	<140>	--
Alternative C	0 acres	27,850 acres	28,140 acres	0 acres
Historic Properties	--	122	<127>	--
Alternative D	0 acres	41,000 acres	14,990 acres	0 acres
Historic Properties	--	182	<67>	--

Sources: BLM GIS 2017; AZSite 2017; LSD GIS 2013

[1]Rounded up to the nearest whole number

In general, VRM Class I and Class II management precludes substantial changes to the visual setting of cultural resources in the planning area and would aid in preserving the character of applicable historic properties. Conversely, VRM Class III and Class IV allow for modifications of the visual environment that could result in alterations of the historical setting.

Conclusions

Under Alternative A, the existing SPRNCA management directives would continue unchanged; however, certain cultural use designations and strategies would not fully conform to current policies and procedures, including the BLM's government-to-government relationship with Native American tribes, nor would they support management goals, objectives, or Native American traditional uses and/or values. Integrated RMPs for the 10 designated public use sites would not be prioritized, thereby potentially increasing the likelihood of incremental and unmitigated degradation of those specific historic properties.

Under Alternatives B and C, the BLM would utilize the full spectrum of treatment and management methods, including biological, chemical, mechanical, and prescribed fire treatments, to meet resource goals and objectives. Although the potential number of cultural sites affected are the same under Alternatives B, C, and D, under Alternative D, the BLM would primarily use natural processes and hand tools as opposed to heavy equipment and herbicides.

Alternative A offers the least protective VRM strategy for cultural resources, and Alternative D poses the greatest amount of potential setting preservation. Alternatives B and C are comparatively close and in between Alternatives A and D.

Although the BLM would designate areas for significant and/or unique resource protection under Alternatives A and D, ACEC overlay designations do not provide any different or enhanced administrative options, restrictions, or protections for cultural resources from that of the authorities granted through congressional designation of the planning area as an NCA. Likewise, NRHP listing may enhance public knowledge and perception of a particular historic property's significance, but listing does nothing to prevent impacts on such properties.

Overall, cultural resources review, compliance, and consultation procedures would continue under all alternatives with proactive (and potentially protective) measures expanded under Alternatives B, C, and D through cultural resource use designations and associated management objectives. Overall, Alternative A provides the fewest specific, proactive measures in pursuit of current and long-term cultural resources management objectives. Alternatives B and C include management actions with potential to expand area ground disturbances and, therefore, pose the greatest potential for direct adverse effects on historic properties and traditional uses; however, this potential is offset by more proactive planning and management strategies to preserve and restore the historical setting and landscape components.

Cumulative Impacts

The analysis area used to analyze cumulative impacts on cultural resources is defined as the Upper San Pedro River watershed within the US. This area encompasses approximately 1.1 million acres with an estimated 12,580 cultural sites (**Figure 3-4**). **Table 3-1** lists the past, present, and RFFAs. Existing levels of disturbance within the analysis area (i.e., past and present actions) cover an estimated 50,460 acres, with potential past impact on 555 cultural sites. The RFFAs will cause an estimated 28,800 acres of surface disturbance within the analysis area, therein posing potential impacts on 317 cultural sites. As such, 7 percent of the analysis area has or will be subject to disturbance.

The RFFAs and BLM-authorized actions may affect historic properties, other cultural resources, and cultural landscapes through loss or disturbance of resources that are not protected, changes in setting, pressure from incremental and/or repeated uses, changes in access, and vandalism. Potential impacts on setting would only occur to historic properties where setting is an integral component of that property's integrity and significance.

Over time, the incremental loss or degradation of cultural resources can result in the loss of interpretive, scientific, and social/traditional values; however, such impacts will continue regardless of BLM-implemented management strategies; cultural resources are constantly being subjected to site formation processes or events after creation (Binford 1981; Schiffer 1987). These processes can be both cultural and natural and take place in an instant or over thousands of years. Within and around the planning area there are prior and actively occurring impacts on cultural resources because of erosion and weathering, use and maintenance of roads and trails, railroads, homesteading and ranching, mining, military use, recreation, vandalism and illegal collection, and isolated residential development.

BLM-authorized actions that could affect cultural resources within the planning area would be subject to project and compliance review as indicated in **Appendix G**. Other ground-disturbing activities, such as road construction, real estate development, and utility infrastructure, in the analysis area may be reviewed by other federal, state, or local agencies, as necessitated by applicable law. With consideration for the estimated ground disturbance per BLM alternative (see **Table 3-36**), the incremental contribution of the BLM's selection and subsequent implementation of Alternative A would pose a negligible increase in potential cumulative impacts on cultural resources; however, proposed activities under Alternatives B, C, or D could result in an approximately 2 percent increase—or an additional 250 cultural sites affected—for a total cumulative impact of 9 percent surface disturbance within the analysis area.

3.2.9 Paleontological Resources

Affected Environment

Paleontological resources, as the term used by the BLM, are any fossilized remains or traces of organisms that are preserved in or on the earth's crust, that are of scientific interest, and that provide information about the history of life. Paleontological resources, whether invertebrate, plant, trace, or vertebrate fossils, constitute a fragile and nonrenewable record of the history of life on our planet. The BLM's policy is to manage paleontological resources on BLM-administered lands for scientific, educational, and recreational values (e.g., hobbyists collecting invertebrate fossils and petrified wood) and to protect these resources from adverse impacts. To accomplish this goal, paleontological resources must be professionally identified and evaluated, and paleontological data should be considered as early as possible in the decision-making process.

The BLM uses the PFYC system as a management tool to assist in determining which geologic units potentially contain fossil resources (BLM 2016 Instructional Memorandum [IM] No. 2016-124, PFYC System for Paleontological Resources on Public Lands). The PFYC scale consists of assigning a number to a geologic unit from PFYC 1 through PFYC 5. A geologic unit assigned PFYC 1 has a low probability of containing fossil resources; an example of this would be an igneous rock formation, such as granite or basalt. A geologic unit that is assigned PFYC 5 is known to likely contain scientifically significant fossil resources. The PFYC map is determined by assigning the numbers to geologic units as they are represented on geologic maps. **Figure 3-11** (**Appendix A**) is the PFYC map that has been developed for the SPRNCA. **Table 3-40** shows the PFYC of BLM-administered land. It should be noted that the largest classification in acres is Unknown Potential.

Table 3-40
Potential Fossil Yield Classification

PFYC Class	Acres on BLM-Administered Land
Class 1—Very Low Potential	2,700
Class 2—Low Potential	21,100
Class 3—Moderate Potential	0
Class 4—High Potential	11,440
Class 5—Very High	0
Unknown Potential	21,380
Total	**56,620**

Source: BLM GIS 2017

Current Conditions

The mountains delineating the San Pedro Basin generally are north- to northwest-trending fault-block ranges of diverse lithology formed by extensional faulting 25 to 8 million years before the present. Surficial geology on the SPRNCA consists primarily of Pliocene through Holocene alluvial fill, with Cretaceous volcanic and intrusive igneous rocks. The San Pedro Basin formed as a graben (dropped down block of the earth's crust) during that same extensional faulting period (Cook et al. 2009). As the basin formed, it was filled with sediments washing off the adjacent mountain blocks, resulting in the existing alluvial fill.

Although there are no PFYC 5 areas on the SPRNCA, it does contain numerous scientifically significant paleontology localities that have been collected and studied since the early 1920s. Though older marine fossils have been studied in the area, it is the abundant Pliocene and Pleistocene-aged vertebrate faunas that have made the San Pedro River Valley of scientific importance.

The fossil-bearing formations in the San Pedro River Valley are the Quiburis Formation and the St. David Formation. The Quiburis Formation contains a diverse late-Miocene to early-Pliocene fauna. The St. David Formation contains a diverse fauna that spans the Pliocene-Pleistocene boundary.

Other late Pleistocene and early Holocene deposits are found scattered throughout the San Pedro River Valley, some of which contain evidence of human-mammoth interaction. Two such sites found on the SPRNCA are also designated as NHLs: the Murray Springs Clovis Site and the Lehner Mammoth-Kill Site. The former is an early human site, created between 12,000 and 13,000 years ago in the late Pleistocene Epoch. It contains stone artifacts and fossil bones that contributed to the knowledge of the flora and fauna of the Pleistocene Epoch. The latter, also created about 13,000 years ago in the late Pleistocene Epoch, contains extinct mammoth bone fragments. Scoping commenters recommended developing the Lehner Mammoth-Kill Site to encourage visitation and public education regarding paleontological resources.

In the late 1970s, a paleontology summary and subsequent report for the SPRNCA was produced by the University of Arizona for the BLM (Lindsay 1979). The report outlined geologic formations where fossils have been discovered. The report stated that, as of 1979, 288 paleontology localities had been recorded and were described in scientific literature. Of these, 149 were invertebrate sites and 139 were vertebrate sites. Subsequent research has increased this number.

Two of the more scientifically important fossil localities on the SPRNCA are the Diack site and Wolf Ranch, both of which are contained in the St. David Formation. Both localities continually produce numerous vertebrate fossils.

Analysis Methods

Paleontological resource impacts primarily concern the potential destruction of these nonrenewable resources and the subsequent loss of scientific information that could provide information of past life or that typifies the distinctive characteristics of a type of organism, environment, period, or geographic region. Paleontological resources could be destroyed by surface disturbance and the unauthorized collection of fossil remains. For the purpose of assessing impacts, the report preparers considered only those objectives and actions potentially affecting vertebrate fossils, such as dinosaurs, mammals, sharks,

and fish, or any animal with a skeletal structure, and scientifically significant invertebrate fossils and plants.

Planning-level impacts on paleontological resources were broadly evaluated using the PFYC system. Occurrences of paleontological resources are closely tied to the geologic units—formations, members, or beds—that contain them. The probability for finding paleontological resources can be broadly predicted from the geologic units at or near the surface. Discoveries are most likely to occur in geologic units classified as high or very high potential (PFYC Class 4 or Class 5); however, known rich localities also have been found in the planning area in other units. There are no geologic units on the SPRNCA that are classified as PFYC Class 5, so the quantitative portion of this analysis uses PFYC Class 4 units.

Based on the RFD and a reasonable prediction of possible future types of development, the impact analysis that follows provides a general description of common impacts on paleontological resources from planning actions.

For this analysis, impacts on paleontological resources would be significant if there were direct or indirect damage, destruction to, or loss of scientifically significant fossils resources (Society of Vertebrate Paleontology 2010).

Indicators of impacts on paleontological resources are the following:

- Acres of potential surface disturbance occurring in paleontologically sensitive geologic formations
- Acres preserved by closure to surface disturbance in paleontologically sensitive geologic formations

In addition, the analysis makes the following assumptions:

- Geologic mapping can be used to assess the broad potential for paleontological resources using the BLM's PFYC system; but comprehensive paleontological resource inventories have not been completed for the SPRNCA.
- Surface disturbance in PFYC 4 geologic units does not equate with an impact on paleontological resources; but, it does provide some comparative information on the potential or risk of impact.
- Inventories conducted before ground-disturbing activities would include further review of known fossil localities and a field evaluation in sensitive areas. Inventories may result in the identification and evaluation of previously undiscovered paleontological resources that would be managed according to BLM policy.
- The potential for impacts on both surface and subsurface paleontological resources is proportional to the extent and depth of disturbance associated with the action.
- At the RMP-level of analysis, the precise locations, extent, and depth of any anticipated surface disturbance resulting from each alternative is unknown. The relative risk of, or potential for, impacts on paleontological resources that may be subject to disturbance under each alternative can be only generally estimated.

Impacts Common to All Alternatives

There would be no direct impacts from the goals, objectives, and allocations noted in the alternatives; there could be direct impacts associated with some management actions. Exposed fossils can be damaged incrementally by natural weathering and erosion from wind and water, and this damage can be exacerbated by concentrating human use and activity. Other sources of human-caused damage are ground-disturbing activity, vandalism, unauthorized collection, and over-collection.

Under all alternatives, the BLM seeks to protect significant paleontological resources by controlling other resource and land uses through avoidance, mitigation, and other measures. Pedestrian surveys would typically be necessary before any ground-disturbing activities were authorized in those units that have a high potential for exposing fossil vertebrates, such as in the Quiburis and the St. David Formations; on-site monitoring could be required during construction.

Typically, impacts can be mitigated to below a level of significance by implementing paleontological mitigation identified in the BMPs or stipulations, such as construction monitoring, salvaging fossils, or avoiding surface exposures.

If recovery is the prescribed mitigation, this could also result in fossils being salvaged that may never have been unearthed as the result of natural processes. These newly exposed fossils would become available for scientific research under BLM permit, education, and preservation at an authorized repository. Unmitigated ground-disturbing activities could dislodge or damage paleontological resources and features that were not visible before surface disturbance.

The types of impacts that are possible include the permanent loss of the paleontological resources and the scientific data they could provide through damage or destruction from ground-disturbing activities. Without removing some rock surrounding fossils, they would remain largely undetected; therefore, management actions that result in erosion do not necessarily damage paleontological resources; however, excessive erosion, especially from other surface disturbance on exposed localities, could damage fossils at the surface.

Generally, such activities as grazing, vegetation treatments, and recreation result in minor surface disturbances that have less potential for directly affecting paleontological resources; impacts could result primarily from subsequent exposure and erosion. Many areas with paleontological resources on the surface would not support significant amounts of vegetation. Actions that prevent or reduce soil erosion, maintain ground cover, limit vehicle use, restrict access, and avoid actions in sensitive areas would reduce the potential for impacts on paleontological resources.

An increase in visitors, or more access to paleontological localities or sensitive areas, could increase the potential for loss of paleontological resources by vandalism and unauthorized collecting (Eagles et al. 2002). These impacts are difficult to mitigate, but they can be reduced by the following:

- Increasing public awareness about the scientific importance of paleontological resources through education, community partnerships, and interpretive displays
- Informing the public about penalties for unlawfully destroying or collecting these resources from BLM-administered lands

Two NHLs are recognized for both cultural and paleontological values: the Murray Springs Clovis Site and the Lehner Mammoth-Kill Site. These sites contain evidence of human-mammoth interaction and are designated for public use under all alternatives. Public education and interpretation are consistent with the BLM's paleontological resource management objectives and guidelines.

For fire management, protecting human life is the highest priority over resource concerns. Firebreaks totaling 610 acres with no PFYC 4 acres are established and would continue to be maintained under all alternatives. Fire management activities related to wildland fire or wildland fire suppression and preparation can involve ground-disturbing activities at depths that can directly affect any paleontological resources. These actions could include using heavy equipment. High-severity fire can also damage surface fossils by cracking, spalling, and oxidizing. Fire can result in impacts through erosion and the increased visibility of paleontological resources.

Fire can also remove vegetation and expose previously undiscovered resources, allowing for their study and protection; however, locations exposed by fire can be susceptible to damage by subsequent erosion, vandalism, and unauthorized collecting.

Under all alternatives, motorized vehicle use would be allowed only on roads and designated trails; all cross-country motorized use would be prohibited. Restricting motorized use to designated roads would reduce the potential for impacts on paleontological resources outside of these designated routes from surface disturbance, vandalism, and unauthorized collection. Public nonmotorized, mechanized use is allowed on the San Pedro Trail System, other designated roads, and administrative vehicle routes. If paleontologically sensitive formations or localities were located on or next to the roads or designated trails, there may be impacts from surface disturbance, exposure of fossils, and erosion.

Alternatives Comparison Analysis

The BLM would continue to protect and preserve significant paleontological resources by controlling other resource and land uses through avoidance, mitigation, and other measures and would preserve and enhance the scientific and potential public-use values of paleontological resources. Current RMP-level decisions for paleontological resources under Alternative A do not specifically address land use allocations or special designations. They also provide limited specific RMP-level objectives, decisions, and direction for the protection, monitoring, preservation, and collection of fossils for scientific and public use. Paleontological resources would continue to be fully considered in management decisions.

Under Alternatives B, C, and D, paleontological resources would be managed according to their PFYC classification. Inventories, including a records search and paleontological survey of proposed ground-disturbing activities, would be required in all Class 3 and Class 4 areas. (There are currently no areas classified as PFYC Class 3 or 5.) A site-specific analysis of the risk of the impacts would be conducted where potential is unknown to determine whether field inventory or monitoring would be needed. The BLM would also continue to refine current PFYC inventories and maintain a database of known localities. These measures would help ensure the protection of paleontological resources from impacts due to authorized ground-disturbing activities and would help preserve opportunities for scientific, educational, and recreational uses of these resources.

The Murray Springs Clovis Site (5 acres total, 3 acres PFYC Class 4) and the Lehner Mammoth-Kill Site (6 acres total, PFYC Unknown) would be managed for scientific use and public visitation under all of the

action alternatives. Under Alternative D, the Lehner Mammoth-Kill Site would be managed as an ACEC and be increased to 30 acres. Also, Alternative D would designate the Curry-Horsethief ACEC (2,540 acres) to protect the significant paleontological values. In addition, the St. David and San Pedro River ACECs would be expanded to 2,710 and 7,300 acres. ACECs would increase from 2,170 acres under Alternative A to 13,070 acres under Alternative D.

Acres of potential long-term disturbance resulting from the RFD scenario are identified in **Table 3-41**. The amount of long-term disturbance ranges from 1 acre under Alternative D to 49 acres under Alternative B. Among all the alternatives, only 2 acres are identified as long-term disturbance in PFYC 4 under Alternatives B and C. The type of impacts or potential risk of impacts are the same as those described under *Impacts Common to All Alternatives* and would be addressed in site-specific project review.

Table 3-41
Acres of Potential Disturbance to PFYC 4 Units

	Alternative			
	A	**B**	**C**	**D**
Existing Surface Disturbance	5,790	5,790	5,790	5,790
Total PFYC 4 Acres	600	600	600	600
RFDs –Long-term Disturbance	41	49	12	1
Total PFYC 4 Acres	0	2	2	0
Vegetation Treatments - All methods[1]	0	27,460	27,460	17,070
Total PFYC 4 Acres	0	8,250	8,250	7,200
Grazing Available	7,030	55,990	26,450	0
Total PFYC 4 Acres	290	11,440	6,010	0

Source: BLM GIS 2017

[1]Not additive

Acres of potential ground disturbance resulting from all methods of vegetation treatments are identified in **Table 3-41**. Alternative A does not specify treatment acreage or preclude vegetation treatments, but it does include the potential for wildland fire use on 21,600 acres. The reasonably foreseeable vegetation treatment scenario for Alternatives B, C, and D include up to 17,070 acres of prescribed fire, and Alternatives B and C would include the additional potential for mechanical and herbicide treatments. Under Alternatives B and C, excavation using heavy equipment may be used to enhance Murray Springs.

The total PFYC 4 acres in vegetation treatment areas are 8,250 acres for Alternatives B and C and 7,200 for Alternative D. Under Alternatives B, C, and D, all of the SPRNCA is allocated as a full suppression area (55,990 acres) for all natural and human-caused ignitions; however, fires would be managed in accordance with resource management objectives based on current conditions and fire location. The type of impacts or potential risk of impacts are the same as those described under *Impacts Common to All Alternatives* and would be addressed in site-specific project review.

Grazing is associated with surface disturbance and trampling, which has some potential for affecting paleontological resources, primarily from subsequent exposure and erosion. Under Alternatives B and C, livestock grazing would be available on 55,900 acres and 26,450 acres, respectively, of BLM-administered lands on the SPRNCA. This represents an increase from 7,030 acres currently available under Alternative A. Under Alternative D, the BLM would not authorize livestock grazing on the

SPRNCA; there would be no further impacts on paleontological resources from this activity from surface disturbance, trampling, and erosion.

The types of impacts from motorized vehicle use and nonmotorized, mechanized vehicle use are the same as those described under *Impacts Common to All Alternatives*. Unlike the other alternatives, Alternative D would close 23,810 acres of roads and would limit 32,180 acres to designated routes and trails, reducing the potential risk on paleontological resources from surface disturbance, vandalism, and unauthorized collection.

Conclusions

The presence of scientifically important paleontological resources on the SPRNCA is primarily known through locality records that would be reviewed for actions that would cause ground disturbance or would increase the potential for impacts from vandalism or unauthorized collecting. The PFYC classification provides a broader look at the geologic units that may contain paleontological resources with 20 percent of the SPRNCA classified as having high potential units for paleontological resources; however, 38 percent of the SPRNCA is classified as unknown and thus a large percentage of this data set does not provide additional indications of sensitivity. Information on the anticipated long-term disturbance shows less than 50 acres of total disturbance and 2 acres or less in PFYC 4 areas. For potential disturbance related to vegetation treatments under Alternatives B and C, approximately 30 percent of the maximum acreage is within PFYC 4 units. For Alternative D, approximately 42 percent of the potential acreage for vegetation treatments would be in PFYC 4.

Each of the alternatives would include measures that would manage paleontological resources on BLM-administered lands for scientific, educational, and recreational values and protect these resources from adverse impacts. Preservation would be accomplished through allocations that would not allow ground disturbance in certain areas and through review of ground-disturbing activities. Of these, Alternative D would incorporate the most measures and closures that would protect paleontological resources explicitly or incidentally as part of the "light on the land approach" to land management.

Cumulative Impacts

The analysis area used to analyze cumulative impacts on paleontological resources are the significant fossil-bearing formations that have exposures in and outside of the SPRNCA: the Quiburis Formation and the St. David Formation. The types of impacts on paleontological resources that have occurred in the past likely include destruction or damage without the benefit of scientific study or interpretation. This would be due to construction, recreation, theft, vandalism, and the impacts of natural processes, without the benefit of recovery, scientific study, or interpretation.

The RFFAs identify approximately 28,800 acres of future plans or projects in the San Pedro watershed, which is approximately 3 percent of the watershed that has potential for paleontological resources that may be cumulatively affected by future actions (BLM GIS 2017). Current and future trends include population growth, urbanization, energy development, increased recreation demand, road construction, and erosion. For actions on federally managed land and mineral estate, impacts would be minimized through existing laws, regulations, and stipulations addressing surface-disturbing activities in PFYC Class 3, Class 4, and Class 5 areas and other sensitive areas.

Other ground-disturbing activities such as road construction, real estate development, and utility infrastructure in the analysis area may be reviewed by other federal, state, or local agencies for the presence and scientific value of paleontological resources. The agencies would take steps to recover or avoid significant finds.

Actions on private land could result in the inadvertent destruction of paleontological resources or the removal of fossils without any scientific study. Population growth and increasing recreation demand can affect resources from unauthorized removal, vandalism, incremental damage of surface resources, and subsequent erosion.

Under the alternatives, the potential for impacts on paleontological resources would be minimized through existing management objectives that protect paleontological resources in planning and that avoid disturbing sensitive formation and fossil localities. Paleontological resources would continue to be considered in management decisions, actions, and projects that may cause ground or other disturbance, that could result in long-term, direct damage or loss of scientifically significant fossils, or that would contribute to erosion, exposure, or vandalism without scientific study.

Alternative A provides the fewest specific actions to ensure that paleontological management objectives are met. Alternatives B and C include the potential for more management actions that could expand ground disturbance with the potential for affecting paleontological resources. This potential is offset by more proactive and specific goals, objectives, PFYC allocations, and management and administrative actions for addressing paleontological resources under Alternatives B, C, and D.

Alternative D would reduce the level of ground disturbance through the most restrictions on resource uses and limitations on the type of management that can be implemented. The potential incremental contribution of the alternatives to cumulative impacts on paleontological resources, when combined with other past, present, and RFFAs, is expected to be less than significant.

3.2.10 Visual Resources

Affected Environment

Public lands are managed by the BLM to protect or preserve scenic values and minimize impacts from allowable lands use activities. Visual resource values are identified through a VRI, and visual impacts from landscape modification may be limited through VRM class objectives established in an RMP (see **Appendix K**). VRI classes represent visual values based on an area's scenic quality, visual sensitivity, and viewing distance, as described in BLM Handbook 8410-1 (BLM 1986a). VRM class objectives are binding land use decisions. They are established considering both visual values as represented in the VRI classes in addition to the need to allow for reasonably foreseeable future land uses. Visual impacts are typically mitigated by BMPs applied at the time of project planning or NEPA review prior to authorization or implementation.

Current Conditions

A VRI was completed for the upper San Pedro Basin, including the planning area, in 2013. The inventory identified the area's visual resource values, including maps of the scenic quality, visual sensitivity, and viewing distances (Logan Simpson Design, Inc. 2013). The current condition is described in **Table 3-42**.

Table 3-42
Visual Resource Inventory Components

VRI Component	Acres of BLM-Administered Lands	% of BLM-Administered Lands
Scenic Quality		
A	14,240	25
B	4,150	8
C	37,600	67
Total	**55,990**	**100**
Sensitivity		
High	41,270	74
Medium	14,720	26
Low	0	0
Total	**55,990**	**100**
Distance Zone		
Foreground-middle ground	52,480	94
Background	2,470	4
Seldom seen	1,040	2
Total	**55,990**	**100**
VRI Class		
Class I	0	0
Class II	16,050	29
Class III	26,860	48
Class IV	13,080	23
Total	**55,990**	**100**

Sources: LSD GIS 2013; BLM GIS 2017

Due to the many outstanding landform, vegetation, and water features, and overall natural quality of the landscape, the scenic quality in the planning area was identified as a Class A along the San Pedro River and Babocomari River, and Class B in the uplands around the Charleston Hills. The scenic quality in the upland bajada slopes was identified as Class C due to the relatively few outstanding visual features (**Figure 3-12**). High visual sensitivity was identified for the riparian corridor and adjacent uplands, with moderate sensitivity on some of the uplands along the SPRNCA boundary (**Figure 3-13**). Most of the planning area is within the foreground-middleground viewing distance zone from travel routes and activity areas considered in the inventory. A few areas were identified as being seldom seen, due to topographic screening. Portions of these seldom seen areas are visible from parts of the San Pedro Trail (**Figure 3-14**). VRI classes indicate relatively high visual resource values (Class II and III) for the riparian corridor, the river valley, and adjacent slopes and uplands (**Figure 3-15**). Relatively low visual resource values (Class IV) were identified in several upland areas along the SPRNCA boundary mainly due to their low scenic value and sensitivity.

Remnants of historic and prehistoric uses or activities in the planning area add to the visual interest and attract sightseeing to the SPRNCA; they may have value as historic landscapes.

The visual impact of existing developments and facilities (clearings and structures) on the SPRNCA is noticeable from the vicinity of the modifications or structures, but visual contrast is reduced by distance and topographic and vegetation screening.

Analysis Methods

The analysis area for analyzing impacts on visual resources is the planning area. Indicators of impacts on visual resources are the following:

- Acres of VRI classes in VRM classes. A proposed VRM class would allow changes to the landscape that could alter its character enough that future VRIs would result in a reclassification. For example, if an area currently managed for VRM Class IV has VRI Class II lands, then the level of change allowed by VRM Class IV could alter the landscape to the point that future VRIs could result in reclassifying the area to VRI Class III or Class IV.

This analysis includes the following assumptions:

- The visual quality of the landscape on the SPRNCA is an important component in the recreational setting and recreation opportunities, and changes in the landscape could adversely affect this conservation value.
- The scenic vistas in the planning area would become more sensitive to visual change; in other words, they would increase in value over time. Scenic resources would become increasingly important to residents of and visitors to the area.
- Visitors to BLM-administered lands or residents living near BLM-administered lands are sensitive to changes in visual quality and to the overall scenic quality of the area that contributes to the visitor experience.
- Activities that cause the most contrast and are the most noticeable to the viewer would have the greatest impact on scenic quality.
- The severity of visual impact depends on changes to the landform, vegetation, and structure features caused by an activity, and the visibility of the changes.
- VRM class objectives apply to all actions on BLM-administered lands. Class objectives would be adhered to through project design, avoidance, or mitigation.
- At the implementation level, appropriate design techniques will be applied to conform with the appropriate VRM class. Visual resource design techniques and BMPs would be implemented to mitigate potential changes to visual resources.
- Visual contrast ratings would be required for all projects. The visual contrast rating system (BLM 1986b) would be used as a guide to analyze site-specific impacts from projects, project design, and placement. It compares the project features with the existing landscape features, using basic elements of form, line, color, and texture. Projects would be designed to minimize their visual impacts to conform to the area's VRM class objective. This would allow the BLM to reduce impacts on a site-specific basis to ensure compliance with the assigned VRM class. If an activity exceeds visual contrast levels allowed by the applicable VRM class, the activity may not be authorized. Visual restoration of enhancement activities would be pursued for existing landscape modifications that exceed the visual contrast levels for the VRM class they are located in.

Every action has the potential to alter visual resources. This analysis, however, is for planning-level actions that occur in the decision area. When actions are analyzed at this scale, their magnitude on visual resources is focused on broad changes to the characteristic landscape.

Impacts Common to All Alternatives

There are no impacts on visual resources that are common to all alternatives for the visual resources indicator.

Alternatives Comparison Analysis

The VRI classes form the basis for analysis in this section. VRI classes are the categories the BLM uses to classify the visual character of the landscape and are a way to communicate the degree of visual value in the area. Impacts on visual resources are assessed by comparing the VRI class of an area to the VRM class for the same area. **Table 3-43** lists how visual resources would be managed for each VRI class for the alternatives.

Table 3-43
Visual Resource Management for Visual Resources by Alternative

Alternative A acres

VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV	Total
I	0	1,720	450	0	2,170
II	0	14,330	3,880	960	19,170
III	0	0	22,530	0	22,530
IV	0	0	0	12,120	12,120
Total	**0**	**16,050**	**26,860**	**13,080**	**55,990**

Alternative B acres

VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV	Total
I	0	0	0	0	0
II	0	15,500	7,820	1,720	25,040
III	0	550	19,040	11,360	30,950
IV	0	0	0	0	0
Total	**0**	**16,050**	**26,860**	**13,080**	**55,990**

Alternative C acres

VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV	Total
I	0	0	0	0	0
II	0	15,860	9,970	2,020	27,850
III	0	190	16,890	11,060	28,140
IV	0	0	0	0	0
Total	**0**	**16,050**	**26,860**	**13,080**	**55,990**

Alternative D acres

VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV	Total
I	0	0	0	0	0
II	0	15,950	19,560	9,360	44,870
III	0	100	7,300	3,720	11,120
IV	0	0	0	0	0
Total	**0**	**16,050**	**26,860**	**13,080**	**55,990**

Sources: BLM GIS 2017; LSD GIS 2013

Lands classified as VRI Class IV represent landscapes with low visual value. This is generally the result of a landscape having lower visual variety leading to a lower scenic quality rating. These landscapes commonly have a lower public sensitivity rating. This is sometimes due to existing cultural modifications that have significantly altered the natural character of the landscape, reducing the scenic quality and

public sensitivity. Managing these landscapes as VRM Class III or Class IV would allow for modifications that result in only slight changes to scenic quality, if any. By managing these landscapes as VRM Class I or Class II, the scenic quality of the landscape would likely remain the same. In other words, scenic quality would be maintained when an area with a high VRI class number is assigned a lower VRM class number (e.g., VRI Class III managed as VRM Class II).

Conversely, lands classified as VRI Class I or Class II represent landscapes with high visual value. This is the result of a landscape having higher visual variety leading to a higher scenic quality rating. These landscapes commonly have higher public sensitivity rating. As such, lands classified as VRI Class I or Class II have the potential to experience a greater magnitude of impact from VRM Class III or Class IV management than lands classified as VRI Class III or Class IV. In other words, scenic quality may not be maintained when an area with a low VRI class number is assigned a higher VRM class number (e.g., VRI Class II managed as VRM Class III).

Under Alternative A, VRM Class I would preserve the existing character of the landscape in the ACECs along the river, VRM Class II would retain the character of the landscape along the rest of the river corridor and Babocomari, VRM Class III would partially retain the character of the upland slopes adjacent to the river, and VRM Class IV would provide for potential activities that may cause major modification of the landscape on the upper bajada slopes and hills (see **Figure 2-8**).

Under Alternative B, no VRM Class I areas would be designated; VRM Class II would retain the character of the landscape along the river corridor, Babocomari River, Curry Draw, Terrenate area, and state highway corridors; VRM Class III would partially retain the existing character of the landscape on all other lands in the planning area (see **Figure 2-9**). Under Alternative C, no VRM Class I areas would be designated; VRM Class II would retain the character of the landscape along the river corridor, Babocomari River, Curry Draw, Terrenate area, state highway corridors, and county road corridors; VRM Class III would partially retain the existing character of the landscape on all other lands in the planning area (see **Figure 2-10**).

Under Alternative D, no VRM Class I would be designated; VRM Class II would retain the character of the existing landscape along the river corridor, state highway and county road corridors, and most of the upland bajada slopes, hills, and side drainages; VRM Class III would partially retain the character of the landscape on the rest of the planning area (see **Figure 2-11**).

Conclusions

Compared with Alternative A, the action alternatives reflect a greater sensitivity toward preserving the character of the landscape throughout the planning area, and supporting the setting for recreation opportunities and cultural landscapes, while providing for potential activities that may cause changes in the landscape from allowable uses.

Cumulative Impacts

The analysis area for visual resources is the planning area. **Table 3-1** lists the past, present, and RFFAs and the number of acres associated with the actions. The BLM administers 96 percent of the surface lands in the planning area (BLM GIS 2017). As such, visual resources would be largely influenced by activities on BLM-administered lands. Visual resources in the viewshed beyond the planning area would be influenced by activities on mostly private, state, and National Forest System lands.

Past and present actions that have affected visual resources in the planning area are recreation, livestock grazing, OHV travel, ROWs, and natural resources management (such as vegetation treatments); these have modified the scenic quality of the landscape. For example, they have altered vegetation and landforms and have introduced artificial elements into the natural landscape.

Any RFFAs or projects that would disturb the surface can affect scenic quality. Proposed surface-disturbing projects can change landform, vegetation, color, and adjacent scenery.

Beyond the planning area, surface-disturbing activities (such as livestock grazing and vegetation treatments) and human-made modifications (such as housing developments, infrastructure, and erosion control and water supply projects) can alter the visual resources of the foreground, middleground, and background landscapes. Depending on the location and scale of the activities and modifications, the scenic quality of an area can be degraded. Several activities and modifications within 3 miles (the approximate foreground distance zone) of the planning area would occur; however, the Bella Vista Ranches, Riverstone recharge site, and Horseshoe Draw recharge site could have the greatest influence on the cumulative impacts on visual resources, because they are immediately adjacent to the planning area. They would occur on lands not administered by the BLM.

Under Alternative A, all BLM-administered lands would continue to be managed in a manner that would maintain visual quality. When combined with past, present, and RFFAs or projects, Alternative A would have no cumulative impacts on visual resources. Under Alternatives B, C, and D, 550, 190, and 100 acres (respectively) would be managed in a manner that does not maintain the scenic quality. When combined with past, present, and RFFAs or projects, Alternative B would have the greatest influence on cumulative impacts on visual resources.

3.2.11 Lands with Wilderness Characteristics

Affected Environment

As part of the RMP process, the BLM is required to inventory for areas that could be managed for wilderness characteristics. These areas must be roadless, of a sufficient size (minimum 5,000 acres), of a largely natural appearance (e.g., minimal human modifications), and provide outstanding opportunities for either solitude or primitive and unconfined recreation. A citizen's wilderness characteristics inventory of six areas on the SPRNCA was received during public scoping on February 24, 2016, and the BLM subsequently completed a planning area inventory. All six areas were evaluated in the BLM's Lands with Wilderness Characteristics Inventory Report (BLM 2016). Two of the units identified in the citizen's inventory were found by the BLM to not contain wilderness characteristics. The first (called Jaguar, AZ-G022-022) did not meet the size criteria of 5,000 acres, and the second (called Banning Creek, AZ-G022-023) was also found to not meet the size criteria of 5,000 acres because of an existing gravel route that meets the BLM's definition of a wilderness inventory road. Thus, these two areas were not carried forward into any of the action alternatives.

The BLM's inventory identified four units totaling 23,810 acres that have wilderness characteristics (BLM 2016; BLM GIS 2017; **Table 3-44**; **Figure 3-16** [**Appendix A**]).

Table 3-44
Units with Wilderness Characteristics

Inventory Unit	Acres with Wilderness Characteristics
Cereus[a]	5,290
Oxbow[a]	7,750
Coati Wash[a]	4,870
Kestrel	5,900
Total	**23,810**

Source: BLM GIS 2017

[a]Unit includes contiguous lands outside of the SPRNCA

Analysis Methods

This section is a discussion of the impacts of planning decisions on managing lands with wilderness characteristics. Only potentially significant impacts are discussed in detail. This section also analyzes impacts on lands with wilderness characteristics that would not be managed to protect those characteristics. The analysis area used to analyze these impacts is the planning area.

The indicator of impacts on lands with wilderness characteristics is the following:

- Acres managed to protect wilderness characteristics
- Acres of other management actions that could protect the presence of wilderness characteristics
- Acres of other management actions that could reduce the presence of wilderness characteristics

In addition to the assumptions in **Section 3.1**, the analysis assumes the following:

- Management and activities outside of lands with wilderness characteristics would not affect those characteristics, so long as they are not pervasive and omnipresent.

Impacts Common to All Alternatives

In general, management of the primary purposes for which the conservation area was established (i.e., aquatic, wildlife, archaeological, paleontological, scientific, cultural, educational, and recreational resources; see **Chapter 1**) is generally compatible with wilderness characteristics. Activities that affect a unit's size or roadlessness would diminish the presence of wilderness characteristics.

Generally, actions that disturb land surface (e.g., vegetation or watershed treatments, and development of facilities) degrade the naturalness of lands with wilderness characteristics.

Activities that introduce the presence of humans alter experiences for solitude and primitive recreation. In addition, restrictions on dispersed recreation, such as prohibited campfires and camping permitted only in designated sites, diminish the opportunities for unconfined recreation, but may be necessary to preserve wilderness characteristics.

Alternatives Comparison Analysis

Table 3-45 displays the acres of lands with wilderness characteristics that overlap allocations that could either support the protection of or diminish wilderness characteristics.

Table 3-45
Land Use Allocations within Lands with Wilderness Characteristics

	Alternative			
Land Use Allocation (acres)	**A**	**B**	**C**	**D**
Area managed for wilderness characteristics*	0	0	0	23,810
VRM Class I	1,420	0	0	0
VRM Class II	7,940	10,340	10,570	23,810
VRM Class III	6,970	13,470	13,240	0
VRM Class IV	7,480	0	0	0
Available to livestock grazing	4,180	23,810	12,810	0
Unavailable to livestock grazing	19,630	0	10,990	23,810
SRMA	23,810	0	0	0
ERMA Primitive RMZ	0	0	16,870	22,460
ERMA Backcountry RMZ	0	20,110	5,590	620
ERMA Backcountry (motorized) RMZ	0	2,980	630	10
ERMA Rural RMZ	0	720	720	720
Open to motorized and mechanized travel	0	0	0	0
Motorized and mechanized travel limited to designated routes	23,810	23,810	23,810	0
Closed to motorized and mechanized travel	0	0	0	23,810
Open to new ROWs on a case-by-case basis	23,810	0	0	0
ROW avoidance areas	0	23,810	23,810	0
ROW exclusion areas	0	0	0	23,810
ACEC	1,410	0	0	4,390
WSR	5,790	4,960	6,840	6,840

Source: BLM GIS 2017

*Alternatives A, B, and C do not manage lands to protect wilderness characteristics as a priority over other uses, while Alternative D manages lands to protect wilderness characteristics as a priority over other uses.

Alternative A

The BLM would not manage lands to protect wilderness characteristics. Not managing for the protection of wilderness characteristics would leave these lands vulnerable to surface-disturbing activities, which could diminish wilderness characteristics over time.

Managing 6 percent (1,420 acres) of lands with wilderness characteristics as VRM Class I would preserve the area's naturalness. This is because the level of change to the characteristic landscape in VRM Class I areas should be very low and must not attract attention. Managing 33 percent (7,940 acres) of lands with wilderness characteristics as VRM Class II would also provide some protection. Managing 29 percent (6,970 acres) as VRM Class III and 31 percent (7,480 acres) as Class IV, which could impair the naturalness of the area, would provide minimal protection. This is because modifications would be allowed to dominate the view and would be the major focus of viewer attention.

Eighty-two percent of lands with wilderness characteristics would remain unavailable, and 18 percent (4,180 acres) available, for livestock grazing. Impacts on lands with wilderness characteristics are

possible from livestock grazing due to the presence of range improvements, such as fences and developed water sources.

Under current SRMA management, motorized recreation opportunities could occur along the edge of some units, which would impair opportunities for solitude and primitive and unconfined recreation.

Implementation of motorized route designations would reduce the size and roadlessness of the Cereus unit. Allowing potential ROW development on a case-by-case basis could impair the unit's naturalness due to vehicle access, clearing of vegetation, and placement of structures.

ACEC management could indirectly protect naturalness in the Cereus unit where it overlaps the St. David Ciénega and San Pedro River ACECs and where the Kestrel unit overlaps the San Rafael ACEC (6 percent of lands with wilderness characteristics). Protective WSR management of the Babocomari River corridor and the San Pedro River corridor would protect the area's naturalness by limiting development in the four units where they overlap the study river corridor (24 percent). Potential development of the Hereford campground would reduce naturalness and opportunities for solitude in the southern portion of the Kestrel unit.

Alternative B

The impact of not managing units to protect their wilderness characteristics would be the same as Alternative A. Forty-three percent (10,340 acres) would be managed as VRM Class II (10 percent more than Alternative A), which would preserve the units' naturalness. The remaining 13,470 acres (57 percent) would be managed as VRM Class III, which would partially retain naturalness. Impacts would be similar to Alternative A, with negligibly different protection from VRM management.

The types of impacts on the lands with wilderness characteristics are the same as described under Alternative A but could occur across a broader area (19,630 more acres).

Management objectives for the overlapping ERMA Backcountry RMZ are consistent with managing to protect wilderness characteristics in 84 percent of the four units. Management of the Backcountry (motorized) RMZ (2,980 acres) would have the same impact as under Alternative A.

Wilderness characteristics in the 3 percent of the Oxbow, Coati Wash, and Kestrel units that overlap the Rural RMZ are influenced by the sights and sounds by the nearby highway; however, management of the Rural RMZ in these areas is not expected to alter wilderness characteristics, because no roads development or vegetation treatments would occur.

Impacts from travel management would be the same as under Alternative A.

Because there would be no ACECs, lands with wilderness characteristics would not receive indirect protection, unlike under Alternatives A and D. Protective WSR management of the San Pedro River corridor would have the same impact on lands with wilderness characteristics as Alternative A. Because there would be no protective WSR management for the Babocomari River, there would be no indirect protection for lands with wilderness characteristics, unlike Alternative A.

The potential impact from the Hereford campground would be the same as under Alternative A.

Impacts from wildland fire suppression activities would be the same as under Alternative A.

Alternative C

The impact of not managing units to protect their wilderness characteristics would be the same as under Alternatives A and B.

Impacts from VRM would be similar to Alternative B, except that in Alternative C, 2 percent (230 acres) more lands with wilderness characteristics would be managed as VRM Class II. Impacts would be similar to Alternative B, with negligibly different indirect protection from VRM management.

The types of impacts on wilderness characteristics from livestock grazing would be similar to those under Alternatives A and B but would occur across a broader area (12,810 acres) than under Alternative A.

Managing for Primitive RMZ would protect wilderness characteristics in 71 percent of all four units, as are the objectives for the overlapping ERMA Backcountry and Backcountry (motorized) RMZ in approximately 26 percent of the Coati Wash and Kestrel units. The types of impacts of Backcountry and Backcountry (motorized) RMZ are the same as those described under Alternative B. The Primitive RMZ would retain the naturalness and opportunities for solitude. Impacts on wilderness characteristics on the 3 percent of the Oxbow, Coati Wash, and Kestrel units that overlap the Rural RMZ would be the same as described under Alternative B.

The impacts from travel management designations would be the same as those described under Alternatives A and B.

Effects of managing all lands with wilderness characteristics as ROW avoidance areas are the same as those under Alternative B. No ACECs would be designated under Alternative C; impacts are the same as those under Alternative B.

The Babocomari River is found suitable for inclusion in the NWSRS in Alternative C and, therefore, the river corridor would receive similar protective management as under Alternative A. The impact from protective management of the San Pedro River would be the similar to Alternative A but occur over a larger area due to the wider river corridor.

Impacts from wildland fire suppression activities would be the same as under Alternative A.

Alternative D

Managing the four units, totaling 23,810 acres (43 percent of the decision area), to protect wilderness characteristics as a priority over other uses would retain their roadlessness, naturalness, and opportunities for solitude and primitive and unconfined recreation.

All units would be managed as VRM Class II, which would protect naturalness throughout the units.

All of the units would be unavailable for livestock grazing; therefore, there would be no impacts from livestock grazing on naturalness or opportunities for solitude. Removal of range improvements would help restore naturalness.

Primitive and Backcountry RMZ management would protect wilderness characteristics in 97 percent of the four units. The remaining portions of the units are influenced by adjacent activity and have been designated as Backcountry (motorized) or Rural; however, management for wilderness characteristics would preclude road development and vegetation treatments. The entirety of the units would be designated as closed for motorized travel, which would help retain wilderness characteristics.

Management of ACECs would indirectly support the retention of wilderness characteristics, as described under Alternative A; however, under Alternative D, the ACECs would be expanded so the indirect support of wilderness characteristics would occur over a larger area (2,980 more acres). Impacts from protective WSR measures related to the San Pedro and Babocamari Rivers would be similar to Alternative C, but the greater portion of the San Pedro River corridor classified as scenic or wild would increase protection of wilderness characteristics in these areas.

Similar to the other alternatives, wildland fire suppression activities could reduce wilderness characteristics in the short term; however, under Alternative D, application of minimum tool principles would decrease the intensity of these impacts.

Conclusions

In Alternatives A, B, and C, the BLM would not manage lands to protect wilderness characteristics, and they may be impaired by other resource management activities; however, wilderness characteristics would be indirectly protected by management for other resource values. In Alternative D, managing all four units to protect wilderness characteristics would retain the areas' roadlessness, naturalness, and opportunities for solitude and primitive and unconfined recreation over the long term.

Cumulative Impacts

The cumulative impact analysis area is the planning area. The identified lands with wilderness characteristics are present today due to past actions. Due to the isolated, roadless nature of the units and their surrounding areas, present and RFFAs are not expected to degrade the wilderness characteristics of these areas, particularly because impacts would be minimized or avoided by management to protect the SPRNCA conservation values; however, the past, present, and RFFAs (**Table 3-1**) that could affect lands with wilderness characteristics are the FCC tower, which would be visible from 1 percent (53 acres) of the Coati Wash unit, 4 percent (308 acres) of the Oxbow unit, and 22 percent (1,316 acres) of the Kestrel unit, or a total of 7 percent (1,677 acres) of all lands with wilderness characteristics units combined (BLM GIS 2017).

3.3 RESOURCE USES

3.3.1 Livestock Grazing

Affected Environment

A grazing lease is a document that authorizes grazing use of public lands outside of a Taylor Grazing Act district in accordance with Section 15 of the Act. It specifies permitted forage use levels and the terms and conditions. An allotment is a designated area or management unit that allows grazing and can be made up of multiple pastures. Permitted use is forage allocated for livestock grazing in an allotment and is expressed in AUMs. One AUM is equal to the approximate amount of forage needed to sustain one cow and one calf, five sheep, or five goats for a month. A number of variables can result in a difference

between permitted use and billed use. Seasonal changes in precipitation and temperature result in more or less available forage. In addition, fluctuations in the beef markets can make grazing less profitable.

Arizona Standards for Rangeland Health and Guidelines for Grazing Administration

The BLM must ensure that all BLM-administered lands are meeting or making significant progress toward the attainment of the Arizona Standards for Rangeland Health and Guidelines for Grazing Administration (BLM 1997). Together with livestock operators, the state, and interested public, the BLM examines the indicators addressed by the standards and assesses whether they are being achieved. If monitoring data indicate standards are being met or making significant progress toward the attainment of standards, or livestock are not the casual factor toward the nonattainment of a standard, existing livestock management may continue; however, if existing livestock grazing is the casual factor for the nonattainment of a standard, the BLM Authorized Officer shall take appropriate action no later than the start of the next grazing year after the determination has been made. Land health assessment information for allotments, as available, is summarized in **Table 3-46**.

Table 3-46
Current Grazing Allotments in SPRNCA

Number	Name	Total Acres	BLM/ Other Acres	Head of Cattle/ Season of Use	Acres on the SPRNCA	BLM AUMs on the SPRNCA	Land Health Assessment Status
52080	Babocomari	11,721	2,025 BLM; 7,892 state; 1,804 private	15/year-long (a portion is seasonal)	1,865	165	No formal BLM land health assessment has been completed. A PFC assessment conducted in 2013 found that the allotment in the riparian area was FAR. See **Section 3.2.4**.
52510	Brunckow Hill	2,079	1,196 BLM; 171 state; 712 private	7/year-long	974	68	Upland health assessments were completed at one key area in 2008 and 2013. Land Health Standard 1 has been achieved. Achievement of Land Health Standard 3 was not assessed.
52520	Lucky Hills	20,998	448 BLM; 10,749 state; 800 private; 1,320 patented claims; 1,707 uncontrolled state land	90/year-long	1,728	197	Upland health assessments were completed at two key areas in 2008 and 2009. Rangeland Health Allotment Evaluation was completed in 2009. Land Health Standard 1 has been achieved. Achievement of Land Health Standard 3 was not assessed.
52320	Three Brothers	8,254	2,691 BLM; 5,403 state; 160 private	68/year-long	2,280	162	Upland health assessments were completed at one key area in 2008. Land Health Standard 1 has been achieved. Achievement of Land Health Standard 3 was not assessed.

Source: BLM 2015

Coordinated Resource Management Plans

A coordinated resource management plan (CRMP) is required anytime Arizona NRCS conservation planners assist a client to develop a conservation plan for a ranch that includes state or federally managed lands within the boundaries of the ranching operation. Under CRMPs, the private landowner, the BLM, the state, NRCS, AZGFD, and any other interested groups agree to management practices on this allotment through the CRMP. Compliance with CRMPs is not mandated by BLM laws or regulations; rather, CRMPs represent management recommendations. Bobocomari has an active CRMP with all parties' signatures, and it is monitored every other year. Lucky Hills has a CRMP that was signed in 1997. Three Brothers does not currently have a CRMP, but the operators have started the process with the NRCS to complete one.

Current Conditions

Grazing is currently authorized on four allotments overlapping the SPRNCA, for a total of 592 AUMs. They are the Babocomari, Brunckow Hill, Lucky Hills, and Three Brothers (**Figure 3-7**). Grazing is authorized through a grazing lease. Grazing leases are issued for a period not to exceed 10 years. Each of these leases has been renewed for a new period of 10 years in accordance with Section 402(c)(2) of the FLPMA, as amended by PL No. 113-291. Refer to **Table 3-46** for current grazing allotment information.

Livestock operations on the SPRNCA encompass a mixed ownership of private, Arizona State Trust, and public lands within allotment boundaries. Currently, cattle graze on all allotments; no sheep or goats are authorized on allotments on the SPRNCA.

Analysis Methods

The analysis area for livestock grazing is BLM-administered lands on the SPRNCA.

Indicators for analysis of impacts on livestock grazing management include the following:

- Quantity of forage available for livestock grazing (measured by acres available and unavailable to grazing, number of AUMs allocated to livestock grazing, acres of forage removed by ground disturbing activities, and acres with proposed vegetation treatment)
- Potential for disturbance of forage or disturbance and unwanted dispersal of livestock from recreation (forage disturbance measured by acres within 150 meters of motorized routes in semidesert grassland vegetation; livestock disturbance or unwanted dispersal measured by acres available to livestock grazing in recreation areas)

Analysis assumptions for livestock grazing management include the following:

- Surface disturbing activities for campgrounds and recreation sites would remove all vegetation for grazing
- It would take two growing seasons after a prescribed burn for vegetation to rehabilitate to a level that grazing could be started again
- Road dust would affect palatability of vegetation up to 150 meters from motorized, unpaved routes

Impacts Common to All Alternatives

Impacts on livestock grazing are generally the result of activities that affect forage levels or the acres open to grazing. Impacts also include activities that result in disturbance of livestock in grazing allotments. General types of impacts are described below, grouped by category of impact.

Livestock Grazing Management: Direct impacts on livestock grazing result from management actions that alter the amount of land that is available or unavailable for livestock grazing, that impose restrictions on the level of permitted use (AUMs), or that impose other restrictions on the timing or location of grazing. Adjustments to grazing management can reduce available forage, both directly, through making areas unavailable to grazing, or indirectly, through actions that limit the season of use or otherwise limit the ability to use available forage (i.e., limiting distribution). Impacts from making all or portions of individual leases unavailable to livestock grazing on BLM-administered lands would be the loss of available forage and the potential need to locate alternative forage.

The level of impacts would depend on the reduction in acreage and AUMs, and the extent to which lessees depend on forage on BLM-administered lands. Some pastures on BLM-administered lands may be used in rotational grazing strategies; therefore, making areas unavailable to grazing on BLM-administered lands or reducing BLM-permitted AUMs can result in impacts on grazing over the entire allotment. In addition, making all or portions of BLM leases unavailable to livestock grazing would require increased fencing or management to ensure that livestock are excluded. The need for additional fencing and the responsibility for the associated costs would be determined on a case-by-case basis in the context of cooperative agreements. **Section 3.5.3** provides a discussion of the social and economic impacts of changes to management for livestock grazing.

Ground-Disturbing Activities: Impacts include activities that result in changes to the level of forage in an area open to grazing, which can reduce livestock productivity. Development of a trailhead or campground, for example, would remove forge for the life of the project with site-specific impacts on livestock grazing forage availability. The level of impacts for lessee would depend upon the acres affected within a given allotment.

Vegetation Management Activities: Vegetation management may impose short-term limitations on grazing operations. Examples are requiring rest periods after vegetation disturbance and adjusting timing to meet resource objectives. As a result, site-specific impacts on availability of forage and management options for range improvements may occur. This may not affect the level of forage available overall due to the temporary nature of such restrictions. In the long term, these vegetation treatments would generally enhance rangeland conditions, potentially increasing herbage production and maintaining or improving the available forage (DiTomaso 2000; Gottfried and Severson 1994; Pease et. al 2006). Increased forage could in turn cause small increases in livestock weight gain (Walburger et al. 2007). Similarly, prescribed fire as a vegetation treatment or noxious weed treatments may result in indirect, short-term exclusion of grazing or reductions in forage, but it is likely to benefit livestock forage availability in the long term by increasing the forage base (Clary and Jameson 1981).

Recreation: Recreation can affect livestock grazing directly through human disturbance and indirectly through rangeland degradation. Many of the conflicts surrounding the use of rangelands revolve around the impacts of urban development and related public land use (Holechek 2001; Brunson and Steel 1994). Disturbance can include unwanted animal dispersion or trespass due to gates left open by recreationists;

displacement, harassment, or injury of animals; or damage to range improvements from recreational vehicles (Morgan et al. 2007). Recreation may also directly remove forage resources and increase fugitive dust (e.g., particles lifted into the ambient air caused by activities such as the movement of soil because of vehicles) in motorized use areas. Dust can alter roadside soil chemistry and may aid in the establishment of invasive plants (Brown 2009), which may alter forage yield and the quality of forage (DiTomaso et al. 2010). In addition, dust can settle on forage adjacent to roads, making it less palatable for livestock.

The degree of impacts would vary with the intensity of recreation, the timing of recreation, and the location of recreation in the allotment (a higher level of disturbance would occur near areas frequented by livestock, such as water sources or supplemental mineral sites). SRMAs and ERMAs managed for motorized use and access would increase these potential conflicts, and those managed for a quiet recreational experience would decrease the conflicts. Making areas of concentrated recreation unavailable to livestock grazing would reduce recreation-related conflicts but would also result in a direct loss of available forage.

Alternatives Comparison Analysis

Livestock Grazing Management: Livestock grazing management decisions would result in changes to the acres of BLM-administered lands available for grazing and the permitted AUMs under each alternative (see **Table 3-47**). Additional impacts on the ability to manage livestock could also occur from management for trailing in riparian areas. Under Alternative C, no crossing permits would be issued. Some additional seasonal limitations would also occur for grazing in designated critical habitat under Alternative C, not reflected in this table. A collaborative adaptive management strategy would also be developed to support increased levels of livestock grazing under Alternative C.

Table 3-47
Acres Available to Livestock Grazing and Permitted AUMs

	Alternative A	Alternative B	Alternative C	Alternative D
Acres Available	7,030 acres	55,990 acres (8 times more than Alt. A)	26,450 acres (3.8 times more than Alt. A)	0 acres
Permitted AUMs	592 AUMs	13,332 AUMs	3,955 AUMs	0 AUMs

Source: BLM GIS 2017

Ground-Disturbing Activities: Proposed ground-disturbing activities would result in the loss of available forage in site-specific areas across the SPRNCA (see **Table 3-48**). Impacts would be limited under all alternatives due to the minimal acres of disturbance.

Table 3-48
Livestock Grazing Potentially Affected by Long-Term Reasonably Foreseeable Disturbance

	Acres Affected, by Alternative			
	A	B	C	D
Acres open for livestock grazing	0	49	6	0

Source: BLM GIS 2017

Note: Long-term reasonably foreseeable disturbance includes potential planned camping areas, routes, trails, or livestock waters.

Vegetation Management: As described in *Impacts Common to All Alternatives*, vegetation treatments to could result in short-term limitations on forage availability but may result in increased forage in the long term. Acres with proposed treatment are summarized in **Table 3-49**. Site-specific areas for treatment would be determined at implementation, and impacts on livestock grazing would vary depending on the location and timing of treatments. Additional adjustments to grazing management for vegetation could be required if monitoring were to indicate that grazing is affecting species, vegetation density, or the ability to meet land health standards.

Table 3-49
Acres of Reasonably Foreseeable Vegetation Treatments in Areas Open to Livestock Grazing

Alternative A	Alternative B	Alternative C	Alternative D
0	26,290	14,840	0

Source: BLM GIS 2017

Recreation: As discussed under *Impacts Common to All Alternatives*, recreation may affect livestock due to disturbance and unwanted dispersal, as well as by reducing forage availability by affecting palatability and species distribution due to fugitive dust. In the planning area, the greatest level of impacts from fugitive dust are anticipated within 150 meters of motorized routes in semidesert grassland. This is because impacts would be limited to areas adjacent to roads, and semi-dessert grassland represents a large portion of the forage in areas available to grazing. Fugitive dust is likely to increase under alternatives with new routes open to motorized use and decrease under alternatives with a focus on nonmotorized recreation (see **Table 3-50**). The potential for disturbance of livestock and unwanted dispersal due to recreation would follow the same trends seen for impacts on forage, with the greatest level of impacts anticipated under alternatives permitting the highest level of motorized recreational use, although there is potential for conflict in any areas where recreation and livestock grazing overlap.

Table 3-50
Acres Available to Livestock Grazing in Recreation Areas

	Alternative A	Alternative B	Alternative C	Alternative D
Acres within 150 meters of motorized routes in semidesert grassland vegetation	<1	530	170	0
SRMA acres	7,070	N/A	N/A	N/A
Backcountry RMZ acres	N/A	42,640	16,190	0
Backcountry (motorized) RMZ acres	N/A	8,440	1,730	0
Rural RMZ acres	N/A	4,900	2,310	0
Primitive RMZ acres	N/A	N/A	6,220	0

Source: BLM GIS 2017

Note: N/A signifies no similar designation under this Alternative.

Conclusions

Authorizing grazing on the four current allotments under Alternative A would support the ongoing grazing operations. Under Alternatives B and C, grazing on BLM-administered lands would increase,

resulting in the potential for increased forage and increased opportunities for grazing in the planning area.

Under Alternative A, grazing would continue at permitted levels. Under Alternative B, livestock grazing would be permitted throughout the SPRNCA, and permitted forage would be increased 22.5 times over the levels in Alternative A. Under Alternative C, grazing would be permitted in upland areas. Permitted AUMs would be increased 6.7 times over that in Alternative A. Grazing would not be permitted in expanded areas under Alternative C until fencing or other control methods are in place to prevent livestock access to riparian areas. Under Alternative D, the entire SPRNCA would be closed to livestock grazing and the 592 permitted AUMs would be removed.

Overall impacts from vegetation management may result in short-term changes to forage availability but would potentially improve quantity of forage in the long term, with the emphasis on grassland restoration. The greatest level of potential treatment in areas available for grazing would occur under Alternative B. Under Alternative D, no authorized grazing would occur; therefore, there would be no impacts on livestock forage under this alternative.

Impacts on livestock grazing from permanent land disturbance would be limited under all alternatives. Under Alternative A, no reasonably foreseeable areas of potential disturbance have been identified in areas open to grazing. Due to increased acres available to grazing and increased development under Alternative B, acres of disturbance would be increased to 49 acres (< 0.1 percent of areas available to grazing). Under Alternative C, impacts would occur on 6 acres (< 0.1 percent of areas available to grazing). Under Alternative D, no authorized grazing would occur; therefore, there would be no impacts from surface disturbing activities.

Potential for conflicts with recreation could occur on a site-specific basis, but impacts would be limited due to the small portion of allotments affected by these activities, and the fact that recreation disturbance would be limited in time and location. Some potential for impacts from recreation on livestock grazing could occur from all recreation types in the SRMA under Alternative A. The greatest potential for conflicts between recreation and livestock grazing would occur in motorized RMZs under Alternatives B and C. The potential of impacts would be highest under Alternative B due to the greatest overlap in motorized RMZ and areas available to grazing. Excluding grazing from developed public use areas under Alternative C could further decrease conflicts.

Cumulative Impacts

Past actions that have affected livestock grazing are human-caused surface disturbances (recreation, prescribed burning, mechanical vegetation treatments, and historical grazing practices) and wildland fires that have contributed to current ecological conditions. Livestock grazing management would continue to be affected by vegetation management projects and other actions that affect forage availability. Specifically, Sands Ranch, Ladd Ranch, and Brookline Ranch have conducted range improvement projects, which have improved available forage for livestock grazing (see **Table 3-1**).

Continued urban growth, such as the master-planned communities in Sierra Vista and Benson, could affect livestock grazing. Impacts would occur if urban growth were to result in a loss of forage on private lands next to the planning area. In the San Pedro watershed, an estimated 28,800 acres would have a permanent reduction in forage due to RFFAs. This would add to the current 36,280 acres of developed

areas. Livestock grazing may also be indirectly affected from environmental causes, such as wildfire, drought, or climate variation, that may diminish the productivity of land and, therefore, the level of available forage.

Under Alternative A, contributions to cumulative impacts would occur from ongoing vegetation management projects on BLM-administered lands. Impacts would be limited and short term. Authorizing grazing on the four current allotments would support the operations that use BLM and private forage and the ongoing grazing from the four allotments on BLM-administered lands. Under Alternatives B and C, grazing on BLM-administered lands would increase, resulting in the potential for increased forage and increased opportunities for grazing in the planning area. Cumulative contributions from other resources may include site-specific limitations on forage or restrictions on management.

Closing the SPRNCA to grazing under Alternative D would require lessees to reduce federal grazing use, reduce herd size, or substitute alternative forage at increased cost. This may shift grazing to lands under other ownership. Alternatively, it could affect economic feasibility of area ranches, thereby reducing grazing in the planning area overall. The need to exclude livestock from BLM-administered lands closed to grazing would indirectly result in the need for additional livestock control, such as additional fence construction or increased herding practices.

3.3.2 Recreation

Affected Environment

The SPRNCA provides opportunities for outdoor recreation, subject to current planning decisions, enabling legislation, and supplementary rules. Opportunities are accommodated by existing access and recreation facilities, such as recreation sites and travel routes. The trail system provides access to a variety of settings and attractions throughout the SPRNCA.

PL100-696 allows only uses found to further the purposes for which the SPRNCA was established, which includes recreation as one of the conservation values. It provides authority to implement reasonable limits to visitation and use for the protection of resources. Examples are requiring permits for public use and closing portions of the SPRNCA.

The general goal for recreation management and planning is to provide opportunities for visitors to obtain their desired experiences and beneficial outcomes, while protecting resources by managing the physical, social, and operational settings and the recreation in the area. Recreation planning decisions are made after issues, concerns, and potential recreation opportunities identified during scoping are analyzed in the RMP.

Current Management

The entire SPRNCA was designated as an SRMA in the current RMP; recreation facility development was identified to accommodate recreation use, and special use restrictions were established in supplementary rules. RMZs were not identified, but developments were identified in specific areas to accommodate public use. **Appendix M** describes existing recreation facilities on the SPRNCA.

Education and Interpretation

The BLM provides visitor information through self-service exhibits, signs, and volunteer-guided trips to certain sites. For example, at San Pedro House, there are a visitor contact station, interpretive signs, and

an interpretive pavilion that is used as a venue for organized educational events, including school programs. Interpretive and educational programs are provided by partners and other service providers, including guided hikes and organized programs (see **Appendix M**).

Location and Setting

The SPRNCA provides opportunities for outdoor recreation in a variety of settings, including the riparian area, river valley, side drainages, and uplands. The climate is cool in the winter and hot in the summer. The area attracts winter visitors from colder regions.

The SPRNCA is near I-10 and is easily accessible to regional and out-of-state travelers via State Highways 80, 82, 90, and 92. Several Cochise County roads provide access to the SPRNCA, including Charleston and Hereford Roads. The trail system for the SPRNCA was established in 1996 with trailheads and developed recreation sites along all of the public highways.

The SPRNCA is approximately 80 miles from Tucson, the nearest major population center. The nearest towns are Sierra Vista, Fort Huachuca, Saint David, Tombstone, Bisbee, and Benson, where many local SPRNCA visitors originate. Lands next to the SPRNCA include extensive tracts of largely undeveloped open space on Arizona State Trust lands, other BLM-administered lands, and private property.

Outdoor recreation opportunities similar to those available on the SPRNCA are also available on National Forest System lands in the surrounding mountains, on Arizona State Trust lands on the bajada slopes, and other BLM-administered lands outside the SPRNCA. Recreation opportunities are also available on private lands in the area, but these are not generally considered to be available to the public. Some private lands are developed to accommodate recreational visitors, particularly those in the area for motorhome and RV camping.

Recreation Setting Characteristics

An inventory of the SPRNCA was completed to identify its recreational setting characteristics, in accordance with current BLM planning guidance and criteria (see **Appendix M**). As shown on **Figure 3-17** (**Appendix A**), this inventory identified a range of recreational settings, based on current physical, social, and operational factors. It included areas with characteristics inventoried as:

- Primitive—remote with access by nonmotorized trail or cross country only and a largely natural environment with no facilities and low visitation
- Backcountry—relatively remote with few modifications to the environment, few or no facilities, and low visitation
- Middle country—relatively accessible from primitive motorized routes with a largely natural landscape and some facilities, and with more visitation than more primitive areas
- Front country—relatively accessible with easy access from improved roads in a relatively natural landscape with rustic facilities for recreation use, and regular visitation
- Rural—not remote and readily accessible from improved roads by all vehicles with a noticeably modified landscape and modern facilities with heavy visitation

Physical setting attributes considered in the inventory included the area's remoteness relative to public access points and travel routes, the naturalness of the landscape, and the availability of recreation facilities and improvements. Social setting attributes considered included the frequency of encounters

among visitors, visitor group size, and evidence of use. Operational setting attributes considered included the type of access available, visitor services and information, and management. **Table 3-51** summarizes the acres of recreational settings identified on the SPRNCA.

Table 3-51
Recreational Settings on the SPRNCA

Unit	Acres
Primitive	12,270
Backcountry	28,840
Middle Country	60
Front Country	11,190
Rural	3,630
Total	**55,990**

Source: BLM GIS 2017

Recreation Use and Activities

Recreational use of BLM-administered lands is based on counts and estimates by local BLM staff. **Table 3-52** shows the visitation on the SPRNCA for 2010 to 2015. During this time, the average annual visitation was 125,585. While visitation fluctuates from year to year, the overall trend has been increasing. The most heavily visited sites are the San Pedro House and the Fairbank Historic Townsite.

Table 3-52
Annual Visits

Fiscal Year	Annual Visits
2010	107,097
2011	95,450
2012	137,859
2013	140,001
2014	144,741
2015	128,365

Source: BLM 2017

Visitor Characteristics

A detailed visitor study is not available for the SPRNCA, but information on some visitor characteristics is available from visitor registers maintained at the San Pedro House and the Fairbank Historic Townsite and from backcountry permits.

Most visitors to the SPRNCA are in small groups of one to four persons. Some visitors are in relatively large family or social club groups, which may include 10 to 20 persons. Commercial tour buses occasionally come to the area, with 40 to 60 persons at one time. School field trips sometimes come to the area, with 80 to 100 persons at one time.

The SPRNCA attracts visitors from local, regional, national, and international locations. Most visitors stay for half a day or less, and overnight camping visitors typically stay one or two nights.

Recreation Activities

Recreation activities that occur on the SPRNCA include sightseeing, birding and wildlife viewing, visiting human heritage and natural heritage sites, using the trails, camping and picnicking, hunting, and fishing.

The San Pedro River is occasionally used for river floating; however, shallow waters, stream flow characteristics, narrow channel width, and stream obstructions often preclude this type of activity.

Birding/Wildlife Viewing

Opportunities for birding and viewing other wildlife are found throughout the SPRNCA. The variety and quality of the different habitats attract a variety of wildlife, including numerous resident and migratory avian species, which attract birders from the local area, region, and international origins. The SPRNCA is designated by the Audubon Society as an Important Bird Area with international significance. This is because of its rich habitat and importance for neotropical bird migration from Central America to Canada.

Visiting Human Heritage Sites

Opportunities for visiting human heritage sites are available at the Murray Springs and Lehner paleontological sites, Clanton Ranch and homesteads, Fairbank Historic Townsite, San Pedro House and reclaimed farm fields, and mining processing sites (mills).

Visiting Natural Heritage Sites

Opportunities for viewing natural heritage sites can be found in the San Pedro River and its riparian area, big sacaton grasslands, high desert scrub, mesquite woodland, and the St. David Ciénega wetlands. At Kingfisher, a former gravel pit, there are opportunities to view wildlife in an open water habitat.

Nonmotorized Trail Use

Opportunities for hiking, biking, and horseback riding are available throughout the SPRNCA, on the San Pedro Trail System and administrative access roads. The trail system provides access for recreational riding and access to remote attractions in the area. Trailheads accommodate equestrian uses, but parking lots become congested at times due to the relatively large size of horse trailer towing vehicles typically used.

Approximately 44 miles of the Union Pacific Railroad cross the SPRNCA within a 200-foot wide strip of land owned by the Union Pacific Railroad. The railroad is no longer active, and the tracks and ancillary facilities have been removed. Portions of the San Pedro Trail cross or are within the Union Pacific Railroad private property without written permission; therefore, the San Pedro Trail system will need to be relocated off of the private property or permission will need to be obtained for crossing or using the private land.

OHV Recreation

The SPRNCA has been managed to provide primarily nonmotorized access and related recreation opportunities accessed by nonmotorized trails (hiking, bicycling, and equestrian riding). Motorized access is limited to designated routes that lead to trailheads and other designated public use areas. Opportunities for OHV recreation are available on National Forest System lands and Arizona State Trust lands in the upper San Pedro basin. An OHV track for speed and skill riding is near the SPRNCA, along Charleston Road, on a BLM-administered parcel under an R&PP lease. Although illegal, some OHV recreation use occurs on some of the existing administrative routes and large washes on the SPRNCA.

Camping/Picnicking

There are no developed campgrounds on the SPRNCA. Dispersed camping is allowed away from the developed areas, except in the ACECs. The Miller Backcountry campsite, which is only accessible by nonmotorized trail, has minimal improvements: tent pads, fire rings, animal-proof food storage, and a toilet. It is approximately 4 miles south of the San Pedro House. Backcountry camping represents a small percentage of the overall use, with camping visits typically fewer than 200 per year.

Visitors picnic at most of the public use areas, but picnic tables and shelters are provided only at the San Pedro House, Fairbank Historic Townsite, Hereford trailhead, and Palominas trailhead.

Hunting

Hunting opportunities on the SPRNCA are available for big game, small game, and bird species. The SPRNCA is partly within AZGFD Game Management Units (GMUs) 30B, 34B, and 35A. BLM-administered lands in these GMUs represent a relatively small percentage of their land base, and not all game species found within the GMU occur on the SPRNCA; however, the SPRNCA attracts hunting due to the high-quality habitat.

Upland species in these units include Coues white-tailed deer, mule deer, black bear, javelina, mountain lion, cottontail rabbit, Gambel's and scaled quail, coyote, skunk, raccoon, bobcat, fox, ringtail, badger, pronghorn, and Gould's turkey. Waterfowl species in these units include mergansers, American coot, common moorhen, white geese (snow, blue, and Ross's geese), dark geese (Canada and white-fronted), and sandhill crane.

Waterfowl hunting opportunities on the SPRNCA are limited by the type of habitat present. Hunters have adapted to the SPRNCA hunting area's nonmotorized access restrictions by hiking and bicycling to the backcountry from the area access points. Hunting on the SPRNCA with firearms is allowed north of Charleston Road and south of State Route 92. Archery hunting is allowed throughout the SPRNCA.

Fishing

Fishing opportunities on the SPRNCA are limited by the aquatic habitat available but are available for mainly exotic warm-water species. Available fish are black bullhead, bluegill, common carp, green sunfish, largemouth bass, and channel catfish. Other species that can be lawfully taken with an AZGFD fishing license are American bullfrog and crayfish.

Special Recreation Permits

Use of BLM-administered lands related to commercial recreational activities, organized groups, competitive activities, and vending are managed through Special Recreation Permits (SRPs). These permits authorize temporary use of BLM-administered lands and are issued on a case-by-case basis. Issuance of SRPs is subject to review for conformance with the land use plan and for compliance with other applicable laws and regulations, and subject to special stipulations to protect resources and prevent use conflicts.

Commercial recreation use permitted in the past accounts for a relatively small amount of recreation in the area. Permitted activities include guided nature tours, heritage site tours, special events, hunting, and trail riding. Individual SRPs are required for noncommercial camping outside developed recreation sites.

The SPRNCA is available for public recreation at no cost; however, there is a fee for SRPs.

Recreation Demand

Demand for the recreation opportunities available on the SPRNCA is reflected by past and present visitation. Increasing demand is expected due to the growing population and changing demographics in the region and the country generally. Growing awareness of the area from marketing efforts by economic development and ecotourism interests is expected to continue attracting more visitors to the area. Demand for commercial and organized group activities is also likely to increase.

Recreation Visitation

Recreation is likely to increase due to growing demand. Recreation use on the SPRNCA under current management is projected to increase at approximately 2 percent per year based on available visitation information.

Public Access from Adjacent Lands

Access to the SPRNCA is available on existing routes across BLM-administered lands, State Trust Lands, and private property adjacent to the planning area. There are approximately 17 miles of designated routes at several locations that provide legal public access from state or county highways to developed recreation sites, such as visitor contact stations, trailheads, and picnic areas. Current route designations also identify approximately 51 miles of public routes included in the San Pedro Trail system (**Table 3-53**). The travel route system receives primarily nonmotorized (hiking, bicycling, and equestrian) use. Over time, users have also pioneered new unauthorized routes, which the BLM does not maintain or include as part of its system of designated routes.

Table 3-53
Existing Routes

Route Type	SPRNCA Miles	SPRNCA BLM Miles
Public Motorized Routes	17	10
Nonmotorized Routes	68	68
Administrative Routes	168	132

Source: BLM GIS 2017

Some routes that predate the establishment of the SPRNCA have been fenced across or gated at the NCA boundary. The gates and fences impede access to the SPRNCA by dispersed recreational users. The boundary fence has been cut in places, and there are gates installed in the fence by adjacent property owners to gain access to the SPRNCA from adjoining private lands.

The BLM has acquired easements to provide legal public access in the Palominas, Murray Springs, and the Curtis Flats areas. The easements provide road access from state or county roads to the SPRNCA across private and State Trust land.

The BLM maintains roads providing public access to developed facilities with grading and gravel and surfacing. Other roads are primitive with soil surfaces. Fencing is used to control vehicle use. Improved roads are typically 20 to 24 feet wide with two lanes. Nonmotorized trails are typically 3 to 5 feet wide with natural soil surfaces. Many roads and trails have drainage problems with runoff causing erosion in places.

Demand for access to the SPRNCA from adjacent residential developments has increased over time as areas have become developed. This has led to new user-created trails into the SPRNCA and requests from neighbors to access the trail system using gated roads, which predated the SPRNCA. Increased development on adjacent land will likely increase demand for access into the SPRNCA from these neighborhoods.

Congestion and Crowding

Current use levels at some of the public use sites approaches the capacity of the parking areas, particularly at the San Pedro House and Fairbank Historic Townsite. With increasing demand and visitation, use may reach or exceed current capacity and lead to congestion and crowding at the parking areas. There may be a need to redesign the parking areas to accommodate use more efficiently or increase capacity.

Analysis Methods

This section discusses the potential effects of decisions and management actions on recreation. A metric (e.g., acres or miles) was selected whenever possible to best reflect the scale and magnitude of these effects. A GIS dataset and overlays of resources and resource uses were used to quantify effects when available.

The analysis area for recreation is the SPRNCA.

Indicators

This analysis uses indicators of impacts to describe the magnitude, location, and type of change from current recreational setting characteristics as described in the affected environment section above. Indicators of impacts on recreation are as follows:

- Changes in acres of type of RMZ
- Changes in the recreational setting from other resource management actions

Assumptions

Assumptions for the analysis of impacts on recreation are as follows:

- Changes in the existing recreational setting characteristics can change the recreational experiences and outcomes that are associated with the RMZs.
- Conflict between nonmotorized and motorized users reduces the recreational experience for each group.
- Mountain bikers and equestrian users conflict with use of paths targeted for education and interpretative uses.
- An RMZ to provide for motorized opportunities would have roads designated.
- Nonmotorized trails may be designated in any RMZ.
- All routes in the route inventory would be considered for designation to provide administrative or public access, up to the total number of routes inventoried.
- Access to the SPRNCA trail system from adjacent residential communities will be considered to accommodate appropriate use.

- Potential for conflict in areas developed for specific recreational and educational uses, where they overlap with livestock grazing.
- Changes to the landscape from multiple resource management activities could change the recreational setting and affect the quality of the recreational opportunities and visitors' experience (i.e., treatments, developments, or improvements).
- Different users have different expectations based on their recreation preferences.

Impacts Common to All Alternatives

All alternatives would provide for nonmotorized trail-based recreation. All alternatives would prohibit cross-country OHV travel throughout the SPRNCA, which would reduce or eliminate the potential for disruption to or conflict with other nonmotorized users. Limiting motorized travel to designated routes would prevent new user-created routes while achieving recreation zone objectives.

Under all alternatives, prohibiting the discharge of firearms and archery equipment within 0.25 miles of developed recreation sites would preclude opportunities for those uses within the closed areas; however, the closure would maintain the safety of visitors to the developed sites and reduce the potential for uses that require firearms and archery equipment to conflict with developed recreation activities.

Under all alternatives, there would be education and interpretation opportunities at all public use areas on the SPRNCA, including at the San Pedro House, Terrenate, Murray Springs, Millville, Boquillas Ranch, and Petroglyph Discovery Interpretive Sites. These sites would have varying types of opportunities and levels of access.

Visitor centers, kiosks, trailheads, publications, events, and other education and interpretive facilities and programs support recreation opportunities and positive visitor experiences on the SPRNCA. Signage and information available at trailheads, kiosks, and visitor centers can also bring awareness to potential conflicts between user groups and with other resources and uses. Education and interpretation facilities and programs are most effective when they are easily accessible by the public. Improving the capacity and quality of access to educational sites improves educational and interpretation opportunities while reducing the potential for conflicts.

Improvements will make recreation facilities, programs, and opportunities available to the general public available to wheelchair and disabled visitors. Accessibility improvements to accommodate wheelchair and disabled visitors would be provided primarily in the rural zone. In the long term, additional route improvements outside of developed areas would improve accessibility and opportunities for birding and wildlife viewing, and cultural heritage site interpretation. Use and discharge of firearms will occur in accordance with AZGFD regulations.

Alternatives Comparison Analysis

Impacts on recreation would occur primarily from the changes in character of the recreational setting. Management actions that change the remoteness and access, naturalness, and facilities would affect the opportunities available to different types of users or alter the level of conflict between recreational users and other resources and resource uses.

The frequency and intensity of impacts would increase over time as an increasing number of visitors seek developed and backcountry recreation opportunities on the SPRNCA. To varying degrees, management controls under each alternative would allow the BLM to provide a range of recreation opportunities while limiting conflicts among recreational users and between users and other resources and uses.

Recreation Management Zones

Designating RMZs provides specific recreation management for areas with unique recreation opportunities, which may change or specifically protect the quality of the recreational setting. RMZs can also help reduce conflicts by tailoring management and defining recreation objectives for specific areas. **Table 3-54** provides the acres of each RMZ by alternative.

Alternative A would not designate RMZs. In the near term, concentrated and dispersed recreation opportunities and setting characteristics would be consistent with observed trends. Over time, however, without specific recreation management for high-use areas and strategies for maintaining primitive and backcountry settings, there would be a decline in the quality of recreation opportunities and greater potential for conflict among recreational users.

Table 3-54
RMZ Acres by Alternative

ERMA RMZ Name	Alternative A*	Alternative B	Alternative C	Alternative D
Primitive RMZ	0	0	16,870	22,480
Backcountry RMZ	0	42,650	30,960	27,720
Backcountry (motorized) RMZ	0	8,440	3,010	640
Rural RMZ	0	4,900	5,150	5,150

Source: BLM 2018

*Under Alternative A, the BLM would manage the entire SPRNCA as an SRMA and would not designate RMZs.

In rural RMZs designated under Alternatives B through D, the management focus would be providing opportunities for developed recreation, such as camping in developed campgrounds, education and interpretation opportunities at visitor centers, and trail-based activities originating from developed trailheads. Designating 5,100 acres as a rural RMZ under Alternatives C and D would provide the greatest support for developed recreation on the SPRNCA. Designating 4,900 acres of rural RMZs under Alternative B would provide similar developed opportunities as Alternatives C and D. In rural and backcountry motorized RMZs, there would be the potential for motorized and developed uses to conflict with pedestrian-based, backcountry, and primitive uses. The potential for these conflicts would be greatest under Alternative B, which would manage a combined 13,340 acres as rural and backcountry motorized RMZs.

Targeted recreation in primitive and backcountry RMZs is more dependent on the natural setting with less emphasis on recreation opportunities on trails, in campgrounds, or other developed settings. Managing portions of the SPRNCA as primitive and backcountry RMZs under Alternatives B through D would provide opportunities for wildlife viewing, hunting, camping, and sightseeing in a primitive setting with few recreation facilities. Alternative D, which would manage a combined 60,200 acres as backcountry and primitive RMZs, would provide the greatest support for undeveloped recreation;

opportunities for developed and motorized recreation would be concentrated in a comparatively smaller portion of the SPRNCA managed as backcountry motorized and rural RMZs.

Recreation Opportunities

Under all alternatives, there would continue to be site-specific, trail-based, and dispersed recreation opportunities on the SPRNCA; however, developed recreation opportunities would vary depending on the number of sites and management associated with those sites. Under Alternative A, there would be 11 sites designated for overnight camping and day-use public use. These would be in the San Pedro House and Lewis Springs areas. Alternative B would designate 15 sites, while Alternative C would designate 14. Under Alternatives A and B, the BLM would develop campgrounds near San Pedro House, Hereford, and Lewis Springs. Dispersed camping and semi-developed backcountry campsites, such as the Miller Backcountry Camp, would be available under all alternatives, with backcountry camping limited to designated sites under Alternative D. Alternatives B through D would limit equestrian and bicycle access to 11 sites; this would reduce opportunities to access the sites via those modes, but would reduce the potential for conflicts with the primary visitor uses being provided at the sites.

Opportunities for dispersed camping would depend on the areas managed as open or closed to camping outside developed areas (see **Table 3-55**). Dispersed camping would occur along existing or designated routes, with no facilities provided.

Table 3-55
Dispersed Camping Acres

ERMA RMZ Name	Alternative A*	Alternative B	Alternative C	Alternative D
Open				
Primitive RMZ	N/A	N/A	13,960	19,280
Backcountry RMZ	N/A	36,830	26,990	22,910
Backcountry (motorized) RMZ	N/A	5,590	2,480	230
Rural RMZ	N/A	2,860	2,860	2,860
Non-RMZ	55,990	N/A	N/A	N/A
Closed				
Primitive RMZ	N/A	N/A	2,910	3,210
Backcountry RMZ	N/A	5,180	4,980	4,800
Backcountry (motorized) RMZ	N/A	2,850	520	400
Rural RMZ	N/A	2,050	2,290	2,290
Non-RMZ	0	N/A	N/A	N/A

Source: BLM 2018

*Under Alternative A, the BLM would manage the entire SPRNCA as an SRMA and would not designate RMZs.

There would be the most opportunities for dispersed camping under Alternative A. Closing over 10,000 acres under Alternatives B through D would reduce dispersed camping opportunities compared with Alternative A; however, because the closure would apply to areas within 0.5 miles of recreation sites, there would be less potential for dispersed camping to conflict with developed recreation opportunities.

Opportunities for trail-based recreation are primarily based on the number of trail miles available for each user group. Limiting use of roads and trails reduces recreation opportunities and can indirectly affect visitors' ability to participate in associated activities that depend on trails for access, such as using an OHV to access hunting opportunities. Limiting use of roads and trails would help reduce the potential

for conflict between users. **Table 3-56** shows the miles of routes and trails open to various user groups by alternative based on the reasonably foreseeable route system necessary to achieve recreation management objectives.

Table 3-56
Miles of Access for Different Recreational User Groups

Recreation User Group	Alternative A	Alternative B	Alternative C	Alternative D
Equestrian users	172	172	168	168
Foot travel/birders/cultural site visitors	172	172	172	172
Mountain bikers	172	172	168	168
OHV users	17	17	17	17

Source: BLM 2018

Alternatives A and B would maintain trail-based opportunities on all 172 miles of routes on the SPRNCA for all users. Prohibiting equestrian and mountain bike use near developed recreation sites under Alternative C and D would result in a slight reduction in trail access for those modes compared with Alternative A. Closing 23,800 acres of the SPRNCA to OHV use under Alternative D would eliminate OHV access opportunities on 4 miles of trails within the OHV closure area. Over time, compared with Alternative A, developing trail connections from nearby communities to the San Pedro Trail System under Alternatives B, C, and D would increase trail-based opportunities for all users.

Resource Conflicts

Other resource management actions that apply stipulations to protect resource values, such as wildlife or cultural resources, can reduce some types of recreation conflicts while increasing others; however, other resource management actions can also protect the recreational setting. Maintaining or improving the recreational setting upon which the quality of recreation opportunities depends supports positive recreation experiences and outcomes; however, in some cases, management to protect resources conflicts with and decreases the quantity of recreation opportunities by closing areas or routes to certain recreation uses. While management that closes areas eliminates some recreation opportunities, it can improve the quality of other activities by reducing conflicts among users seeking different types of opportunities in the same area. Resource protections would be the greatest under Alternative D and the fewest under Alternative A. Alternatives B and C would seek to balance resources and uses, which would result in similar outcomes.

Implementing vegetation treatments can affect recreationists by displacing recreation activities or altering the recreational setting. During the application of a vegetation treatment, recreation activities may be temporarily displaced from the vicinity of the treatment area due to safety concerns arising from proximity to the treatment, such as a prescribed burn, or by reducing the quality of the recreational setting to such a degree that the area is not attractive or conducive for certain recreation activities. The duration and intensity of impacts would depend on the type and location of treatment and type of recreation activity potentially being affected. Vegetation treatments could enhance or detract from the recreational setting and experiences, depending on the recreationists' expectations. **Table 3-57** identifies the acres of treatments in each RMZ by alternative.

Table 3-57
Reasonably Foreseeable Vegetation Treatment Acres in RMZs

RMZ Name	Alternative A*	Alternative B	Alternative C	Alternative D
Primitive RMZ	N/A	N/A	5,860	6,310
Backcountry RMZ	N/A	19,460	15,420	8,030
Backcountry (motorized) RMZ	N/A	3,980	2,000	120
Rural RMZ	N/A	2,840	3,000	2,280

Source: BLM 2018

*Under Alternative A, the BLM would manage the entire SPRNCA as an SRMA and would not designate RMZs.

Not implementing vegetation treatments under Alternative A would avoid short-term conflicts with recreation. Implementing treatments under Alternatives B and C could temporarily displace dispersed recreationists, especially in the backcountry RMZ. Treating fewer acres under Alternative D would result in less potential for short-term impacts. In the rural RMZ, treatments would not interfere with the recreation opportunities at developed sites, with the exception that smoke from prescribed fire could temporarily affect the quality of developed recreation. Over the long term, treatments under Alternatives B through D would improve the condition of native vegetation on the SPRNCA, which would contribute to positive recreation outcomes in the long term.

The visual quality of the landscape is a primary component of the recreational setting and the quality of the experience and visitors' satisfaction in a given area. Visual landscapes that are less disturbed by human activities typically contribute to higher-quality recreation opportunities and fewer conflicts, particularly for recreationists participating in backcountry, undeveloped recreation activities, such as hiking, backpacking, and sightseeing. Visual resource conditions may contribute less to visitor satisfaction for those participating in more developed activities, such as camping in campgrounds and recreational OHV use, where the degree of user satisfaction is less dependent on the naturalness of the surrounding landscape. While visual quality would be an important element of the users' overall experience, other factors, such as the quality of camping facilities, signage, parking availability, and access opportunities at trailheads, may be equally or more important factors contributing to the recreation experience.

Managing 23 percent (12,920 acres) of the SPRNCA as VRM Class IV under Alternative A would allow for changes to the visual environment that could conflict with dispersed and developed recreation. Managing 100 percent of the SPRNCA as VRM Class II or III under Alternatives B, C and D would increase protections of recreation conditions and qualities compared with Alternative A, while continuing to support developed recreation at campgrounds and day-use areas.

Wildfire reduces the quality and quantity of recreation opportunities and displaces visitors by damaging recreation facilities, degrading visual qualities, eroding trails, and potentially closing areas during and after fire events. Restoration (e.g., native seed plantings) and pre-suppression (e.g., prescribed fire and noxious weed treatment) projects can increase recreation opportunities and experiences in the long term by restoring landscapes or preventing wildfire. In the short term, fire restoration and pre-suppression projects can close areas to recreation activities, resulting in a temporary loss of recreation opportunities. Fire management that prioritizes suppressing fires in or near recreation sites and recreation management areas would preserve the recreational values and future opportunities in those areas. Limited fire suppression tactics could result in larger, longer burning fires that could displace visitors for longer periods. Burn scars would decrease the quality of the recreational setting until lands are restored. Under Alternatives B, C, and D, managing the SPRNCA for full suppression would reduce

the potential for these impacts on recreation. Only managing 61 percent of the SPRNCA as a priority for full suppression under Alternative A would increase the potential for impacts on recreation opportunities in the short and long term.

Recreation User Conflicts

Conflicts between recreational uses occur when multiple recreation activities are allowed on the same trail or within the same area. The frequency and intensity of impacts depend primarily on the types of uses allowed. For example, allowing motorized uses creates the potential for conflicts with nonmotorized pedestrian, equestrian, and mechanized activities. Allowing equestrian use creates the potential for conflicts with other motorized, mechanized, and pedestrian trail users. Mountain biking can also conflict with the other types of trail-based recreation. All forms of travel could directly impact the quality of recreation opportunities by degrading trail surfaces and creating congestion on trails.

There is also the potential for conflict among non-trail-based forms of recreation and between those activities and trail-based recreation. In general, the more activities allowed in an area, the higher the potential for conflicts. Allowing hunting, camping, and OHV use in an area would provide opportunities for those activities; however, if the area is popular for sightseeing and hiking, allowing hunting, camping, and OHV use could conflict with sightseers and hikers.

Under Alternatives A and B, there would be the potential for user conflicts on and adjacent to all routes throughout the SPRNCA (see **Table 3-56**). Allowing cross-country equestrian use under Alternative A would also result in equestrian user conflicts with hikers, backpackers, sightseers, and fishers recreating off trails. Limiting equestrian use to designated trails under Alternatives B through D would minimize equestrian conflicts. There would be slightly fewer conflicts under Alternatives C and D, which would close 4 miles of routes to equestrians and bicycles. Closing 23,810 acres (43 percent) and 4 miles of routes on the SPRNCA to OHV use under Alternative D would further reduce the potential for conflict between motorized and nonmotorized users.

Other Resource Use Conflicts

The management of resource uses, such as ROWs, can conflict with recreation by physically displacing recreation opportunities or decreasing the quality of the recreation experience. In some cases, expanding resource uses can improve recreation opportunities and reduce conflicts; for example, developing a new access road for a power line ROW could increase trail-based recreation opportunities and relieve user conflicts on other routes.

Designating ROW exclusion and avoidance areas protects recreation opportunities and reduces the potential for ROW development to conflict with or reduce the quality of recreation opportunities. Designating utility corridors could lead to additional ROW development in those areas; however, collocating infrastructure would concentrate impacts from ROW development in a smaller area. Lands and realty activities that displace or disrupt the normal distribution and movement patterns of wildlife, or affect wildlife habitat, would affect hunting quality.

The potential for ROW conflicts with recreation would be greatest under Alternative A, which would not designate ROW avoidance or exclusion areas. Excluding ROWs under Alternative D would eliminate the potential for conflicts. Designating ROW avoidance areas under Alternatives B and C would reduce, but not eliminate, the potential for conflicts. Collocating infrastructure in the designated

corridor would reduce the potential for new ROW conflicts with recreation activities outside the corridor.

Resources uses, including recreation activities such as OHV use or hunting, that generate noise can conflict with recreation. Increasing opportunities for those activities would result in a greater potential for conflicts with activities such as hiking, fishing, sightseeing, and camping that are more sensitive to higher noise levels. Expanding the portion of the SPRNCA available for hunting could decrease the quality of other activities because there would be more frequent noise impacts from firearm discharges.

Noise impacts from OHV use would be the same under Alternatives A through C. Closing 22,500 acres under Alternative D in the primitive RMZ would result in slightly fewer noise-related impacts on other nonmotorized recreation activities. Alternative D would also result in the fewest noise-related impacts from the discharge of firearms by closing 29,600 acres (4,000 more acres than Alternative A), including 19,700 and 5,900 acres in backcountry and primitive RMZs, respectively. Only closing 4,100 acres under Alternatives B and C would maintain the potential for noise-related impacts from firearms in the remaining 51,900 acres.

Impacts on recreation from areas available to livestock grazing include livestock trampling vegetation, dust, odor, and manure on trails. The intensity of the impact would vary with the visitor's expectation for recreating in areas where livestock grazing is present. Developing livestock grazing facilities can affect the naturalness of the physical setting because features such as stock ponds and catchments contrast with the natural landscape. Range improvements can also create barriers to access and modify the recreational setting; however, range improvements that protect and promote land health also enhance the quality of recreation opportunities by managing use in support of the natural surroundings. Range improvements could help reduce conflicts with recreationists by prohibiting animals from wandering onto roads, trails, or developed recreation sites. **Table 3-58** identifies the acres in each RMZ available and unavailable to grazing by alternative.

Table 3-58
Grazing Acres in RMZs

RMZ Name	Alternative A*	Alternative B	Alternative C	Alternative D
Available				
Primitive RMZ	N/A	N/A	6,220	0
Backcountry RMZ	N/A	42,650	16,190	0
Backcountry (motorized) RMZ	N/A	8,440	1,730	0
Rural RMZ	N/A	4,900	2,310	0
Non-RMZ	7,030	N/A	N/A	N/A
Unavailable				
Primitive RMZ	N/A	N/A	10,650	22,480
Backcountry RMZ	N/A	0	14,770	27,720
Backcountry (motorized) RMZ	N/A	0	1,270	640
Rural RMZ	N/A	0	2,850	5,150
Non-RMZ	48,960	N/A	N/A	N/A

Source: BLM 2018

*Under Alternative A, the BLM would manage the entire SPRNCA as an SRMA and would not designate RMZs.

Continuing to allow livestock grazing on four allotments totaling 7,030 acres on the SPRNCA under Alternative A would maintain the potential for grazing to conflict with dispersed motorized and

nonmotorized recreation users. Allowing livestock grazing on the entire SPRNCA under Alternative B would increase the potential for grazing to conflict with dispersed motorized and nonmotorized recreational users. Alternative C would also increase the potential for grazing conflicts by managing 19,420 more acres available for grazing compared with Alternative A. Alternatives A through C could also increase the potential for cattle to degrade the quality of trails, disturb soils and vegetation, disrupt riparian ecosystem functions, and result in an overall decline in the quality of recreation conditions. Alternative B would result in the greatest potential for these impacts. Closing the entire SPRNCA to livestock grazing under Alternative D would eliminate the potential for grazing to conflict with dispersed motorized and nonmotorized recreational users; however, additional fencing and other range infrastructure to keep livestock out of the SPRNCA could block access to recreation opportunities, such as hunting, birding, and other activities that may require off-trail access across the SPRNCA boundary.

Conclusions

Under all alternatives, the SPRNCA would continue to provide a mixture of developed and dispersed recreation opportunities, including educational and interpretive opportunities at several developed sites. Designating motorized backcountry RMZs would accommodate OHV recreation opportunities and improve sportsmen's access for hunting. Limiting OHV travel to designated routes would prevent OHV conflicts with sightseers, bird watchers, hunters, hikers, and others forms of recreation that take place outside of developed sites and trails.

Under Alternative A, the BLM would continue managing the SPRNCA as an SRMA with the goal of providing a diverse range of developed, trail-based, and dispersed recreation opportunities. Under Alternative A, there would be opportunities for motorized, mechanized, equestrian, and pedestrian forms of recreation, geocaching, and dispersed camping. In some areas, there would be opportunities to discharge firearms. While these opportunities would continue to exist, recreation management and the management of other resources and uses would conflict with recreation opportunities in the short and long term. Conflicts would include those between motorized and nonmotorized users on trails, motorized and dispersed activities outside of developed areas, near new ROWs, and in areas where grazing is available. Not implementing vegetation treatments and managing portions of the SPRNCA as VRM Class IV would allow for long-term changes to the landscape that contribute to positive recreation outcomes.

Under Alternatives B and C, the BLM would provide similar opportunities as Alternative A, but would designate RMZs to clarify recreation management objectives for specific areas on the SPRNCA. Designating RMZs would support positive recreation outcomes for the unique forms of recreation occurring in each zone, while minimizing conflicts with incompatible uses. Alternative C would designate a larger primitive RMZ than Alternative B, which would provide more opportunities for backpacking and other activities in a remote, primitive setting. Both alternatives would enhance backcountry and primitive opportunities compared with Alternative A.

Alternatives B and C would equally reduce the potential for new ROWs to conflict with recreation compared with Alternative A; however, by managing more acres as available for grazing, the BLM would expand the potential for grazing to conflict with recreation compared with Alternative A. The potential for grazing and recreation conflicts would be greatest under Alternative B, which would make the entire SPRNCA available for grazing. Alternative C would lessen potential recreational user conflicts on trails

by closing routes within developed interpretive sites and Americans with Disabilities Act-accessible routes to equestrian and mountain bicycles. Implementing vegetation treatments and managing all the SPRNCA as VRM Class II or III would preserve landscape conditions that contribute to positive recreation outcomes.

There would be the most opportunities for primitive, undeveloped recreation under Alternative D, with the least potential for conflicts. This is because Alternative D would designate the largest primitive RMZ and allow dispersed camping in the largest area. Designating the entire SPRNCA as a ROW exclusion area and managing it as unavailable for grazing would eliminate the potential for those uses to conflict with developed and dispersed recreation opportunities. Under Alternative D, the BLM would also close routes to equestrian, mountain bicycles, and OHV uses. This would provide more opportunities for pedestrian-based activities with less potential for conflicts. Compared with Alternative A, Alternative D would emphasize nonmotorized, backcountry, and primitive use and would provide fewer opportunities for recreational OHV use.

Cumulative Impacts

The analysis area for recreation is the planning area. Past actions that have affected recreation are primarily related to the development of the San Pedro Trail system and public use areas, trailheads, and interpretive sites.

Demand for recreation is growing on the SPRNCA. Cumulative impacts on recreation opportunities and potential for conflicts would be greatest under Alternative A because the BLM would allow the most types of recreation across the largest portion of the SPRNCA and provide the least protections from conflicting uses such as ROWs and grazing.

Under Alternative A, no specific vegetation treatments would be implemented, which would result in long-term changes in the landscape and trails that contribute to positive recreation outcomes. Overgrown vegetation could also increase the number and intensity of wildland fire, which would decrease recreation opportunities.

Under Alternatives B and C, the BLM would mostly decrease the potential for cumulative impacts compared with Alternative A by designating RMZs to support specific recreation opportunities and minimize conflicts. The exception is that under Alternatives B and C, the BLM would increase the number of acres available for grazing, which would cumulatively affect recreational setting by increasing the presence of cattle and range improvements, which could conflict with recreation and degrade trail surface conditions. Vegetation treatments would reduce the potential for long-term cumulative impacts from overgrowth and wildland fire.

Excluding ROWs, managing the SPRNCA as unavailable for grazing, closing some routes to non-pedestrian travel modes, and limiting the areas available for firearm discharging would reduce potential cumulative impacts on developed and dispersed forms of recreation. Cumulative impacts from vegetation overgrowth and wildland fire could be slightly more than Alternatives B and C because fewer acres would be treated.

Compared with Alternative A, management under Alternatives B through D would increase the BLM's ability to accommodate increasing demand by facilitating opportunities for visitors to experience positive recreation outcomes throughout the recreational settings available on the SPRNCA.

3.3.3 Travel Management

Affected Environment

Current travel management designations were established in the Safford RMP, which designated the entire SPRNCA as limited to designated routes and trails. The Riparian Management Plan and the San Pedro Intermodal Transportation Plan designated motorized routes and the San Pedro Trail system. These plans also identified a system of interconnected access points. The system of trails and access points has been largely implemented and maintained.

In June 2014, the BLM completed a route inventory (see **Figure 3-18** [**Appendix A**]). The 2014 route inventory identifies all roads and trails that are providing access for administrative purposes and public use on the SPRNCA.

There are approximately 166 miles of routes used for administrative vehicle access. Administrative roads are single lane and 10 to 16 feet wide. The BLM continually evaluates administrative access needs in the planning area for travel management purposes and based on the needs of other resource management programs. Additionally, the BLM coordinates with other agencies, partners, and authorization holders, including USGS, grazing permittees, ROW holders for utilities or other infrastructure, and US Border Patrol, to identify administrative access needs on the SPRNCA.

Under current management, foot and horse traffic is allowed throughout the SPRNCA, including off trail.

Analysis

Travel designations support resource programs and are designed to help achieve their objectives. The land use emphasis for each area guides travel designations. Consequently, the travel designations would adhere to the management prescriptions included under each alternative, while following the theme of each alternative. Impacts result from resource allocations, management actions, and allowable use decisions. For example, a decision to close routes to protect wildlife habitat could have impacts on recreation opportunities and wildlife habitat. In this case, the impacts of improved wildlife habitat and loss of recreation opportunity flows from the wildlife decision, not a travel decision. These types of impacts are discussed in those particular resource sections of this chapter.

As required by Executive Order and regulation, this RMP makes area allocation travel management decisions only. The RMP classifies all BLM-administered lands as open, limited, or closed to motorized travel, as discussed in **Chapter 2**. Travel management implementation decisions for the RMP are being deferred to an implementation plan. During future implementation-level planning, for areas classified as limited, the implementation plan would designate the types or modes of travel, such as pedestrian, equestrian, bicycle, and motorized; limitations on time or season of use; limitations on certain types of vehicles (e.g., OHVs, motorcycles, all-terrain vehicles, and mechanized vehicles [mountain bikes]); limitations on licensed or permitted vehicles or users; limitations on BLM administrative use only; or other types of limitations.

3.3.4 Lands and Realty

Affected Environment

The lands and realty program consists of three primary elements: land use authorizations (including renewable energy), land tenure, and withdrawals.

The following sections describe the current lands and realty conditions on the SPRNCA for these three program areas.

Land Use Authorizations

The BLM issues land use authorizations for the use, occupancy, and development of BLM-administered lands. Types of BLM land use authorizations include ROWs, communication site leases, R&PP Act leases, and FLPMA permits, leases, and easements.

Location and Conditions

There are 47 ROWs on the SPRNCA, most of which were issued via private easements or similar agreements by the private landowner before the BLM began administration of the land. These ROWs are considered valid existing rights. The BLM allows for the continued operation and maintenance of these ROWs, subject to the terms and conditions of the private easements or other agreements. Existing ROWs are State Highways 82, 90, and 92; two Cochise County roads; and many other ROWs for water and natural gas pipelines, utility easements, power lines, and telephone lines (see **Table 3-59**). Of the nearly 1,900 acres of ROWs on the SPRNCA, over 1,300 are associated with abandoned Union Pacific Railroad lines. Although the rails and ties have been removed, Southern Pacific retains ownership of the decommissioned lines (BLM 2017). Some ROWs, such as railroad ROWs and the El Paso Gas pipeline, are fee title, meaning that the lands are owned by the railroad or utility company. These authorizations also pre-date and were not a part of the land acquisition that formed the SPRNCA. These are not administered by the BLM.

Table 3-59
Existing Lands Authorizations

Existing Authorization*	Number
ROW roads	5
ROW Federal Aid Highway	2
ROW county road	4
ROW telephone lines	3
ROW railroads	11
ROW power or fiber optic lines	8
ROW gas pipelines	4
ROW border fence	1
ROW water facilities (pipelines)	7
ROW miscellaneous (wells)	2
Total	**47**

Source: BLM 2017

*Some ROWs, such as railroad ROWs and the El Paso Gas pipeline, are fee title, meaning that the lands are owned by the railroad or utility company. These authorizations also predate and were not a part of the land acquisition that formed the SPRNCA. These are not managed by the BLM SPRNCA.

For new land use authorizations, the BLM restricts development in areas where it would adversely affect the SPRNCA's unique resource values. Accordingly, the BLM reviews applications for ROWs and other land use authorizations on a case-by-case basis. This is to ensure the proposed development would minimize disturbances and be consistent with the management objectives of the area.

Demand for new or expanded land use authorizations in the planning area, particularly ROWs for energy and telecommunications equipment, is anticipated to increase in correlation with future residential and commercial development and associated energy and communication needs. Restrictions on new ROW development intended to preserve the unique qualities of the SPRNCA are expected to limit the number and type of authorizations the BLM approves throughout the life of the RMP.

Renewable Energy

The BLM lands and realty program deals with wind and solar energy development. These resources on BLM-administered lands are becoming increasingly attractive for energy developers.

Location and Conditions

As part of the programmatic EISs for wind and solar (BLM 2005, 2012), the BLM identified areas where future wind and solar energy development would be prohibited. These exclusion areas were identified to preserve sensitive environmental values that are not compatible with utility-scale energy development. Both documents identify the SPRNCA as one of these exclusion areas. In addition, the Restoration Design Energy Project, an initiative of the Arizona BLM to promote solar energy development in the state, eliminated all NCAs from consideration for future development. The BLM may consider small solar developments for administrative sites as needed and in conformance with the plan.

Utility Corridors and Communication Sites

The BLM uses utility corridors as a planning-level tool to guide future land use authorizations. Corridors identify preferred areas for placing or collocating multiple linear ROWs. Infrastructure within corridors may include gas and water pipelines, power lines, and communication lines, such as telephone, fiber optic, and cable. The BLM encourages the placement of new ROWs within existing corridors to the extent possible; however, such factors as origin, destination, purpose, compatibility, and saturation of an existing corridor may prevent or limit placement of a new facility in or next to an existing corridor. Likewise, the proposed placement of a ROW in a designated corridor does not guarantee the authorization of that ROW.

Telecommunications and other service providers lease public lands for locating and operating telecommunication facilities. Most communication sites have multiple collocated facilities, typically including towers, buildings, and other supporting equipment. The BLM manages communication sites through land use plans and individual communication site management plans.

Location and Conditions

There is one designated ROW utility corridor in the planning area, which was established as part of the San Pedro River Riparian Management Plan. This corridor crosses the NCA along Charleston Road and is consistent with an existing electrical transmission line ROW. There is also a 230-kilovolt transmission line that is not in an existing utility corridor. This line and associated ROW runs north to south, from Highway 82 to Charleston Road.

There are no designated communication sites or facilities on the SPRNCA; however, there is a remote video surveillance system tower, associated control facilities, and access road in the southern portion of the SPRNCA; it is managed by the US Border Patrol and is an authorized ROW.

New land use authorizations, such as ROWs, are restricted on the SPRNCA to areas where such development would not adversely affect NCA resources; however, as the demand for land use authorizations on the SPRNCA and surrounding region increases, there may be a need to authorize new development. New communication sites are generally prohibited on the SPRNCA.

Land Tenure

Land tenure management refers to those actions that result in the BLM exchanging, disposing of, or acquiring nonfederal lands or interests in land. The FLPMA requires that public land be retained in public ownership unless, because of land use planning, disposal of certain parcels is warranted and in the public interest. Tracts of land that are designated in BLM land use plans as potentially available for disposal can be conveyed out of federal ownership through sale or via an exchange for other lands.

Land exchanges—These are the most frequently used method of conveying lands out of public ownership and are initiated in direct response to public demand or by the BLM to improve management of the public lands. Lands need to be formally determined as suitable for exchange.

Acquisition—Lands considered for acquisition are those that meet specific land management goals identified in the RMP. Nonfederal lands considered for acquisition through exchange of suitable public land are evaluated on a case-by-case basis, where the exchange is in the public interest, and where acquisition of the nonfederal lands will contain higher resource or public values than the public lands being exchanged. Acquired land, whether purchased, donated, or exchanged, must provide for the public purpose by meeting specific resource or resource use objectives.

The Arizona-Idaho Conservation Act (PL 100-696, Section 105) states that the BLM "may acquire lands or interests in lands within the boundaries of the SPRNCA by exchange, purchase, or donation, except that any lands or interests therein owned by the State or local government may be acquired by donation or exchange only. Any purchase or exchange of lands to be added to the SPRNCA shall require the consent of the owner of those lands or rights." The act also specifies that any land acquired in the boundaries of the SPRNCA become part of the NCA.

Location and Conditions

All BLM-administered lands on the SPRNCA are identified for retention. No federal lands have been designated for disposal through any means.

Withdrawals

Unlike a land tenure adjustment, such as a disposal or exchange where there is a change in landownership and associated transfer of title, a withdrawal places a title encumbrance on the land. Withdrawals are formal actions that set aside, withhold, or reserve federal land by statute or administrative code to achieve one or more of the following:

- Implement a specific resource management objective, such as by closing federal land to operation of all or some of the public land or mineral laws
- Transfer total or partial jurisdiction of federal land between federal agencies
- Dedicate federal land to a specific public purpose

Withdrawals are used to preserve sensitive environmental values, protect major federal investments in facilities, support national security, and provide for public health and safety. Withdrawal segregates a portion of BLM-administered lands and suspends certain operations of the public land laws, such as mining claims or approval of land use authorizations.

Types of withdrawals are administrative withdrawals, presidential proclamations, congressional withdrawals, and Federal Power Act (43 USC 31) withdrawals.

Administrative withdrawals are those made by the president, Secretary of the Interior, or other BLM Authorized Officer. The president has the authority under the Antiquities Act of 1906 (16 USC 431) to designate objects or areas of historic significance, such as historic structures and national monuments.

Congress also can mandate withdrawals by passing public laws. Congressional withdrawals include those for national parks, wilderness areas, and WSRs.

FLPMA (43 USC 1714) restricts all withdrawals to the minimum time and acreage required to serve the public interest, to maximize the use of withdrawn lands consistent with their primary purpose, and to revoke all withdrawals that are no longer needed.

Location and Conditions

There are two land withdrawals on the SPRNCA, which transfer land management authorities for approximately 2,000 acres to the Bureau of Reclamation. Both withdrawals are associated with the Charleston Dam and Reservoir, which were never developed. The BLM has continued to administer the surface since the late 1980s. In addition, there is a 350-acre USGS Federal Power Act withdrawal that predates the formation of the BLM but is still in effect (BLM 2017). This withdraws the lands covered by the application from the operation of the public land laws. It will remain in effect until vacated by an opening order.

Analysis Methods

This section discusses the potential effects of decisions and management actions on lands and realty. A metric (e.g., acres or miles) was selected whenever possible to best reflect the scale and magnitude of these effects. A GIS dataset and overlays of resources and resource uses were used to quantify effects when available.

The analysis area for lands and realty is the SPRNCA.

Indicators

This analysis uses indicators of impacts to describe the magnitude, location, and type of change from current characteristics as described in the affected environment section above. Indicators of impacts on lands and realty are as follows:

- Acres of land identified for acquisition
- Acres of land in ROW exclusion areas
- Acres of land in ROW avoidance areas
- Total linear miles of designated utility corridors for linear projects

Assumptions

Assumptions for the analysis of impacts on lands and realty are as follows:

- Areas identified as priorities for land acquisition will be acquired during the life of the plan.
- Land acquired will be managed per the applicable RMP decisions in that area where the land is located.

Impacts Common to All Alternatives

Land Use Authorizations

There would be no impacts common to all alternatives.

Land Tenure

Land tenure adjustments allow the BLM to acquire lands to protect sensitive resources, maintain public values, and improve overall resource management. For example, land tenure adjustments can facilitate the protection of threatened, endangered, and BLM sensitive species habitat, riparian areas, wetlands, recreation areas, visually sensitive areas, and cultural resource sites; however, in some cases, acquiring or retaining noncontiguous parcels can complicate access, decrease management efficiency, and increase overall management costs.

Under all alternatives, the BLM would retain all lands on the SPRNCA and prioritize 2,270 acres for possible acquisition. This would allow the BLM to maintain or improve overall public and resource values on those lands.

The nature and extent of the impact would be determined by the extent to which the management affects the BLM's ability to acquire inholdings and edge holdings, maintain access to other BLM-administered lands, and carry out its multiple-use mandate under FLPMA.

Alternatives Comparison Analysis

Land Use Authorizations

Resources and resource uses directly affect the lands and realty program by prescribing ROW exclusion and avoidance areas and stipulations. This is done to protect resources or to reduce conflicts with other uses. In ROW exclusion areas, the BLM would not allow new ROW authorizations. ROW applications could be submitted in ROW avoidance areas; however, a project proposed in these areas may be subject to additional requirements, such as resource surveys and reports, construction and reclamation engineering, long-term monitoring, special design features, special siting requirements, timing limitations, and relocation. Such requirements could restrict project location. Restrictions on land use authorizations directly affect the BLM lands and realty program by limiting or prohibiting use authorizations in those areas.

Designating ROW avoidance areas and applying special stipulations would increase application processing time and costs. This would be due to the potential need to relocate facilities or to the requirement for greater design, mitigation, or siting.

New infrastructure can be placed in areas designated as open to ROWs, subject to standard terms and conditions of any applicable local, state, and federal permits.

Collocating new infrastructure in existing ROWs reduces land use conflicts and additional land disturbance. Collocation policies also clarify the preferred locations for new utilities, but they can limit a project proponent's options for selecting ROW locations. See **Table 3-60** for a comparison of ROW avoidance and exclusion areas by alternative.

Table 3-60
Acres in ROW Open, Avoidance, and Exclusion Areas

ROW Decisions	Alternative A	Alternative B	Alternative C	Alternative D
Open	55,780	0	0	0
Avoidance	0	55,780	55,780	0
Exclusion	0	0	0	55,990
Corridor	210	210	210	0

Source: BLM 2018

Managing the entire SPRNCA as open under Alternative A would allow the BLM to accommodate demand for new ROWs anywhere on the SPRNCA. There would be little incentive to collocate new infrastructure in the Charleston Utility Corridor. Alternatives B and C would encourage, but not require, new ROWs to be collocated in the corridor. Managing the SPRNCA as a ROW avoidance area would reduce, but not eliminate, opportunities for the BLM to accommodate new ROWs. Alternative D would eliminate the potential for new ROWs throughout the entire SPRNCA, including in the Charleston Utility Corridor. The BLM could not accommodate demand for future ROWs on the SPRNCA under Alternative D.

Land Tenure

See *Impacts Common to All Alternatives*.

Withdrawals

Under Alternative A, the BLM would maintain the Charleston Dam and Reservoir withdrawal, which would maintain that administrative impact. Under Alternatives B through D, seeking approval to revoke the withdrawal would relieve the BLM of the administrative demand because the land would revert to the same management as in the RMP.

Conclusions

Under all alternatives, retaining all public lands and seeking to acquire 2,270 acres of private inholdings and edge holdings would increase management efficiency and improve overall resource management on the SPRNCA. Similarly, seeking approval to revoke the Charleston Dam withdrawal under Alternatives B through D would reduce the BLM's administrative requirements compared with Alternative A.

Under Alternative A, the BLM would be able to accommodate demand for new ROWs throughout the SPRNCA because the entire SPRNCA would be available for ROW location. Designating all areas on the SPRNCA except the Charleston Utility Corridor as a ROW avoidance area under Alternatives B and C would limit the type and location of new ROWs. New ROWs would be encouraged to collocate in the corridor. There would be no new ROWs under Alternative D because the entire SPRNCA would be a ROW exclusion area, and the Charleston Utility Corridor would be undesignated.

Cumulative Impacts

The analysis area for lands and realty is the planning area. Past actions that have affected lands and realty include the development of roads, power lines, and other ROWs; establishment of the Charleston Utility Corridor; the Charleston Dam withdrawal; and urban development surrounding the SPRNCA. Lands and realty would continue to be affected by existing ROWs and demand for new ROWs, both of which place an administrative demand on the lands and realty program (see **Table 3-1**).

Continued urban growth, such as the master-planned communities in Sierra Vista and Benson, could affect lands and realty by increasing the demand for new ROWs on the SPRNCA.

Under Alternative A, managing the SPRNCA as open to new ROWs would allow the BLM to accommodate current and future demand for land use authorizations. Managing more than 99 percent of the SPRNCA as ROW avoidance areas under Alternatives B and C would reduce but not eliminate the potential for accommodating demand for new ROWs. Avoidance criteria could limit the number, type, and location of new land use authorizations.

Managing the SPRNCA as a ROW exclusion area under Alternative D would eliminate the potential for the BLM to accommodate future ROW demand, including in the Charleston Utility Corridor.

3.4 SPECIAL DESIGNATIONS

The SPRNCA does not contain any congressionally designated wilderness areas or designated backcountry byways.

3.4.1 Areas of Critical Environmental Concern

Affected Environment

An ACEC is defined in FLPMA, Section 103(a), as an area on BLM-administered lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources; or other natural systems or processes, or to protect life and ensure safety from natural hazards. Three ACECs, totaling 2,170 acres of BLM-administered lands, are found on the SPRNCA (**Figure 2-30** [**Appendix A**]). All three are RNAs; how each RNA/ACEC is managed is described in **Chapter 2**, **Section 2.5.15**. Details of each ACEC, as well as the ACEC evaluation process, are included in **Appendix C**.

In accordance with BLM Manual 1613, Areas of Critical Environmental Concern (BLM 1988), the BLM interdisciplinary team reviewed BLM-administered lands in the planning area to determine whether any new areas should be considered for designation as ACECs, if the existing ACECs should continue to be managed as RNA/ACECs, or if they should be expanded or reduced to protect the ACEC values. Based on the relevance and importance criteria defined in BLM Manual 1613, the review determined that the three existing RNA/ACECs should be expanded and considered for designation in this planning process. In addition, the BLM identified two new areas, the Curry-Horsethief and Lehner Mammoth areas, for consideration for their cultural, historic, and paleontological values. No specific, external ACEC nominations were received. Evaluation results are shown in **Table 3-61**. The expanded acres, or potential ACECs, are evaluated under Alternative D.

Table 3-61
Potential ACECs on the SPRNCA

Name	Current Acres (Alternative A)	Potential ACEC[1] (Acres)	Relevant and Important Values
St. David Ciénega RNA	380	2,710	Historic and cultural, fish and wildlife, rare plants, natural processes
San Pedro River RNA	1,420	7,230	Historic and cultural, fish and wildlife, natural processes
San Rafael RNA	370	560	Fish and wildlife, rare plants, natural processes
Curry-Horsethief	0	2,540	Cultural, historic, paleontological
Lehner Mammoth	0	30	Cultural, historic, paleontological
Total	**2,170**	**13,070**	

Sources: BLM 1991; BLM GIS 2017; BLM 2017.

[1]Total acres determined to meet the relevance and importance criteria, as defined by 43 CFR 1610.7-2(a)(1) and 1610.7-2(a)(2), and guidance in BLM Manual 1613 (BLM 1988), are considered potential ACECs and they are considered only under Alternative D; see **Appendix C**.

Analysis Methods

This section describes impacts related to the St. David Ciénega, San Pedro, and San Rafael ACECs, both existing areas and proposed expansions, and the proposed Curry-Horsethief and Lehner Mammoth ACECs. In the analysis, these areas are referred to as "potential ACECs," regardless of whether they are designated in a particular alternative. They are the 13,070 acres that were determined to have relevant and important values and meet the criteria for designation as an ACEC.

Direct impacts on potential ACECs are those that either diminish or enhance the values for which the potential ACEC was proposed for designation. As such, the discussion focuses on relevance and importance criteria as a whole and if these values would receive adequate protection without special management derived from ACEC designation. The values themselves are not expressly analyzed. A qualitative description of whether protection of relevant values is deemed to be adequate without ACEC designation is used.

The analysis area used to analyze impacts on ACECs is the planning area. Impacts identified for ACECs are specific to the area and are based on the impact that management actions would have on the relevant and important values of an ACEC (**Table 3-61**).

The indicator of impacts on potential ACECs is the following: management actions that would fail to "prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards" (BLM 1988).

In addition to the assumptions in **Section 3.1**, this analysis assumes the following:

- Although management actions for most resources and resource uses have SPRNCA-wide application, ACEC management prescriptions apply only to those lands in each specific ACEC, as outlined in **Chapter 2**.
- ACEC designation provides protection and focused management of relevant values beyond that provided through general management of the parent resource. For example, the cultural resource ACECs would receive greater recognition and protection than the general

management action regarding cultural resources; the ESA, as amended, protects threatened and endangered plants, whereas an ACEC for special status plants would offer greater protection of ecosystem processes for plants and focused management.

- Permitted activities would not be allowed to impair the relevant and important values for which the ACECs are designated.

Impacts Common to All Alternatives

In general, management actions that protect resources, such as ground disturbance restrictions, management for desired plant communities and habitats, travel restrictions and closures, and recreation restrictions, would help maintain and improve the important and relevant values in potential ACECs. In the same fashion, management actions that create the potential for resource degradation, such as livestock grazing and infrastructure development, could lead to impacts on the relevant and important values; therefore, management of the primary purposes for which the NCA was established (see **Chapter 1**) is compatible with relevant and important values of potential ACECs. The impacts analyzed in this section are on potential ACECs; in other words, all areas determined to have relevant and important values, regardless of designation.

The legislation that designated the NCA withdrew the area from all forms of mineral entry and location. In addition, NCA management as part of this RMP prohibits new communication sites and allows only minor land use authorizations This management helps protect relevant and important values by eliminating surface disturbance associated with energy and minerals development, the impacts of which include flattening, destroying, or removing vegetation, desired plant communities, and special status plant species; changing the visual landscape; degrading and fragmenting habitat; disturbing wildlife; causing erosion that could degrade aquatic habitats; spreading weeds; damaging cultural or historic resources during road and facility construction; and contaminating surface water from wastewater spills and runoff containing drilling fluids.

Soil and water management could help protect relevant and important values due to complementary management objectives, such as minimizing erosion, improving water quality, and ensuring adequate quantities of water to support healthy riparian and aquatic ecosystems. Protection of instream flows would help protect the aquatic ACEC values of riparian habitats through habitat improvement and improved water quality. Land treatments for soil management could affect relevant and important values.

Under all action alternatives, maintaining or restoring riparian function and managing for appropriate riparian vegetation in the St. David Ciénega, San Pedro, and San Rafael potential ACECs, would protect relevant and important riparian values. Vegetation management objectives also would be complementary to biological ACEC objectives and could protect relevant and important values by maintaining and improving terrestrial and riparian habitat and ecosystems. Vegetation and weed treatments in potential ACECs through physical, mechanical, biological, herbicidal, or fire methods could cause short-term degradation of certain resources. This would be due to increased potential for soil erosion and sedimentation and removal of stream-shading vegetation and habitat. Over the long term, these treatments would improve the relevant and important biological values in these potential ACECs. This would result from creating healthier functioning ecosystems and habitat in cases where they are successful; however, they could cause prolonged degradation in cases where they do not succeed as planned.

Special status species and habitat management would prevent degradation of, and could improve, biological relevant and important values. This would be due to complementary species protection management objectives. These objectives would be achieved through augmentation and reintroduction of native species and habitat protection, restoration, and improvement. Specific impacts of these actions on relevant and important values include increases in species populations and habitat improvements.

Depending on their extent, location, and severity, wildfires could cause short- and long-term damage to relevant and important values. This would result from habitat removal, changes to the visual landscape, sedimentation of waterways, increased likelihood of weed invasion, conversion to weeds, and destruction of surface features or their scientific value. Under all alternatives, emergency stabilization and response techniques would be applied to minimize the impacts of wildfires. If these techniques were successful, wildfires could also improve relevant and important values in the long term by maintaining natural vegetation ecosystem cycles.

Cultural and paleontological resources management strategies would be commensurate with protection of relevant and important ACEC values in all five potential ACECs.

Under all alternatives, impacts from motorized and mechanized travel would be minimized by limiting use to designated routes (Alternatives A, B, C, and D) or closing use (Alternative D). Continuing to allow dispersed foot and horse travel cross country could affect relevant and important values if repeated use created new trails.

Managing segments as eligible (Alternative A) or suitable (Alternatives A, B, C, and D) for inclusion in the NWSRS would protect potential ACECs where they overlap the WSR study corridor, particularly the riparian vegetation along the river. This is because the BLM would take no action that would adversely affect the free-flowing condition, ORVs and adequate water quality to support those ORVs, or tentative classification of the eligible segments. The San Pedro and Babocomari Rivers, identified as eligible or suitable for inclusion in the NWSRS, flow through or next to all potential ACECs, except the Lehner Mammoth potential ACEC; thus, the four overlapping or adjacent potential ACECs would receive some indirect protection from WSR management.

Alternatives Comparison Analysis

As previously described, there are 13,070 acres on the SPRNCA that were determined to have relevant and important values that qualify to be potential ACECs. **Table 3-62** estimates the potential acreage of impacts on designated and undesignated ACECs. Designated ACECs are those acres of potential ACECs that would be designated under a given alternative. Undesignated ACECs are those acres of potential ACECs that would not be designated under a given alternative.

The potential ACECs with a cultural relevant and important value within a cultural setting are dependent upon the visual setting. VRM can be used as a tool to manage the cultural setting upon which the cultural relevant and important value depends. Under Alternative A, managing 17 percent of potential ACECs according to VRM Class I objectives would protect visual values of the ACECs by limiting developments to limited activities.

Managing potential ACECs as VRM Class II (less than 1 percent in Alternative A and 100 percent in Alternative D) would protect relevant and important values from most impacts associated with

Table 3-62
Potential Acreage Impacts on Potential ACECs

Management Action	Alternative			
	A	B	C	D
VRM Class I				
Designated ACECs	2,160	0	0	0
Undesignated ACECs	0	0	0	0
VRM Class II				
Designated ACECs	10	0	0	13,070
Undesignated ACECs	3,850	7,430	7,430	0
VRM Class III				
Designated ACECs	0	0	0	0
Undesignated ACECs	6,410	5,630	5,630	0
VRM Class IV				
Designated ACECs	0	0	0	0
Undesignated ACECs	690	0	0	0
Available for livestock grazing				
Designated ACECs	2,170	0	0	0
Undesignated ACECs	0	13,070	1,150	0
SRMA (Alternative A) or ERMA Backcountry and Backcountry (motorized) RMZ (Alternatives B and C)				
Designated ACECs	2,170	0	0	0
Undesignated ACECs	0	12,010	7,690	0
ERMA Rural RMZ (Alternatives B and C) or ERMA Primitive RMZ (Alternative D)				
Designated ACECs	0	0	0	4,370
Undesignated ACECs	0	1,050	1,050	0
Mechanized/motorized paths (miles)				
Designated ACECs	4	0	0	31
Undesignated ACECs	27	31	31	0
Open to ROWs (not subject to avoidance or exclusion)				
Designated ACECs	0	0	0	0
Undesignated ACECs	13,070	0	0	0
ROW avoidance				
Designated ACECs	0	0	0	0
Undesignated ACECs	0	13,070	13,070	0
ROW exclusion				
Designated ACECs	0	0	0	13,070
Undesignated ACECs	0	0	0	0

Source: BLM GIS 2017

management activities with large-scale, ground-disturbing activities. It would, however, allow activities that modify the landscape but have low visual contrast and do not attract attention. Managing potential ACECs according to VRM Class III or Class IV objectives would allow modifications to the landscape that have noticeable or dominant visual contrasts, which may also affect relevant and important values, particularly those associated with cultural landscapes; however, large-scale disturbances are not expected on the SPRNCA under any alternative. The most noticeable disturbance to the casual observer would be from vegetation treatments, which would only have short-term, localized impacts until vegetation is reestablished.

Managing potential ACECs as ROW exclusion (0 percent in Alternative A and 100 percent in Alternative D) makes them unavailable for ROW location, thereby protecting relevant and important

values by eliminating surface disturbance associated with development. In Alternative A, managing 100 percent of potential ACECs as open to ROWs could, where ROWs were developed, degrade relevant and important values due to surface disturbance associated with development. While not as protective as ROW exclusion, managing 100 percent of potential ACECs as ROW avoidance areas in Alternatives B and C makes them available for ROW location on a case-by-case basis. Relevant and important values could be degraded if development requiring a ROW permit were to occur in the area; however, as described under *Impacts Common to All Alternatives*, prohibiting commercial energy development and new communication sites and allowing only minor land use authorizations would continue to help protect ACEC values. It would do this by minimizing or eliminating surface disturbance associated with development.

Recreation management in potential ACECs would protect ACEC values by providing dispersed, undeveloped uses. Recreation facility development would be designed to avoid affecting ACEC values. Some incidental impacts from recreation use could cause localized damage to vegetation, degrade and fragment habitat, disturb wildlife, spread weeds, and damage cultural or historic resources. Impacts would be reduced where camping is restricted to designated sites or prohibited (17 percent of potential ACECs in Alternative A and none in Alternative D) and where travel is closed (34 percent of potential ACECs in Alternative D). In Alternative D, the ERMA Primitive RMZ physical component of naturalness and minimal and rustic improvements or facilities would also help protect ACEC values in 33 percent of potential ACECs.

In Alternative A, development for recreation uses would disturb the surface and could affect ACEC values on 17 percent of potential ACECs, as well as the 3 campgrounds (40 acres), 1 recreation site (1 acre), and 4 miles of trail included in the Alternatives A and B recreation RFD, where they overlap with potential ACECs. In Alternative B (92 percent of potential ACECs) and Alternative C (59 percent of potential ACECs), the ERMA Backcountry and Backcountry (motorized) RMZ's largely natural areas, with some improvements or minimal and rustic facilities for resource protection, would help retain ACEC values. Increased user numbers and potential recreation developments and facilities in the Rural RMZ would be designed to avoid impacts on ACEC values.

The Alternative C recreation RFD includes 1 recreation site (1 acre) and 4 miles of trail, which, where they overlap with potential ACECs, would disturb the surface and could affect relevant and important values. Under Alternatives B and C, developing interpretative plans and paths would help protect the relevant and important values of the undesignated St. David Ciénega and Curry-Horsethief ACECs.

Making potential ACECs unavailable for livestock grazing would help protect the relevant and important values by precluding grazing infrastructure development, vegetation removal, weed spread, and riparian areas and habitats degradation. Livestock could also damage special status plants by consuming or damaging them. The alternative with the greatest potential for impact is Alternative B, where all of the potential ACECs would be available for livestock grazing. Alternative D would preclude impacts from livestock grazing because the SPRNCA would be unavailable for livestock grazing. Under Alternative C, only 9 percent of potential ACECs would be available for livestock grazing and subject to impacts.

Conclusions

In general, under all alternatives, management of the primary purposes for which the NCA was established is compatible with relevant and important values of potential ACECs. Designation of three

existing ACECs (4 percent of the decision area) under Alternatives A, and of three ACEC expansions and two new ACECs (27 percent of the decision area) in Alternative D, would protect the relevant and important values in those areas. Not designating three ACEC expansions and two new ACECs in Alternative A, or any ACECs in Alternatives B and C, could result in degraded ACEC values, although values would generally still be protected where areas are VRM Class I or II, unavailable for livestock grazing, and managed as ROW exclusion.

Cumulative Impacts

The cumulative impacts analysis area is the planning area. Past, present, and RFFAs and acres associated with those actions in the planning area (**Table 3-1**) that have affected and would likely continue to affect ACECs are developments and facilities, recreation, route construction, ROWs, housing developments (if within the viewshed), weed invasion and spread, weed control, prescribed and wildland fires, and vegetation treatments. Cumulative impacts on potential ACECs could result from non-BLM actions and decisions on lands next to ACECs. While protections exist in potential ACECs, population growth, development, and recreation throughout the planning area could, over time, encroach on these areas. Activities such as unauthorized off-route travel, trash dumping, increased noise, and air and light pollution could degrade relevant and important values.

Other impacts include displacement of species, habitat fragmentation, and changes to the visual landscape that could affect relevant and important values. Visual disturbances, including any structures or resource developments noticeable in the viewshed of ACECs with cultural values (all ACECs except San Rafael), can affect the cultural setting. Impacts would be greater where recreation areas or development were next to an ACEC. The direct and indirect impacts of the alternatives, described above, would cumulatively contribute to the impacts of these RFFAs.

3.4.2 Wild and Scenic Rivers

Affected Environment

WSRs are streams or stream segments designated by Congress under the authority of the Wild and Scenic River Act (WSR Act) of 1968 (PL 90-542, as amended; 16 USC 1271–1287). Their purpose is to preserve the stream or stream section in its free-flowing condition, to preserve water quality, and to protect ORVs. ORVs are identified on a segment-specific basis and may include scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values.

Two segments of the San Pedro River, totaling approximately 44 river miles, were studied in 1997 for potential addition to the NWSRS. Both segments were determined suitable for designation in the NWSRS with a recreational classification. The San Pedro River was reevaluated to determine if any changes have occurred to the river values and the river's suitability.

To fulfill Section 5(d)(1) of the WSR Act, the BLM evaluates streams when developing or revising its RMPs. Public scoping comments also requested that the BLM consider designation potential of other decision area streams. As such, the Babocomari River was studied, and a 4-mile segment was found eligible for designation, with a tentative scenic classification.

The suitability of the San Pedro River for designation based on the tentative reclassifications is considered in this RMP. The suitability of the Babocomari River is also considered based on the tentative classification identified in the eligibility study. Eligibility findings are shown in **Table 3-63**.

Table 3-63
Eligible River Segments

River: Segment	Miles on BLM-Administered Land	Acres on BLM-Administered Land[1]	Tentative Classification/ Reclassification[2]	ORVs
Babocomari River Segment 1	4.0	530	Scenic	scenic, recreational, wildlife, cultural, and historic
San Pedro Segment 1: US-Mexico Border to State Route 92	4.8	1,799	Scenic	scenic, recreational, fish, wildlife, cultural, historic, and paleontological
San Pedro Segment 3: Waters Road to Hereford Road	2.6	1,029	Recreational	
San Pedro Segment 4: Hereford Road to Garden Wash	9.6	4,378	Wild	
San Pedro Segment 5: Garden Wash to State Route 90	0.9	542	Recreational	
San Pedro Segment 6: State Route 90 to Charleston Road	7.1	1,818	Scenic	
San Pedro Segment 7: Charleston Road to State Route 82	9.7	3,454	Wild	
San Pedro Segment 8: State Route 82 to Willow Wash	2.0	639	Recreational	
San Pedro Segment 9: Willow Wash to St. David Diversion Ditch	8.4	1,919	Wild	
San Pedro Segment 10: St. David Diversion Ditch to the SPRNCA Boundary	3.3	989	Recreational	
Total	**52.4**	**17,097**		

Source: BLM 2016

[1]Segments not on BLM-administered lands are ineligible and, therefore, are excluded. Acres of nonfederal land within the river study corridor are also excluded.
[2]Reclassification applies to the San Pedro River segments.

Stream segments found to be eligible for inclusion in the NWSRS are carried forward to the suitability phase of the WSR analysis. In this phase, tradeoffs between corridor development and stream protection are considered by applying eight criteria to each eligible segment.

Preliminary suitability determinations for the Babocomari and San Pedro Rivers are made as part of this RMP and EIS; see **Chapter 2, Section 2.5.16**. A final determination of suitability, as well as protective management measures, will be issued in the ROD for this RMP.

The total impacts of past and present development in the planning area are on approximately 5,786 acres. Development in the Babocomari River corridor includes the old railroad grade, now used as a trail and administrative road; some old rangeland fences; residential lots on SPRNCA inholdings; livestock grazing infrastructure; and dispersed recreation.

Analysis Methods

The analysis area consists of the 10 eligible river segments studied for suitability for inclusion in the NWSRS, in conjunction with the RMP. The elements of a WSR that can be affected by management actions are the free-flowing characteristics, water quality, ORVs for which the river segment was found eligible, and tentative classification assigned to it. Once determined suitable (and until Congress acts on that determination), protective management would prevent impacts that would impede the free-flowing nature, degrade water quality or the ORVs, or alter the tentative classification; therefore, if a river segment is determined suitable, no adverse impacts are anticipated from BLM actions. River segments not determined suitable would not receive such protection, and their free-flowing characteristics, water quality, and ORVs would be managed to conserve, protect, and enhance the SPRNCA conservation values, but some river values could be adversely affected.

Direct impacts on free-flowing characteristics include any action that would modify the watercourse/streambed, which could include impoundments, channelization, or diversions. Indirect impacts would result from actions (either by the BLM or others) that remove water from the river above the segment, or cause groundwater depletion, which could reduce instream flows below a level that sustains the ORVs or SPRNCA conservation values. Direct impacts on the ORVs depend on the ORVs; they include protection of specific species (biological ORVs), habitat, recreational setting, scenic quality, or historic or cultural resources. Indirectly, ORVs could be affected by actions that improve or enhance them, such as treatments to maintain or improve riparian or other habitats. Direct impacts on water quality occur from activities that increase sedimentation, heavy metals, fecal coliforms, or other pollutants that affect river values.

Elimination of surface disturbance next to the river helps preserve scenic ORVs and tentative classification. The tentative classification (recreational, scenic, or wild) is affected when a level of alteration occurs in the management corridor that shifts its characteristics from one class to another. For example, a scenic river that becomes developed with roads and facilities along its banks may no longer qualify as scenic, but it could still be classified as recreational. For the purposes of analysis, the impacts on free-flowing characteristics and ORVs of river segments not determined suitable are described to identify the consequences, if any, of a negative determination.

Indicators of impacts on WSRs are the following:

- Potential substantial change to the ORVs, free-flowing nature, or water quality of the river segment or corridor area from its current state, as described in the *Affected Environment*, above, and the SPRNCA WSR Eligibility Report (BLM 2016; **Appendix N**)
- For segments determined eligible or suitable for inclusion in the NWSRS, a change to the tentative classification (i.e., wild, scenic, or recreational), as described in the *Affected Environment*, above, and the SPRNCA WSR Eligibility Report (BLM 2016; **Appendix N**)

In addition to the assumptions in **Section 3.1**, the analysis assumes the following:

- Until Congress acts on suitability recommendations, stream segments will be managed under protective measures (**Appendix N**). These provisions protect streamside and riparian habitats, riparian and aquatic species, water quality, cultural and visual resources, and the recreational setting. Eligible streams determined in this RMP as not suitable for inclusion in the NWSRS

would be managed according to land use allocations and management practices in place to conserve, protect, and enhance the SPRNCA conservation values. The protective measures would ensure that the values for which these river segments were found suitable are not compromised until Congress makes a decision regarding WSR designation. The major difference between designation and nondesignation is the long-term protection afforded by legislation, instead of an administrative land use plan. Decisions in this RMP, however, affect suitability only. Once a segment is determined suitable, it can be formally recommended to Congress or the Secretary of the Interior for inclusion in the NWSRS.

- The BLM would not permit any actions on eligible or suitable segments that would affect the free-flowing nature, ORVs, or tentative classification, or that would reduce water quality to the extent that it would no longer support the ORVs. As such, implementing the management actions in this RMP would not affect eligible or suitable segments; impacts are not discussed for the San Pedro River segments under any alternatives or for the Babocomari River segment under Alternatives A, C, and D. For Alternative B, however, under which the Babocomari River segment is found not suitable, the impacts from other management prescriptions on its WSR values are analyzed. This is because the values for which the Babocomari River segment was found eligible would still be present and would be managed among the SPRNCA conservation values. Impacts pertaining to the Babocomari River in Alternative B are discussed in the following analysis.

Managing the primary purposes for which the conservation area was established—that is, aquatic, wildlife, archaeological, paleontological, scientific, cultural, educational, and recreational resources; see **Chapter 1**—is generally compatible with protecting segments that have those ORVs. As such, impacts from managing these resources are not discussed further.

Impacts Common to All Alternatives

The potential impact on a stream segment depends on the ORVs identified for the segment and the tentative classification of the segment. Segments classified as recreational would allow for the greatest level of development in the study corridor, while segments classified as wild must remain relatively undeveloped. Segments classified as scenic fall in between recreational and wild segments, allowing a moderate amount of development in the study corridor. Impacts on that segment classified as scenic are the focus of the analysis of impacts on its classification. In the decision area, impacts on the tentative classification would come mostly from livestock grazing, trail and road development, and recreation site improvements.

In the alternatives described in **Chapter 2**, changing classification of the San Pedro River segments, which would be recreational, scenic, and wild under Alternative D and recreational under Alternatives A, B, and C, would not affect the ORVs. Similarly, changing classification of the Babocomari River segment, which would be scenic under Alternatives A and D and recreational under Alternative C, would not change the ORVs. This is because, under all alternatives where segments would be eligible or suitable, the BLM is obligated to protect the ORVs, as stated above. As such, changing classification of the San Pedro or Babocomari River segments across alternatives is not analyzed.

Prohibiting commercial energy development and new communication sites, allowing only minor land use authorizations, and continuing the withdrawal of all decision area lands to disposal and mineral entry,

would help protect the ORVs and tentative classification of all segments by preventing surface disturbance associated with energy and minerals development.

Alternatives Comparison Analysis

Alternative A

The Babocomari River segment was found eligible based on current management and existing conditions. The BLM must manage all eligible segments to protect the tentative classification, free-flowing condition, ORVs, and adequate water quality to support those ORVs. Because of this, continuing current management would not diminish the aforementioned qualities. ORVs could be indirectly enhanced by management for other resources. The entire segment is in an SRMA, management of which would continue to enhance its recreational ORV.

Alternative B

The entire Babocomari River segment would be determined not suitable for inclusion in the NWSRS and would not be under protective WSR management (described under Alternative A). Quantitative impacts pertaining to the Babocomari River segment are displayed in **Table 3-64**; however, management of other resources would protect the river values and free-flowing condition.

Table 3-64
Acreage Impacts on the Nonsuitable Babocomari River WSR Segment

Management Action	Alternative B
VRM Class II	530
Available for livestock grazing	530
ROW avoidance	530
Potential land acquisition	40
ERMA Backcountry RMZ	470
ERMA Rural RMZ	60
Open to motorized travel	0

Source: BLM GIS 2017

Properly functioning riparian and wetland vegetation communities provide soil stabilization, soil filtration, and diverse vegetation species and, in turn, can protect the wildlife ORV. Weed treatments in the short term may affect river values but, in the long term, would benefit river values. Managing the segment according to VRM Class II objectives would protect its scenic values by limiting visual impacts of allowable activities to low levels that do not attract attention.

Permitting livestock grazing in the entire segment could have minor and localized impacts on the riparian areas, water quality, wildlife habitat, and recreation river values. Livestock grazing and trailing could degrade the river values and diminish habitat for southwest willow flycatcher, yellow-billed cuckoo, northern Mexican garter snake, jaguar, and ocelot. Because livestock grazing is subject to Arizona Standards for Rangeland Health and Guidelines for Grazing (BLM 1997), grazing management would be adjusted in cases where land health standards are not being met due to grazing. These adjustments could include changes in stocking rate, the timing of grazing, and additional terms and conditions to maintain appropriate vegetation species, vegetation density, and bank conditions.

Management actions that prohibit surface-disturbing activities in the WSR river corridor would protect river values, including historic, cultural, fish, scenic, and wildlife. The entire segment would be a ROW avoidance area, and impacts on river values from ROWs would be avoided on a case-by-case basis. The existing ROW for the USGS gauging station has a minimal impact on river values. Prohibiting commercial energy development and new communication sites and allowing only minor land use authorizations would continue to help protect river values. If non-BLM-administered lands within the river corridor were acquired, they would be managed to protect the SPRNCA conservation values.

The 3 campgrounds (40 acres), 1 recreation site (1 acre), and 4 miles of trail included in the Alternative B recreation RFD, where they overlap with the segment, would enhance the recreational ORV but could change the classification from scenic to recreational. The segment would be in an ERMA Backcountry RMZ (94 percent) and Rural RMZ (6 percent). Managing for Backcountry recreation would protect the recreational river values. Uses and activities in the Rural RMZ would be managed to avoid impacts on the wildlife, historic, or cultural river values.

Managing the existing railroad grade for a nonmotorized trail and for administrative vehicle access would continue the existing surface disturbance but would have a minimal effect on river values. Limiting motorized and mechanized travel to designated routes would help protect resources.

Alternatives C and D

The Babocomari River segment would be determined suitable for inclusion in the NWSRS. The river would be classified as recreational under Alternative C and as scenic under Alternative D. The river would be managed to protect its free-flowing condition, water quality, and ORVs until Congress acts on the suitability recommendation.

Conclusions

Under all alternatives, protective management of the suitable San Pedro River would prevent impacts that would impede the free-flowing nature, degrade water quality or the ORVs, or alter the tentative classification. In Alternatives A, C, and D, the Babocomari River is found eligible (Alternative A) or suitable (Alternatives C and D), and protective management would protect the tentative classification, free-flowing condition, ORVs, and adequate water quality to support those ORVs. In Alternative B, the nonsuitable Babocomari River would not be directly protected under protective management, but its ORVs and free-flowing condition would be indirectly protected by other Alternative B management actions and allocations. Its tentative classification could be altered by the recreation RFD where those developments overlap with the segment.

Cumulative Impacts

The cumulative impacts analysis area consists of the 10 eligible river segments studied for suitability for inclusion in the NWSRS. Impacts of past and present development on these segments is discussed in *Affected Environment,* above. Past, present, and RFFAs and acres associated with those actions in the planning area (**Table 3-1**) that have affected and would likely continue to affect WSR segments are developments and facilities, recreation, route construction, ROWs, housing developments (if within the viewshed), weed invasion and spread, weed control, prescribed and wildland fires, and vegetation treatments. The direct and indirect impacts disclosed above cumulatively contribute to the impacts of these RFFAs.

For the Babocomari River segment under Alternative B, where the BLM would not be required to prevent impacts on the free-flowing nature, tentative classification, or ORVs, there could be impacts when approving permits or resource use applications, but these impacts would be minimized or avoided by management to protect the SPRNCA conservation values. The key observation point for the Babocomari River is along the existing trail, and the viewshed is confined by topography. Off-site developments would not generally be visible from the WSR corridor, except for potential residential development on private property along the river corridor. If major projects were proposed and there was no systematic analysis of impacts on river-related values, pursuant to the WSR Act, there could be significant cumulative impacts on river-related values.

Other federal agencies considering permit applications (not under BLM authority) that could affect the free-flowing condition, water quality, ORVs, or tentative classification of any of the eligible or suitable segments would need to seek formal comments from the BLM. Although protective management or actions to protect SPRNCA conservation values would prevent impacts in the decision area, activities on non-BLM-administered lands could affect river values, particularly river flows and the riparian and wildlife habitat values that depend on them. Then the BLM would recommend terms and conditions to eliminate, avoid, or mitigate impacts. Other agencies would not be required to act on the BLM's comments, so the impact on eligible and suitable segments would depend on the decisions outside of BLM authority. For the Babocomari River segments determined not suitable under Alternative B, the BLM would make recommendations on non-BLM-administered activities based on SPRNCA conservation values, not on WSR values.

If suitable segments were formally recommended to Congress or the Secretary of the Interior and then included in the NWSRS, then Alternatives C and D would add 4 miles and 480 acres to the total NWSRS miles and corridor acreage in Arizona, as described in the Arizona Statewide WSRs Legislative EIS (BLM 1994).

3.5 TRIBAL INTEREST, PUBLIC HEALTH AND SAFETY, AND SOCIAL AND ECONOMIC CONDITIONS

3.5.1 Tribal Interest

The following is a discussion of tribal interests and potential impacts that may result from proposed management actions on the SPRNCA. Overall socioeconomic impacts from management actions are discussed in **Section 3.5.3**. This section includes cultural and traditional tribal uses of the planning area, such as harvesting plants and plant parts (e.g., saguaro fruit) and collecting clays, minerals, and pigments, any of which may be for medicinal, ceremonial, or personal uses. Potential impacts on tribal interests regarding archaeological and historic resources, TCPs, and sacred sites are discussed primarily as cultural resources in **Section 3.2.8**.

Affected Environment

As indicated by online data available through the Arizona Government-to-Government Consultation Toolkit (accessed August 4, 2017), 14 contemporary Native American tribes claim interest in the planning area. Claimant tribes include the Ak-Chin Indian Community, Fort McDowell Yavapai Nation, Fort Sill (Chiricahua) Apache Tribe, Gila River Indian Community, Hopi Tribe, Mescalero Apache Tribe, Pascua Yaqui Tribe, Pueblo of Zuni, Salt River Pima-Maricopa Indian Community, San Carlos Apache Tribe, Tohono O'odham Nation, Tonto Apache Tribe, White Mountain Apache Tribe, and the Yavapai-Apache Nation. The BLM has initiated consultation with all of these tribes and has invited them to

become cooperating agencies during the RMP/EIS development. To date, the Hopi Tribe and Tohono O'odham Nation have responded to the BLM as interested parties who claim cultural affiliation to the lands and resources of the SPRNCA. No tribes have signed a cooperating agency memorandum of understanding.

Potential tribal interests in the planning area include a wide range of overlapping economic, social, traditional, and religious practices and uses. The BLM has the responsibility to consult with tribes to consider the conditions necessary to satisfy any economic or resource access concerns and to continue traditional uses in interest areas. Currently, tribal members may be using BLM-administered lands for subsistence and cultural purposes. Tribal traditional or economic interests in the planning area need to be considered during land use and project planning.

Indian trust assets (ITAs) are legal interests in property, physical assets, or intangible property rights held in trust by the United States for tribes or individual Native Americans. Common examples of trust assets may include lands, minerals, hunting and fishing rights, water rights, other natural resources, and money. This trust responsibility requires that all federal agencies ensure that their actions protect ITAs. In this context it is important to note that the SPRNCA is not contiguous to any tribal trust lands, nor are there any known off-reservation treaty rights or ITAs that the BLM must comply with, consider, or otherwise manage on behalf of tribes. There are no current tribal agreements or plans that specifically address the SPRNCA.

Known economic, traditional, or sacred uses within the planning area also include the harvesting of plants and plant parts (such as saguaro fruit harvesting) and collection of clays, minerals, or pigments, any of which may be for medicinal, ceremonial, or personal uses. The individuals or family groups that perform these activities tend to visit different localities on a seasonal or annual basis, therein resulting in a generalized "traditional use area" as dictated by the presence and availability of the desired material(s).

Currently, no specific locations on the SPRNCA have been identified as TCPs or sacred sites; however, the Hopi Tribe regards the archaeological sites of their ancestors as "footprints" and TCPs (Kuwanwisiwma [Hopi] to Bellew [BLM], December 26, 2012). In addition to considerations for cultural resources, the O'Odham and Pee Posh of the Four Southern Tribes of Arizona[4] are also interested in consulting on projects and activities where any of the following may apply:

- American Indian Religious Freedom Act (16 USC 1996)
- Bald and Golden Eagle Act of 1940 (16 USC 668-668d)
- ESA of 1973, as amended (16 USC 1531-1543)
- EO 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 16, 1994)
- EO 13175: Consultation and Coordination with Indian Tribal Governments (November 6, 2000)
- Migratory Bird Treaty Act of 1918 (16 USC 703-711)

[4] The Four Southern Tribes of Arizona consists of the Ak-Chin Indian Community, Gila River Indian Community, Salt River Pima-Maricopa Indian Community, and Tohono O'odham Nation. These tribes have a relationship of shared group identity that can be traced historically and prehistorically (Arizona Government-to-Government Consultation Toolkit 2017).

- NEPA (42 USC 4321 et seq.) and its implementing regulations found at 40 CFR 1500

The San Pedro River Riparian Management Plan (BLM 1989) does not contain any specific guidance related to Native American concerns or tribal interests, and no tribal consultation was documented for the prior planning effort. The BLM will continue consultation with the above-listed tribes throughout the SPRNCA RMP/EIS process to ensure that tribal perspectives are integrated into the BLM planning process.

Analysis Methods

All laws, regulations, and policies pertinent to determining potential impacts on tribal interests were considered and included in the impact criteria (e.g., EO 13007, Indian Sacred Sites). Known information was assessed against the actions found under each alternative in Chapter 2 with conclusions drawn based on an understanding of how these types of actions may affect tribal interests.

BLM undertakings would be subject to applicable review, compliance, and consultation procedures as provided in **Appendix G**. The BLM would continue to accommodate and facilitate Native American religious traditions, cultural practices, and uses in accordance with applicable laws. The BLM's compliance with Section 106 of the NHPA typically eliminates NEPA-defined significant impacts that may result from federal undertakings such as construction or use of ROWs, recreation site development, prescribed fire, vegetation treatments, and special recreation permitting or construction of range improvements. It is important to note, however, that while the BLM favors avoidance of potential impacts where feasible, other measures to eliminate, minimize, or mitigate impacts may not be preferred by tribes or other interested parties. Differences in values regarding the treatment of cultural resources and tribal interests may be resolved cooperatively through consultation.

Impact indicators for tribal interests include the following:

- The extent and location(s) of activities that may be incompatible with maintaining the physical integrity and/or setting of sensitive cultural resources and traditional use areas
- Changes in access to traditional use areas or culturally important locations
- Loss of vegetation, topographical features, and other important landscape elements that may define an area of traditional use or cultural importance

The analysis of potential impacts on tribal interests assumes the following:

- Native Americans or other traditional communities may have concerns about impacts on cultural resources, religious practices, or natural resource gathering that may occur because of federal actions.
- There may be areas of importance to contemporary Native Americans that are not readily identifiable outside of those communities.
- Potential impacts are difficult to determine or quantify because aspects of tribal interest in the planning area may not be specified or mapped.

- While no specific locations on the SPRNCA have been formally identified as TCPs or sacred sites, the Hopi Tribe regards the archaeological sites of their ancestors as "footprints" and TCPs.[5]
- Individuals and family groups who perform gathering or other traditional-use activities tend to visit different localities on a seasonal or annual basis. This results in a generalized "traditional use area," as dictated by the presence and availability of the desired material(s).
- No impacts on tribal interests based on ITAs, treaty-based rights, or other federal-tribal agreements will occur because no such rights or agreements exist that are applicable to the planning area.
- No specific impacts on tribal interests have been identified within the planning area. The BLM's ongoing and future consultation may identify locations or impacts on tribal interests that would be addressed in accordance with applicable laws and policies.
- The impacts on areas or resources of tribal interest and the severity of impacts depend on the perspective and context of the affected tribe(s). In other words, individual tribes would have to consider whether impacts may occur based on what is culturally or spiritually important to them and communicate that to the BLM**.**

Direct and Indirect Impacts

Potential impacts on tribal interests related to traditional use or culturally significant resources, features, locations, or landforms may result from both natural events and human activities such as those described in **Section 3.2.8**. Direct physical disturbances can occur through development, construction, road and/or trail use, removal of vegetation or minerals through chemical or fire treatments, water diversion, and excavation or vandalism of cultural sites. Potential indirect impacts are often further removed and may include alterations of setting or feeling through visual, auditory, or atmospheric intrusions, water diversion or pollution, and accelerated erosion.

Because the SPRNCA is withdrawn from mineral entry and excluded from new utility-scale energy projects, there would be no new impacts on tribal interests from these kinds of activities. The use and maintenance of existing roads, trails, rights-of-way, and associated infrastructure can, however, cause direct and indirect impacts through ground disturbances, erosion, and alteration of the viewshed. Potential direct and indirect impacts could be reduced where objectives aim to restrict ground disturbances and access routes, protect the quality and diversity of vegetation and habitats, preserve or retain scenic qualities, protect or restore water sources, and allocate cultural sites to preservation or traditional use.

Although vegetation and fuels treatments may benefit native and status species—including plants and wildlife—such treatments remove materials that could be of tribal interest. Likewise, the use of chemical treatments has the potential to affect the health of individuals and groups who perform gathering or other traditional-use activities. Impacts from vegetation management, however, are considered short term until the treatment has achieved the desired effect (typically restoration and/or invasive species removal).

[5]Leigh Kuwanwisiwma, Director, Hopi Tribal Cultural Preservation Office to Brian Bellew, BLM TFO Manager, December 26, 2012.

Changes in public access or public use designations to increase or enhance recreation opportunities can interfere with traditional uses through direct disturbance, intrusions to setting, and potential interference. The potential for impacts increases when there is a change in the intensity of recreation that alters the visual or aural character of the setting or when public uses are concentrated in sensitive areas. Increased access to more remote areas can also lead to impacts on previously undisturbed locations, resources, or cultural uses. Although continuing and enhancing interpretation and educational opportunities can serve to vest the public in resource protection and respect for Native American cultural values, tribes may not desire interpretation or visitation of potentially sensitive areas.

Conclusions

Alternative A represents a continuation of the existing management and current RMP-level decisions. Under this alternative, certain use designations and strategies would not fully conform to the BLM's current tribal relations policies and procedures, nor would they fully support management goals, objectives, or Native American traditional uses and/or values.

Alternatives B, C, and D reaffirm the BLM's responsibilities, in cooperation with Native American tribes, for identifying and managing cultural resources, TCPs, sacred sites, traditional uses, and cultural landscapes; for identifying suitable harvesting areas for noncommercial, personal use quantities of herbals, medicines, and traditional use items; and for preparing comprehensive ethnographic or ethno-ecological studies. These actions would help ensure that resources of tribal interest are considered in project-specific planning and overall management strategies for the SPRNCA.

With consideration for vegetation and fuels management strategies, Alternatives B and C emphasize active restoration methods, such as planting and seeding of native vegetation, in addition to the use of a suite of methods including chemical, mechanical, and prescribed fire. These methods may restore native plant resources and landscapes important for tribal uses more effectively than methods under Alternative A, and such methods may reduce the length of time a treatment area would restrict access when compared with Alternatives A or D.

Alternative D emphasizes the use of natural processes and hand tools as opposed to use of heavy equipment and herbicides for vegetation management. Dependence on natural processes for vegetation and landscape restoration may slow progress on reestablishing plants for tribal uses and, therefore, restrict access longer than with a more active treatment strategy. But, it would result in less direct ground disturbances or potential risks to human health (i.e., through inadvertent exposure to heavy equipment or chemicals). Herbicide-only treatments under Alternatives B and C would be applied to an estimated 10,380 acres within the planning area. Conversely, Alternatives A and D pose no such applications.

Under Alternatives B, C, and D, the removal of approximately 310 acres of tamarisk, regardless of method, will result in temporary impacts through implementation and access restriction; however, the reestablishment of willow and cottonwood galleries along the San Pedro River corridor would ultimately benefit tribal interests, cultural value, and traditional uses through landscape and habitat restoration. No such removal or restoration work is proposed under Alternative A. In the long term, implementation of any measures for erosion control, native plant and habitat restoration, and ground cover maintenance helps to protect tribal interests on the SPRNCA.

Under Alternative A, allowable recreation uses and strategies are essentially determined on a case-by-case basis. A lack of area planning and site-specific plans poses potential impacts through unrestricted public use. Alternative B emphasizes increased motorized access, particularly for hikers, hunters, and anglers, whereas the recreational emphasis under Alternatives C and D is primitive and backcountry nonmotorized. This latter emphasis would likely have less potential for impacts on tribal interests from the types of uses, the intensity of use, and limited access. Restrictions on certain activities to preserve recreational settings and opportunities may provide incidental protection for tribal interests.

Although the BLM could designate areas for significant and/or unique resource protection under Alternatives A and D, ACEC overlay designations do not provide any different or enhanced administrative options, restrictions, or protections for resources of tribal interest from that of the authorities granted through Congressional designation of the planning area as an NCA. Likewise, NRHP listing may enhance public perception regarding a particular historic property's significance, but listing does nothing to preserve, protect, or restrict impacts on such properties.

Cumulative Impacts

The analysis area used to analyze potential cumulative impacts on tribal interests is the Upper San Pedro River watershed because tribal interests are part of a larger landscape that includes ancestral archaeological sites; traditional use areas, trails, and cultural resources; and places of religious importance that extend beyond administrative and jurisdictional boundaries. The specific locations of important traditional cultural and religious sites, sacred sites, and sites or areas important to other traditional activities are, however, currently unknown to the BLM and may be considered confidential. Furthermore, the extent and nature of potential impacts ultimately depends on the perspective of the affected tribe or group.

Table 3-1 lists the past, present, and reasonably foreseeable cumulative actions in the analysis area. These may affect tribal interests, ancestral sites, or traditional uses through loss or disturbance of resources that are not protected, changes in setting, pressure from incremental and/or repeated uses, changes in access, and vandalism. Under all alternatives, traditional use areas on the SPRNCA with tribal cultural value would continue to be affected by natural weathering and erosion. Ongoing and proposed human uses may also degrade the integrity of traditional use areas; however, such impacts will continue regardless of BLM-implemented management strategies. Continued use of the planning area has an additive effect of changing the landscape from that known ancestrally by the tribes. Although there are no specific sites or areas of concern identified in the analysis area, it is rather the broader continued change that modern culture brings to the landscape. Landscape fragmentation and changes of setting are addressed primarily as impacts on cultural resources in **Section 3.2.8**.

Contributions to cumulative impacts from all alternatives may be reduced through tribal consultation to determine the presence and potential for impacts on tribal interests. BLM-authorized actions that could affect cultural resources within the planning area would be subject to project and compliance review as indicated in **Appendix G**. Other activities, such as road construction, real estate development, and utility infrastructure in the analysis area, may be reviewed by other federal, state, or local agencies. Actions on private land could result in the inadvertent destruction or loss of tribal access to resources and locations.

Alternative A provides the basic measures to ensure that tribal interests are identified and are accounted for under BLM resource management. Alternatives B and C include the potential for management actions that could expand ground disturbance and increase landscape fragmentation with the potential for affecting tribal access, traditional uses, and cultural values. This potential is, however, offset by more proactive planning strategies with specific goals and objectives. Conversely, although Alternative D would reduce the overall amount of ground disturbance and potential alteration of setting through use restriction, it also limits implementation strategies. Ultimately, the potential incremental contribution of the BLM's selection and implementation of any of the alternatives is not expected to cause significant impacts on tribal interests within the analysis area.

3.5.2 Public Health and Safety

Affected Environment

The BLM hazardous materials program focuses on identifying, managing, and controlling all imminent hazards to human health and the environment. Past and current land uses, both authorized and illegal, have created a variety of threats to the public lands and natural systems.

Abandoned Mine Lands

Southeastern Arizona has historically been a hub of mining activity. Significant and widespread mining, both on- and off-site beneficiation (treatment to improve a mineral's properties), and smelting have occurred since the 1860s. Although many of the lands originally mined were patented, abandoned mine lands (AMLs) commonly occur on BLM-administered land (BLM 2006). There are currently 66 AML sites in the planning area.

Unexploded Ordnances

The presence of an unexploded ordnance (UXO) represents a threat to public safety. Known and potential UXO contamination exists in and around the boundary of the SPRNCA and Fort Huachuca, in particular near the Charleston Hills (**Figure 3-19** [**Appendix A**]). While the UXO is generally limited to the military installation, it can also be found on BLM-administered lands.

Unspent munitions may be located on the ground's surface or buried beneath due to the momentum of impact. UXO may also possess a potential chemical hazard due to explosive, pyrotechnic, propellant, and incendiary components. In the fall 2013, the UXO area was surveyed, and any UXO found was disposed of; therefore, public safety risks from UXO are anticipated to be negligible and are not carried forward to the alternatives comparison analysis.

Analysis Methods

The following indicator will be measured to determine the level of impacts on public health and safety under each alternative:

- Accessibility to areas with known AML, as measured by sites within a quarter mile of motorized routes

Analysis assumptions for public health and safety include the following:

- Ease of public accessibility to areas with known safety risks increases the likelihood that those risks will be encountered.

Alternatives Comparison Analysis

The potential for impacts on public safety is summarized in **Table 3-65**. An emphasis on motorized recreation may further increase use and potential for exposure to AML sites in motorized RMZs (i.e., in Alternatives B and C). Limiting the SPRNCA to designated motorized routes would reduce the risk of exposure to unsafe AML features. It is anticipated that all AML sites will eventually be remediated, which would further reduce the risk these sites present.

Table 3-65
Potential for Exposure to AML Sites

	Alternative A	Alternative B	Alternative C	Alternative D
Number of AML sites located within ¼ mile of motorized routes	49	57	45	45

Conclusions

Potential safety risks from AML sites could occur across all alternatives. Increased recreation access (i.e., from motorized routes) would increase the potential for risks under Alternative B, where motorized use is emphasized, and to some extent under Alternative C.

Cumulative Impacts

The analysis area for public health and safety is the planning area.

Recreation use on BLM-administered lands under all alternatives could contribute to cumulative impacts on public safety. Visitor use is likely to be highest under Alternative B; however, implementing RMZs and activity-specific regulations may decrease the potential risks under Alternatives B, C, and D.

3.5.3 Social and Economic Conditions

Affected Environment

The BLM's management of resources both affect and are affected by the local history, population, demographics, key industries, unique area amenities, and natural features. This discussion provides a summary of key economic and social characteristics of the planning area as related to proposed management actions. Additional details are included in **Appendix T.**

The planning area for the SPRNCA is entirely in unincorporated Cochise County, Arizona; therefore, the socioeconomic study area is defined as Cochise County. Over 95 percent of Cochise County residents both live and work in the county, indicating that income among residents is kept primarily in the county, with few people commuting in from adjacent areas (Headwaters Economics 2016). Additionally, local visitors to the SPRNCA and visitor services are primarily contained within the county.

Communities of Place and Communities of Interest

Local communities of place (i.e., geographically delimited political units such as towns and cities) represent one unit of measuring social and economic impacts. These include the City of Sierra Vista, Tombstone, and Bisbee. In the planning area, demographic data for Cochise County and the City of Sierra Vista are the most current readily available population information for the study area and are examined to represent communities of place.

In addition to communities of place, there are specific groups for whom management of public lands is of particular interest, specifically bird and wildlife groups, residents, and area ranchers. Furthermore, special interest groups and individuals who represent resource conservation or resource use perspectives have an interest in planning area public lands management. Impacts on these communities of interest are discussed on a qualitative level below.

Recreational Users: The SPRNCA is an important site destination for recreational uses of many types. These types include birding, hiking, wildlife watching horseback riding, and vehicle-based touring. These recreational users are principally concerned with maintaining the natural resources and aesthetic values of the SPRNCA.

Residents: Residents represent a diverse group, with varying interests and priorities; however, most residents with property next to the SPRNCA are concerned with regulating visitation and recreation and minimizing conflicts. In addition, residents are concerned with fire and fuels due to the potential for fires on the SPRNCA to spread to adjacent property.

Ranchers: The planning area has traditionally supported livestock grazing. Ranchers in the planning area use both private and BLM-administered lands to support grazing operations. Ranchers are primarily concerned with locations for which grazing will be permitted, as well as the level of restrictions applied on structural and nonstructural range improvements.

Populations and Demographics

Population trends in the local area can affect demand for activities on BLM-administered lands and influence local economic conditions. Since 2000, the population of Cochise County has increased (approximately 10 percent). The level of increase, however, is less than that of the reference population for the State of Arizona (29.5 percent). Recent data (2012) for the city of Sierra Vista and Cochise County show that population increases are decreasing and may be slower or may even decrease in the future if current trends continue (Cochise College 2013).

Over the past 10 years, Cochise County has consistently had an older population of residents than that of Arizona or the United States (US Census Bureau 2016). The age of the population may indicate that a higher than average number of retirees reside in the county. The attractiveness of an area to retirees can be influenced by the quality of life factors provided by area public lands, as discussed under the *Contributions from BLM-Administered Lands*, below.

See **Appendix T** for additional population and demographic data, as well as information on housing trends.

Employment and Income

Historically, employment in Cochise County was based on mining, ranching, and agriculture. By 2014, the mining industry had declined to less than one percent of employment, and the agricultural sector to just over 3 percent (Headwaters Economics 2016). In contrast, employment in the service industries had steadily increased, representing 34 percent of total employment in 1970 and 60 percent in 2014 (Headwater Economics 2016). Details of employment by sector are included in **Appendix T**.

Contributions from BLM-Administered Lands

Details are provided below for key social and economic values derived from BLM-administered lands in the planning area.

Tourism and Recreation

The SPRNCA provides opportunities for residents and visitors from throughout the world to participate in such opportunities as wildlife viewing, bird-watching, picnicking, primitive camping, prehistoric and historic site visiting, hunting, hiking, fishing, biking, and horseback riding (see **Table 3-66**). It also includes guided hikes, interpretive site visiting, and weekend children's programs.

Table 3-66
Visitor Activities

Activity	Percent Participation
Birding	47.3
Hiking	39.0
Touring	33.2
Picnicking	4.7
Biking	1.0
Hunting	0.8
Backpacking	0.8
Group activities	0.5
Horseback riding	0.2
Fishing	0.2
Other	6.7

Source: BLM 2017b

Note: Participants could indicate more than one activity on a given visit (based on visitor-reported San Pedro House data).

There are parking areas, interpretive kiosks, and trailheads at multiple historic and prehistoric sites scattered across the SPRNCA, including Fairbank Historic Townsite, Murray Springs, San Pedro House, Land Corral, Terrenate, Millville, and Hereford Bridge. Parking and trailheads are also available at Hereford Road, Charleston Road, Palominas, Escapule, and Lehner. These amenities accommodate hikers, bikers, and equestrian users of the trails that access the heart of the SPRNCA.

The SPRNCA contains nationally and internationally significant historic and paleontological sites, such as Presidio Santa Cruz de Terrenate, a Spanish-period fortified hacienda, and the Murray Springs Clovis Site, recently named an NHL. Reconstructed historic communities, hiking and interpretive trails, and the presence of such historic sites all contribute to the status of the SPRNCA as a recreation destination for visitors to the region. Data collected by the Friends of the San Pedro River Association in fiscal year 2015 indicated roughly 48 percent (753 of 1,577 total participants in events) attended cultural history events to historic sites; specifically, 357 participants attended the 18 history walks. Fairbank Day, which provides activities and information on the SPRNCA history, had an estimated attendance of 350 people.

Recreation visitation numbers are shown in **Section 3.3.2**. The annual visitor count was estimated at 128,365 in 2015 (BLM 2017b). Local, national, and international visitors come to the SPRNCA; over 86 percent of visitors were from outside of Cochise County. Visitation occurs throughout the year, with the high use season from January through May. The SPRNCA, particularly the San Pedro House, is a

destination mentioned in birding guides and trip itineraries for tour companies, such as Victor Emanuel Nature Tours, Wings, and Field Guides. There are many groups (including casual, noncommercial) and individuals who visit to enjoy the diversity, quality, and sheer numbers of native birds and other natural resources. These out-of-town visitors come to see specific target birds, such as the yellow-billed cuckoo, because the SPRNCA is one of its remaining strongholds in the western United States.

If the annual visitation continues to increase at a rate similar to that of the past 15 years, visitation could increase to 160,000 by 2020 and 180,000 by 2025. Factors that could affect the visitation trend include management of the area affecting recreation opportunities, marketing efforts increasing public awareness, population, demographics, and the local, national, and global economy (BLM 2017b).

Recreation on the SPRNCA contributes economically to local communities. A 2002 study by the University of Arizona on nature-oriented visitors and their expenditures in the San Pedro River Basin found that, on average, overnight visitors in local hotels spent an average of $97.18 per night, while day trip visitors spent $24.42 per day. Overnight visitors averaged 4.7 nights in the study area, while day trip visitors spent an average of 4.9 hours in the study area (Orr and Colby 2002).

For an estimated 129,353 annual visits (5-year average for fiscal years 2011 to 2015) to the SPRNCA, assuming that most visitors are from out of town, the estimated impact supports 188 jobs and generates $4,752,000 in labor income annually. This is approximately 0.32 percent of total employment and 0.12 percent of labor income in Cochise County (Jaworski 2013).

Livestock Grazing

Livestock grazing represents a traditional land use in the planning area. Local ranchers have grazing allotments on the SPRNCA and continue a ranching lifestyle that started with Spanish occupation. See **Section 3.3.1** for an overview of grazing in the planning area.

Across the SPRNCA's four grazing allotments, there is a maximum of 592 AUMs available. Billed use, however, various annually, as described in **Section 3.3.1**. This grazing use is estimated to support one job and approximately $11,000 in labor annually (Jaworski 2013).

Ecosystem Services

The value of public lands can also be determined by examining ecosystem services, including the contributions from clean air and water. BLM IM 2013-131 explains that "Ecosystem goods and services include a range of human benefits resulting from appropriate ecosystem structure and function, such as flood control from intact wetlands and carbon sequestration from healthy forests. Some involve commodities sold in markets, for example, natural gas. Others, such as wetlands protection and carbon sequestration, do not commonly involve markets, and thus reflect nonmarket values" (BLM 2013). Specific ecosystem services provided by the SPRNCA are discussed below. See **Appendix T** for additional details.

More recently, there has been a growing demand for more comprehensive analyses of the ecological and sociological consequences of land management decisions, particularly in the federal government's policy direction for environmental and natural resources planning (Bagsted et al. 2013a).

The ecosystem service contributions from the San Pedro watershed were modeled in a pilot study to examine the quantification of actual service provision and use (Bagsted et al. 2013b). The SPRNCA's

primary purpose is to protect and enhance the desert riparian ecosystem; the San Pedro watershed is one of the last free-flowing perennial rivers in the Southwest and is a major migratory bird flyway. As such, ecosystem services include contributions from the water and habitat associated with this ecosystem. Four broad categories of ecosystem services were identified in coordination with stakeholders, in the 2010 study: carbon sequestration and storage, water supply, biodiversity, and other cultural services (Bagstad et al. 2013a).

Nonmarket Values

Social or nonmarket values are the benefits derived by society from the uses or experiences that are not dispensed through markets and do not require payment. They can be broken down into two categories, use and nonuse values. The use value of a nonmarket good is the value to society from the direct use of the asset, for example through recreation, such as bird-watching.

The use of nonmarket goods often requires consumption of associated market goods, such as lodging and gas. Nonuse, or passive use, values of a nonmarket good reflect the value of an asset beyond its current use. The value is based on a willingness to preserve a resource for potential future use and for future generations to enjoy, as well as a recognition of the value of something's existence, such as an animal or plant species. This can include values such as scenic views and plant and animal habitat preservation that are not currently providing economic benefits.

Nonmarket contributions can enhance the quality of life for residents and attract visitors to the area. Open space in the region has an important nonmarket function in the use category through area recreation, which provides recreation opportunities for residents and attracts area visitors.

Environmental Justice

Environmental justice refers to the fair treatment and meaningful involvement of people of all races, cultures, and incomes with respect to the development, implementation, and enforcement of environmental laws, regulations, programs, and policies. EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires that federal agencies identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority, low-income, and tribal populations. Details for the steps required to identify populations for further consideration for analysis are included in **Appendix T**.

Based on examination of low-income, minority, and tribal populations in the planning area, the following was determined:

- Analyses show the communities of Bisbee and Tombstone to both have substantial low-income populations. Bisbee and Tombstone will be considered low-income environmental justice populations of concern in assessing impacts. Cochise County and all communities in the planning area were less ethnically and racially diverse than the comparison population of the state of Arizona. As a result, no minority populations were identified for further environmental justice consideration.
- While Native Americans do not currently represent a substantial portion of the local area population, Native American people have occupied the region for more than 10,000 years, using lands in the planning area for hunting, fishing, plant gathering, trade and exchange, and other

cultural, social, and religious activities. The potential for impacts on Native American populations are considered in the environmental justice impacts analysis.

Impacts Analysis Methodology

Economic Conditions

The primary form of economic analysis in this assessment is economic impact analysis, which examines the changes in economic activity because of the proposed management. Economic impact analysis in this assessment takes one of two forms depending on the available data: qualitative or quantitative assessment. For those activities that directly generate measurable spending, the analysis estimates economic impact in terms of output (total spending) and employment in the regional economy. For example, spending to raise cattle and to recreate on BLM-administered land fits this type of analysis.

Using a regional input-output model (IMPLAN), an assessment of impacts on selected industrial sectors of the economy has been evaluated. IMPLAN is a regional economic impact model that provides a mathematical account of the flow of dollars and commodities through a region's economy. This model provides estimates of how a given amount of an economic activity translates into jobs and income in the region. These multipliers were applied to changes in final demand resulting from the differing BLM management alternatives in the RMP. The results measure the change in the level of output, employment, and income for those industrial sectors affected by each action. Details of the economic impact analysis methodology are included in **Appendix T.**

Social Conditions

Potential impacts on social conditions include changes in population, in the demand for housing and community services, and in community character, culture, and social trends. In addition, changes to recreation opportunities, scenic views, and other features of open space next to communities can affect the social setting for local communities. The impacts on social conditions are analyzed by qualitatively discussing the type and level of impacts associated with proposed management on local communities of interest, as identified in the *Communities of Place and Communities of Interest* discussion.

Ecosystem Services

The San Pedro River ecosystem provides contributions for human benefit through ecosystem structure and function. Key contributions from the water and habitat include carbon sequestration and storage, water supply, viewshed, and biodiversity. Levels of contributions are discussed qualitatively, using information from the pilot study examining modeling of contributions, where applicable.

Environmental Justice

Based on criteria detailed in the *Affected Environment* and **Appendix T**, populations identified for further consideration due to the percentage of the population below the poverty line were those in Tombstone and Bisbee.

Since the analysis of disproportionate impacts is based on other resource impacts, the assumptions for this analysis are those of other resource areas, as they relate to the identification and analysis of impacts. In addition, this analysis assumes that the latest available demographic data from the US census and other sources accurately represent the population in the planning area.

Indicators

The following indicators were used on a quantitative or qualitative basis to determine potential impacts from proposed management actions:

- Alteration to local area employment, income, and economic output associated with planning area recreation and livestock grazing
- Social setting and quality of life for area residents and identified groups of interest
- Changes to key ecosystem services

In addition to the assumptions in **Section 3.1**, the analysis assumes the following:

- The economic analysis area is Cochise County, Arizona.
- Economic impacts are estimated, based on best available information, and they should be used to compare the relative impact of alternatives only. Actual impacts would vary based on market conditions and trends in resource use.
- The analysis uses 2016 IMPLAN data for Cochise County.
- All data are presented in 2017 dollars, unless otherwise noted.
- Jobs reported from IMPLAN are an annual average and are not full-time equivalents. These estimates measure the number of jobs per year supported by SPRNCA management and include all full-time, part-time, and temporary positions. As a result, a job can be interpreted as 1 job lasting 12 months = 2 jobs lasting 6 months each = 3 jobs lasting 4 months, etc.
- Employment and labor income estimates developed for this analysis include direct, indirect, and induced economic effects, as appropriate and available. Direct employment would, for example, be generated in the grazing sector as livestock operators/ranchers using BLM forage. Additional employment would be generated as the affected livestock operators purchase services and materials as inputs (indirect impacts) and ranchers and suppliers spend their earnings in the analysis area economy (induced impacts). The discussion of impacts, below, combines direct, indirect, and induced impacts.
- Recreation estimates by alternative were provided based on current recreational use and the BLM recreational specialist's professional judgement. Baseline recreation demand is assumed to increase by approximately 2 percent per year, based on the rate of increase observed from previously collected BLM recreation management information system data (BLM 2017a). Actual rates of use may differ, based on population changes, additional increase in demand, or changes in regional economic conditions. To account for increased recreation over time, a quantitative economic analysis is provided for 3 years throughout the planning period: 2017, 2027, and 2037.
- The distribution of visit type (i.e., local or nonlocal visitor) is estimated, based on the percentage of residents and visitors, as recorded at the San Pedro House visitor register (BLM 2017b). This analysis assumes 13 percent of visitors are from Cochise County, and the remaining 86 percent are from outside the area; the latter represent new revenue brought into the socioeconomic study area and are included in the economic model.
- For visitors, the percentage of day trips as compared with overnight visits is based on the percentage identified in Orr and Colby (2002).
- Average visit expenditures by economic sector of spending for day trips and overnight visits were obtained from the Forest Service's National Visitor Use Monitoring program (White and

Stynes 2010) and converted to 2017 dollars using the Bureau of Economic Analysis's consumer price index inflation calculator (BEA 2017).

- Livestock grazing economic contributions examine maximum possible contributions. The model uses the high per-cow revenue and cost estimates developed for southeastern Arizona by the Arizona Cooperative Extension (Teegerstrom and Tronstad 2016). Data are converted to 2017 dollars using the BEA's consumer price index inflation calculator (BEA 2017). For the purposes of this analysis, the assumption is that billed AUMs are the same as permitted AUMs. The analysis assumes a rate of 12 AUMs to produce marketable cattle. The BLM acknowledges that actual used or billed AUMs may be different than total authorized levels.

Impacts Common to All Alternatives

Economic Conditions

As noted in *Affected Environment*, recreation opportunities in the planning area play a role in attracting visitors and maintaining visitor spending in the local economy. Only contributions from nonlocal visitors are included in this model. This is because their expenditures represent an inflow of revenue to the economy. In contrast, residents' expenditures represent income already in the economy. While type and location of recreation may change because of proposed actions, the role of recreation in the local economy would continue to increase as the population continues to increase. Under all alternatives, recreation management would continue to sustain a wide range of opportunities that are directly attributed with supporting local employment and income. Note that some visitors may visit sites in and out of the socioeconomic planning area in addition to the SPRNCA on the same trip; therefore, the contributions cannot be entirely attributed to the SPRNCA.

The type of recreation can affect the level of spending in the local economy. The primary recreation types in the planning area are bird-watching, hiking, and vehicle touring (Orr and Colby 2002). Based on National Forest Service visitor spending profiles (White and Stynes 2010), the average spending per party of overnight visitors was estimated at $473, for trips where the primary purpose was nature related. Hiking had the same average expenditures, but driving was $576. For this analysis, the average estimated spending is used to allow for better comparison across alternatives. This is because the ratio of specific recreation activities is difficult to predict with certainty based on proposed management changes.

Public land forage provides a low-cost and important complement to other sources of forage used by local livestock producers; it can support jobs and income in the region. Spending in the livestock industry can result in indirect support for other industries in the area. Reduced access to federal forage may have adverse impacts on individual ranchers and the traditional ranching way of life. Proposed restrictions and closures would limit access to critical seasonal forage, which may make it more difficult for local cattle ranchers to sustain current herd sizes. As noted by Torell et al. (2014), if a ranch is seasonally dependent on federal forage, reducing federal AUMs can create forage imbalances and produce a greater reduction in grazing capacity than just the loss of federal AUMs.

The financial burden of trying to offset federal forage losses with more expensive private forage or supplement feed may force some local ranchers to transition land and other ranch resources from livestock production to other agricultural uses or to abandon agricultural practices altogether. Changes to grazing management that have reduced available federal forage have correlated with a decrease in net income for the ranches studied (Torell et al. 1981). Tanaka et al. (2011) found that many rangeland

improvement or management changes are not financially feasible for the average rancher. Changes in management of the SPRNCA may therefore result in impacts not fully represented in the economic model in terms of the impacts at the ranch level.

Social Conditions

Nonmarket or social impacts could occur on communities of interest if management changes cause alterations to historic uses (i.e., livestock grazing), change the extent of or quality of experiences on the landscape (i.e., for recreational use), or alter the quality of life for area residents.

Nonmarket values, such as natural amenities and quality of life, have been increasingly recognized as important factors in the economic prospects of many rural communities in the West (Rudzitis and Johnson 2000). Rural recreation and retirement destination areas are all related to natural amenities (McGranahan 1999). As discussed in *Affected Environment*, the socioeconomic planning area has a higher than average percentage of those in retirement age. Some of this population may be attracted to the area by recreation opportunities and a setting supported by public lands on the SPRNCA. This population in turn supports additional economic contributions in the form of nonlabor income from retirement or investment payments; thus, managing the SPRNCA designation characteristics that keep and protect natural amenities contributes to the social setting and economic contributions.

Ecosystem Services

The level of and type of ecosystem services provided by the SPRNCA could be altered based on the emphasis of management actions, and the degree to which resource uses would alter the natural setting. For example, in the modeled scenario for urban growth (Bagstad et al. 2013b), the increase in impervious surfaces (i.e., asphalt) because of development was predicted to affect water supply due to a reduction in water infiltration. In terms of some cultural services, while the quality of the service may decline with increasing population pressure, its importance may increase (Bagstad et al. 2013b). This is particularly important for aesthetics (that is, the visual setting) and access to open space.

Based on proposed management, however, contributions from some ecosystem services provided by the SPRNCA are anticipated to remain similar across all alternatives. Due to a lack of proposed large-scale vegetation treatment, and an emphasis on fire suppression under all alternatives, it is not anticipated that substantial changes would occur to the level of carbon sequestration or storage. Similarly, contributions to cultural services, including recreation opportunities and preservation of sites of historic value, would be maintained across all alternatives.

Environmental Justice

Under all alternatives, impacts would be spread to all populations in the planning region. No disproportionately high adverse impacts are anticipated on the identified low-income populations; as a result, environmental justice is not discussed further. As noted in the *Affected Environment* discussion, while the planning area does not currently have high Native American populations, it has historical significance for numerous tribes. After consideration, the BLM does not anticipate disproportionately high and adverse environmental justice impacts on any consulted Native American tribe or population because of this RMP.

Alternatives Comparison Analysis

Economic Conditions

The SPRNCA would continue to contribute to the Cochise County economy. Primary uses in the area are recreation and livestock grazing, as detailed below. Estimated recreation contributions are summarized in **Table 3-67**. Estimated livestock grazing contributions are summarized in **Table 3-68**. **Table 3-67** and **Table 3-68** are provided to illustrate potential recreation and livestock grazing contributions over a 20-year period, assuming linear change through time. Direct effects represent the initial change in the economic sector in question. Indirect effects are changes in the inter-industry transactions when supplying industries respond to changes in demands from the directly affected industries. Induced effects reflect changes in local spending that result from income changes in the directly and indirectly affected industry sectors.

Table 3-67
Recreation Economic Impacts by Alternative (in 2017 Dollars)

Impact Type	Employment	Labor Income	Value Added	Output
		Alternatives A and D		
Annual Average 2017				
Direct impact	131.5	$2,605,925	$4,191,306	$8,361,370
Indirect impact	15.1	$516,026	$837,969	$1,810,104
Induced impact	11.8	$381,543	$781,666	$1,471,522
Total impact	**158.4**	**$3,503,494.00**	**$5,810,941**	**$11,642,996**
Annual Average 2027				
Direct impact	173.9	$3,448,877	$5,565,924	$10,970,757
Indirect impact	19.6	$669,217	$1,093,398	$2,358,441
Induced impact	15.6	$503,285	$1,031,078	$1,941,052
Total impact	**209.1**	**$4,621,379**	**$7,690,400.00**	**$15,270,250.00**
Annual Average 2037				
Direct impact	212	$4,204,161	$6,784,830	$13,373,290
Indirect impact	23.9	$815,771	$1,332,846	$2,874,926
Induced impact	19	$613,501	$1,256,879	$2,366,131
Total impact	**254.9**	**$5,633,433.00**	**$9,374,555.00**	**$18,614,347**
		Alternative B		
Annual Average 2017				
Direct impact	154	$3,046,917	$4,917,228	$9,692,138
Indirect impact	17	$591,221	$965,965	$2,083,569
Induced impact	14	$444,628	$910,908	$1,714,826
Total impact	**185**	**$4,082,766**	**$6,794,101**	**$13,490,533.00**
Annual Average 2027				
Direct impact	245.3	$4,865,054	$7,851,403	$15,475,568
Indirect impact	27.6	$944,011	$1,542,369	$3,326,863
Induced impact	22	$709,944	$1,454,460	$2,738,086
Total impact	**294.9**	**$6,519,009.00**	**$10,848,232**	**$21,540,517**

Table 3-67
Recreation Economic Impacts by Alternative (in 2017 Dollars)

Impact Type	Employment	Labor Income	Value Added	Output
Annual Average 2037				
Direct impact	299.1	$5,930,473	$9,570,816	$18,864,630
Indirect impact	33.7	$1,150,744	$1,880,139	$4,055,428
Induced impact	26.8	$865,417	$1,772,978	$3,337,712
Total impact	**359.6**	**$7,946,634**	**$13,223,933.00**	**$26,257,770**
Alternative C				
Annual Average 2017				
Direct impact	142.7	$2,829,261	$4,565,971	$8,999,794
Indirect impact	16.1	$548,988	$896,962	$1,934,732
Induced impact	12.8	$412,866	$845,838	$1,592,328
Total impact	**171.6**	**$3,791,115**	**$6,308,771**	**$12,526,854.00**
Annual Average 2027				
Direct impact	183.8	$3,644,204	$5,881,150	$11,592,086
Indirect impact	20.7	$707,118	$1,155,323	$2,492,011
Induced impact	16.5	$531,788	$1,089,473	$2,050,983
Total impact	**221**	**$4,883,110**	**$8,125,946**	**$16,135,080**
Annual Average 2037				
Direct impact	223.7	$4,407,816	$7,131,409	$14,130,689
Indirect impact	25.3	$870,078	$1,415,647	$3,053,291
Induced impact	20	$644,996	$1,321,327	$2,487,538
Total impact	**269**	**$5,922,890**	**$9,868,383.00**	**$19,671,518**

Source: IMPLAN 2017 with BLM data

Table 3-68
Average Annual Livestock Grazing Economic Impacts by Alternative

Impact	Employment	Labor Income	Value Added	Output
Alternative A				
Direct impact	0.1	$6,053	$5,781	$39,341
Indirect impact	0.1	$3,770	$4,849	$19,074
Induced impact	0.0	$1,209	$2,499	$5,492
Total impact	**0.2**	**$11,032**	**$13,129**	**$63,907**
Alternative B				
Direct impact	3.0	$164,010	$156,635	$908,742
Indirect impact	3.7	$102,143	$131,397	$440,580
Induced impact	1.0	$32,770	$67,712	$126,861
Total impact	**7.7**	**$298,923**	**$355,744**	**$1,476,183.00**
Alternative C				
Direct impact	0.8	$41,476	$39,611	$229,809
Indirect impact	0.9	$25,831	$33,229	$111,417
Induced impact	0.3	$8,287	$17,123	$132,081
Total impact	**2.0**	**$75,594.00**	**$89,963**	**$473,307.00**
Alternative D				
No permitted grazing under Alternative D				

Source: IMPLAN 2017 from BLM data

Under Alternative A, levels of use were estimated to support 131 direct jobs and $8.3 million in economic output in 2017. Overall recreation levels and economic output are anticipated to increase

under Alternatives B and C, primarily because of opening additional roads for public vehicle use for sightseeing and access to backcountry opportunities. Under Alternative B, recreation levels would also increase because of two RV/car campgrounds developed in the San Pedro House and Hereford areas. Under Alternative C, the lack of campground development may decrease contributions from this use; however, the impacts are likely to be limited. This is because other recreation activities—birding, hiking, and touring—represent a larger segment of primary visitor use.

Under Alternative D, overall recreation visitation levels and associated economic impacts would remain the same as predicted under Alternative A. As a result, annual average economic contributions would also be the same; however, it is likely that the type of recreation would differ between Alternatives A and D, resulting in some difference in associated spending on an average annual basis. Because the specific level of recreation by type cannot be predicted with certainty, these changes are not included in the economic model.

Alternative A permitted grazing levels on the SPRNCA (592 AUMs) support less than one full-time job, and a total of $39,341 in direct economic output on an annual basis. Based on the 2012 county livestock inventory, the number of cattle that BLM forage supports under this alternative constitutes less than 1 percent of the total inventory in the county analysis area (USDA 2012). BLM management under Alternative B would allow for livestock grazing over the entire decision area. There is a potential for increased forage available for livestock grazing, production, and associated economic impacts, compared with Alternative A; however, the total impacts at the county level remain limited. Similarly, under Alternative C, an increase in permitted grazing would result in an increase in total economic output, but overall contributions would remain limited. Under Alternative D, all grazing would be eliminated. As a result, contributions to the local economy from grazing on the SPRNCA would be reduced to zero. Because current livestock grazing in the decision area supports a negligible level of jobs and economic output, eliminating all grazing on the SPRNCA is not anticipated to significantly affect the county's livestock industry. In addition to the employment and income supported by BLM forage, payments to counties associated with grazing fees would also be reduced under Alternative D.

Social Conditions

Recreational users—Alternative A lacks a landscape-level approach to wildlife planning. Nonmarket values of recreational users, such as natural landscapes and birding, may not improve over time. Alternative B places an emphasis on opportunities for increased public access and livestock grazing, while focusing on active resource management to mitigate impacts on wildlife from increased use; therefore, this alternative would support continued use of the planning area by recreational users, but it may not increase habitat and visitor experience in the long term, as compared with Alternative A.

Alternative C focuses on active resource management for ecosystem restoration and to achieve goals and objectives. As a result, priority wildlife habitat would be managed to meet the goals and objectives for vegetation and would minimize loss, fragmentation, and degradation of fish and wildlife habitat. Alternative C would support increased recreation opportunities for hikers, birders, and quality of experience for wildlife viewing. Alternative D emphasizes resource protection, which would support natural amenities, natural landscapes, birding, and other nonmarket values over time.

Residents—Under Alternative A, the planning area would continue to be available to residents and visitors. In the near term, concentrated and dispersed recreation and setting characteristics would be

consistent with observed trends. Over time and without specific recreation management for high-use areas and strategies for maintaining primitive and backcountry settings, the overall quality of the settings and targeted activities and experiences could decline. Designating SRMAs to target specific recreation experiences under Alternatives B, C, and D would likely improve desired recreation experiences for residents and visitors, as compared with Alternative A. This would be the result of reducing the level of conflict between different types of recreation use.

Under Alternative C, there would be increased primitive recreation opportunities, and management would focus on supporting natural systems. Similarly, Alternative D would emphasize a mostly primitive recreation experience. The quality of recreation would be enhanced for those who prefer this setting. Some increased restrictions would apply, such as OHV restrictions, as compared with Alternative A; however, most of the area would remain readily accessible for public use.

Ranchers—Historically, livestock grazing was an important economic activity in the planning area. Under Alternative A, limited livestock grazing would continue in the planning area, providing support for this traditional use to continue in Cochise County. Increased opportunities for livestock grazing on the SPRNCA under Alternative B and C would support continuing this way of life in the planning area. Although direct economic contributions to the local economy would remain limited, these alternatives would reduce chances of ranchers going out of business or reducing grazing operations, as compared with Alternative A. As discussed under *Economic Conditions*, eliminating authorized livestock grazing under Alternative D would result in direct economic impacts on ranchers. Losses of livestock grazing jobs and lifestyles would constitute a negative impact on traditional lifeways and other nonmarket values in the region. Although overall economic impacts would be limited, impacts on individual ranchers could occur.

Ecosystem Services

In the long term, under Alternative A, the lack of directed management for some resources may reduce contributions from some services. For example, a lack of specific management for erosion control and groundwater pumping would decrease water quality or quantity. This would affect the water supply and habitat biodiversity. This would be exacerbated by the continuing pressures on resources from population growth and development in the surrounding area.

Under Alternative B, providing targeted management to improve and protect watershed health and vegetation conditions would support enhanced contributions from ecosystem services. An example of this is enhancing riverine geomorphology and bank recharge to protect base flow values through structural and nonstructural approaches. These actions would provide indirect support for protecting biodiversity by maintaining or increasing suitable habitat for a range of species in the riparian area, thereby mitigating the impacts of increased resource use. Under Alternative C, increased restrictions on resource uses would support the quantity and quality of contributions.

Similarly, management to classify and protect paleontological resources and cultural artifacts and to provide opportunities for public access to cultural sites would enhance contributions to cultural services under Alternatives B and C.

Under Alternative B, increased acres would be managed in a manner that may not maintain the same level of visual quality on the landscape. Although measures to protect water and vegetation could

enhance the visual setting in the long term, Alternative B permits the highest level of livestock grazing and other resource uses. This could affect natural amenities and related cultural services. Under Alternative C, designating more ROW avoidance acres, closing more acres to livestock grazing, and designating more Primitive and Backcountry RMZ acres would indirectly protect the visual setting and related cultural services.

Compared with the other alternatives, Alternative D would provide for the greatest overall protection of water resources, soil, and vegetation. It would do this by designating the most ACEC and ROW exclusion acres, closing the decision area to livestock grazing, and designating the most Primitive and Backcountry RMZ acres. Managing lands to protect wilderness characteristics as a priority over other uses under Alternative D would provide further support for ecosystem services.

Conclusions

Management under all alternatives would support the continued economic contributions from recreation. Based on the quantitative economic impact analysis, direct, indirect, and induced jobs associated with recreation helped support up to 185 jobs in 2017. This represents less than 1 percent of total area employment. Note that these jobs and related economic impacts do not necessarily represent new jobs, but rather the total level of jobs supported, which may be filled by those currently employed in related industries, those unemployed, or those from outside of the area.

Livestock grazing in the planning area would represent a smaller level of economic contributions due to the limited number of cattle supported by planning area forage, as compared with the total number of cattle in the county. Economic contributions supported would be highest under Alternatives B and C due to the greater number of permitted AUMs, and lowest under Alternative D, where livestock grazing would be discontinued.

Support of economic and social values important to identified communities of interest would vary for each group, due to the different identified values. For example, preserving natural amenities to support wildlife watching and quiet recreation, and as a component of the social setting for residents, would continue across all alternatives, but may be greatest under Alternative D due to the emphasis on minimal disturbance. Ranchers and those favoring motorized recreation, however, would have values supported by Alternative B, which allows for a greater level of resource use. Ecosystem service contributions identified would continue across all alternatives, in keeping with the conservation values of the NCA. Alternative A, with a lack of defined management approaches for some resources, may have lower levels of contributions. Alternative D would represent the greatest degree of habitat preservation using minimally invasive techniques. Alternatives B and C would allow a higher level of uses, which could affect some identified services, but active management to improve vegetation conditions may improve contributions in the long term.

Cumulative Impacts

The analysis area for socioeconomics and environmental justice is Cochise County. Past and present actions in the analysis area that have affected socioeconomics are those that support direct or indirect economic contributions to the local economy, such as recreation and livestock grazing. In addition, activities affecting natural amenities and preservation of habitat, water quality, and quantity would affect the quality of life and ecosystem service contributions.

The factors identified in RFFAs (**Table 3-1**) affecting socioeconomics include county and city land use plans that outline continued growth and local master-planned communities, which would continue to increase demand for use and pressure on resources on the SPRNCA.

In addition, vegetation, habitat management, and fuels and fire management proposed activities, including Fort Huachuca and analysis area vegetation treatments, could affect the setting for recreationists and residents, as well as ecosystem service contributions of water supply and biodiversity.

A variety of factors can affect the regional economy, including population growth, changes in interest rates, locations of new industries, recession, growth of new sectors, tax policy, and state economic policy. When compared with these impacts, the management action impacts under this RMP on the county economy would be relatively small. Because the changes in economic activity presented above would be minimal regionally, contributions to cumulative impacts would also be minimal under all alternatives; however, for communities and individuals, there may be cumulative economic effects.

Contributions to cumulative impacts for economic and social contributions from recreation would occur under all alternatives; however, it would be highest under Alternative B, due to increased opportunities for recreation.

Contributions to the sustained presence of livestock grazing in the area would occur under Alternatives A, B, and C. Under Alternative D, eliminating grazing would add increased economic pressure to grazing operations affected by area development and changing land use.

Contributions to preserving natural amenities for recreation and as a component of the social setting for residents would continue across all alternatives. Alternative D would represent the greatest degree of habitat preservation; however, management under Alternatives B and C would also support maintained or increased water quality and quantity and would benefit habitat maintenance and the visual setting.

3.6 UNAVOIDABLE ADVERSE IMPACTS

Section 102(C) of NEPA requires disclosure of any adverse environmental impacts that cannot be avoided should the proposal be implemented. Unavoidable adverse impacts are those that remain following the implementation of mitigation measures or impacts for which there are no mitigation measures. No unavoidable adverse impacts are directly attributable to planning decisions found within this Draft RMP. Some unavoidable adverse impacts occur because of implementing the RMP. Others are a result of public use of the BLM-administered lands within the decision area. This section summarizes major unavoidable impacts; discussions of the impacts of each management action (in the discussion of alternatives) provide greater information on specific unavoidable impacts.

Surface-disturbing activities, motorized vehicle use and recreation, fire and fuels management, inappropriate grazing practices, and the operation and maintenance of existing facilities and infrastructure in the planning area would contribute to soil erosion and soil compaction, sediment loading and increased turbidity of streams, and the potential spread of invasive species. Invasive species would continue to spread via the wind, in water courses, and by attaching to livestock, wildlife, humans, and vehicles. The continued presence of invasive species in the planning area is considered an unavoidable impact.

Surface-disturbing activities and the development of ROWs and other facilities in the planning area are expected to cause the unavoidable degradation, loss, and fragmentation of riparian and upland habitats, and, therefore, would unavoidably affect wildlife that depends on these habitats.

Surface-disturbing activities and development for resource uses would change the landscape, scenic quality, and setting in the decision area. Surface-disturbing activities, motorized vehicle use, theft and vandalism, and natural processes (e.g., erosion) would adversely affect cultural and paleontological resources in the decision area.

Recreational activities would result in unavoidable adverse impacts. Portions of the decision area with intense recreational use would continue to experience scarring, increased soil erosion or compaction, and loss of vegetation. Although these latter impacts are unavoidable, if they are concentrated in areas already disturbed, this would reduce the spread of impacts from increased visitation to more remote or less frequented areas; however, changes in the amount of recreational visitation and patterns of use could also result in increased conflicts between users, unanticipated changes in resource conditions, vandalism, and illegal collection of cultural and paleontological resources.

Conflicts between recreational users are unavoidable adverse impacts. As recreation demands increase, recreation use would disperse to other parts of the decision area, which could create conflicts with previous users of those areas. Unavoidable adverse impacts would occur even though alternative use areas for affected activities could be provided.

Although mitigation measures could be implemented for scientific data recovery of cultural or paleontological resources, the impacts on areas of any excavation would not be mitigable. The number of sites anticipated to be inadvertently damaged is unknown but is directly proportional to the acreage disturbed. Natural processes, such as erosion and natural decay or deterioration, could also result in unmitigated damage to cultural or paleontological resources.

Additional soil erosion and associated impacts would result from any facility developments, including recreation sites, livestock water and other range improvements, and utility and road facilities that are not properly restored even after mitigation measures are applied. Wildland fires are expected to continue to ignite and burn in the planning area over the life of the RMP; these would quickly change the habitat value for biological resources, resulting in the decline of habitat quality and the scenic quality of the landscape, without regard to visual objectives.

In addition, unavoidable adverse impacts would result from implementing proposed restrictions on travel management, ROWs, livestock grazing, and other resource uses to protect sensitive resources and other values. These restrictions would lessen the ability of operators, permittees, individuals, and groups to use public lands and could increase operating costs.

3.7 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Section 102(2)(C) of NEPA requires a discussion of any irreversible or irretrievable commitments of resources that are involved in the proposal should it be implemented. An irretrievable commitment of a resource is one in which the resource or its use is lost for a period of time (e.g., modifications to the landscape from fire or other vegetation treatments). An irreversible commitment of a resource is one that cannot be reversed (e.g., the extinction of a species or disturbance to cultural resources).

Each alternative contains a range of management actions that may lead to future irreversible and irretrievable commitments of those resources, once a decision is made. Decisions made in the selected plan serve to guide future actions and subsequent site-specific decisions. Following the signing of the ROD for the SPRNCA RMP, the BLM would develop and implement implementation plans. Decisions in these implementation plans require appropriate project-specific planning and NEPA analysis, and constitute the BLM's final approval authorizing on-the-ground activities to proceed. Assuming subsequent implementation decisions authorize activity- or project-specific plans, irreversible and irretrievable commitment of resources would occur. For most resources, the RMP could provide objectives for management and guidance for future implementation-level decisions to minimize the potential for irreversible and irretrievable commitments of resources.

This section identifies the irreversible and irretrievable impacts on resources and resource uses that may occur because of implementing one of the four alternatives. The exact nature and extent of any irreversible and irretrievable commitment of resources cannot be defined due to uncertainties about location, scale, timing, and rate of implementation; the relationship to other actions; and the effectiveness of mitigation measures throughout the life of this plan.

Implementing the RMP management actions would result in surface-disturbing activities, including dispersed recreation, recreational development, and ROW development, which results in a commitment to the loss of irreversible or irretrievable resources. Such surface disturbances are generally a permanent encumbrance of the land.

High-intensity wildfire can also result in large-scale surface disturbance. Although new soil can develop, soil development is a slow process in most of the planning area. Soil erosion or the loss of productivity and soil structure might be considered irreversible commitments of resources. Surface-disturbing activities, therefore, would remove vegetation and accelerate erosion that would contribute to irreversible soil loss; however, management actions and BMPs are intended to reduce the magnitude of these impacts and restore some of the soil and vegetation lost.

High-intensity wildfire and construction of roads and other transportation infrastructure improvements can also create an irretrievable degradation, loss, or fragmentation of wildlife habitat.

Cultural and paleontological resources are nonrenewable resources that, once affected (whether legally or illegally), data and other significant aspects (including context and association), are irreversibly displaced; however, legal, scientific removal of these resources typically preserves such information through careful documentation and data curation.

3.8 Relationship Between Local, Short-Term Uses and Long-Term Productivity

Section 102(C) of NEPA requires discussion of the relationship between local, short-term uses of the human environment, and the maintenance and enhancement of long-term productivity of resources. As described in the introduction to this chapter, "short term" is defined as anticipated to occur within 1 to 5 years of implementation of the activity. "Long term" is defined as following the first 5 years of implementation but within the life of the RMP (projected to be 20 years or more).

Regardless of which alternative is selected, management activities would result in various short-term adverse impacts, such as increased localized soil erosion or damage to wildlife habitat. Short-term

impacts associated with travel management could result in long-term impacts on recreation and wildlife movement and wildlife habitats. Other short-term impacts could improve long-term productivity and provide beneficial impacts. For instance, short-term impacts, such as vegetation treatments, would beneficially affect long-term productivity for wildlife and rangeland management by increasing available forage or by improving wildlife habitats. Short-term impacts of wildfire management and vegetation treatments would result in long-term improvements for scenic quality.

Management actions and BMPs would minimize the effect of short-term uses and reverse the change during the long term; however, BLM-administered lands are managed to foster multiple uses, and some long-term productivity impacts might occur regardless of management approach.

Chapter 4. Consultation and Coordination

4.1 Introduction

This chapter describes the public outreach and participation opportunities associated with developing this RMP/EIS. As part of the process, the BLM consulted and coordinated with tribes, government agencies, and other stakeholders.

The BLM conducts land use planning in accordance with NEPA requirements, CEQ regulations, and DOI and BLM policies and procedures for implementing NEPA. NEPA and associated laws, regulations, and policies require the BLM to seek public involvement early in and throughout the planning process. This is to develop a reasonable range of alternatives to proposed actions and to prepare environmental documents that disclose the potential impacts of proposed actions and alternatives.

The BLM involved the public and other agencies by way of *Federal Register* notices, public and informal meetings, individual contacts, media releases, planning newsletters, and the SPRNCA RMP website. This involvement was at the heart of the planning process leading to this RMP/EIS.

4.2 Public Collaboration and Outreach

Public involvement is a vital and legal component of both the RMP and EIS processes. Public involvement vests the public in the decision-making process and allows for full environmental disclosure. Guidance for implementing public involvement under NEPA is codified in 40 CFR 1506.6, thereby ensuring that federal agencies make a diligent effort to involve the public in the NEPA process.

Section 202 of the FLPMA directs the Secretary of the Interior to establish procedures for public involvement during land use planning actions on public lands. These procedures can be found in the BLM's Land Use Planning Handbook H-1601-1 (BLM 2005).

The BLM involved the public in the SPRNCA RMP/EIS during the following phases:

- Public scoping before NEPA analysis to determine the scope of issues and alternatives to be addressed in the RMP/EIS
- Public involvement during development of alternatives to be considered in the RMP/EIS
- Public input during WSR evaluation
- Collaboration with federal, state, local, and tribal governments, the BLM Arizona Resource Advisory Council, and cooperating agencies
- Public review of and comment on the Draft RMP/EIS, which analyzes likely environmental impacts

The public scoping phase has been completed and is described below; the public outreach and collaboration phases are ongoing throughout the RMP/EIS process. The public can obtain information about the process at any time by accessing the SPRNCA RMP website at https://go.usa.gov/xnTuM.

4.2.1 Scoping Process

The purpose of the public scoping process is to identify issues and planning criteria that should be considered in the RMP and /EIS and to initiate public participation in the planning process. The BLM follows the public involvement requirements under CEQ regulations set forth in 40 CFR 1501.7, which state that "there should be an early and open process for determining the scope of issues to be addressed and for identifying the process for determining the scope of issues to be addressed during the planning process."

Public Notification

Notice of Intent

The formal public scoping process for the SPRNCA RMP began with the publication of the NOI in the *Federal Register* on April 30, 2013 (78 FR 25299); the BLM also posted the NOI on the project website (https://go.usa.gov/xnTuM). It notified the public of the BLM's intent to develop an RMP for the SPRNCA planning area and identified the preliminary issues to be considered in the RMP process. The original scoping period was scheduled for at least 90 days, but the BLM extended it through September 27, 2013, for a total of 150 days.

Project Website

The BLM maintains an interactive website to provide the public with the latest information about the RMP/EIS process (see **Section 4.2.4**, Project Website).

News Releases

During the public scoping period, the BLM published three news releases, announcing public involvement opportunities, scoping meetings, and educational forums. The news releases were published on May 31, August 15, and August 22, 2013.

Other Notifications

In addition to news releases, members of the public were notified about the scoping process from a variety of sources. Local and regional articles and news bulletins regarding some aspect of the RMP process were published in newspapers, both in and outside of the planning area. The BLM also generated flyers, providing a summary of the meeting agenda and announcing time and location of each scoping meeting. The flyers were circulated to the public and posted in public locations in advance of the scoping meetings.

Scoping and Education Meetings

Five public scoping meetings were conducted in 2006 during an earlier start on an RMP that would have included the SPRNCA and all of the TFO.

Following publication of the NOI for the SPRNCA RMP/EIS, the BLM conducted three strategic planning meetings (**Table 4-1**, Public Strategic Planning Meetings). The purposes of the meetings were to present information about the RMP process, to discuss public involvement plans, to solicit recommendations to encourage public involvement, and to share lessons learned from other public involvement experiences.

Table 4-1
Public Strategic Planning Meetings

Date	Location (Arizona)	Number of Attendees
May 15, 2013	Sierra Vista	43
June 18, 2013	Benson	29
June 20, 2013	Tucson	18
	Total	**90**

Participants in the strategic planning meetings voiced interest in holding educational forums on relevant topics to inform public comments during the scoping period. As a result, The BLM held five forums in Sierra Vista in July and August 2013 (**Table 4-2**). Each forum consisted of 20-minute presentations by 3 to 4 subject matter experts, followed by a 10-minute question-and-answer period. After the presentations, the participants were invited to meet with the presenters and BLM resource specialists.

Table 4-2
Education and Scoping Forums

Date (2013)[1]	Topic	Number of Attendees
July 20	Water and riparian resources (including groundwater, water rights, watershed, and riparian vegetation)	35
July 27	Watershed and range management (including climate change, watershed and fire restoration, rangeland management, and borderlands restoration)	48
August 10	Wildlife and threatened and endangered species (including birds, fish and aquatic habitat, ESA consultation, and beaver reintroduction)	33
August 17	Cultural and recreation resources (including cultural, paleontological, prehistoric, and archaeological resources, recreation and visitor services, visual resources, wilderness characteristics, and WSRs)	44
August 24	Socioeconomics (including partnerships, economic trends, planning and zoning, and socioeconomic contributions)	22
	Total	**182**

[1]All forums were held in Sierra Vista.

The BLM hosted four public scoping meetings in August and September 2013 to provide information to the public and agencies (**Table 4-3**, Public Scoping Meetings). The meeting attendees were invited to submit comments and share issues and concerns related to the RMP. The public scoping meetings consisted of a hybrid meeting format: presentation, question-and-answer period, and open house.

Each scoping meeting started with introductions and a 20-minute presentation by BLM staff members. They described the scoping process, provided information on submitting scoping comments, and summarized the range of planning decisions to be considered in the RMP/EIS. Following the presentation, participants were given the opportunity to ask questions. The last hour of each scoping meeting was an open house format, in which participants could talk one-on-one with BLM resource specialists.

Table 4-3
Public Scoping Meetings

Date (2013)	Location (Arizona)	Number of Attendees
August 13	Benson	11
August 14	Tucson	9
August 21	Sierra Vista	22
September 12	Bisbee	4
	Total	**46**

Scoping Comments Received

The BLM received 133 unique written comment letters during the public scoping period (April 30 to September 27, 2013). These submissions contained 499 unique comments. Detailed information about the comments received and about the public outreach process can be found in the SPRNCA RMP Scoping Report (BLM 2014). The issues identified during public scoping and outreach helped refine the list of planning issues, which guided the development of alternatives management strategies for the RMP.

4.2.2 Alternatives Development Process

After the scoping period, the BLM conducted additional public involvement to engage the public in developing possible management actions and strategies (i.e., alternatives) for the RMP.

Public meetings to review the planning issues identified during scoping and to provide an overview of the alternatives development process were held on December 14, 2013, in Sierra Vista and on December 17, 2013, in Benson. In total, 12 people participated in these two meetings.

In Spring 2014, BLM resource specialists hosted five full-day field trips to the SPRNCA, focusing on five topics (**Table 4-4**). Field trip groups visited key sites across the SPRNCA to observe together and share ideas about possible management actions and strategies. Fifty-five people participated in the field trips, offering their own insights, questions, and suggestions for how the SPRNCA could be managed. Notes and photographs from the field trips are available on the SPRNCA RMP website.

Table 4-4
Resource Field Trips

Date (2014)	Topic	Number of Attendees
March 21	Range management	14
March 28	Fish and wildlife	11
April 4	Recreation	9
May 9	Hydrology	12
May 20	Cultural resources	9
	Total	**55**

Between February and July 2014, the BLM hosted three public meetings to solicit public comments and suggestions on management strategies related to the planning issues (**Table 4-5**). In May 2015, the BLM presented the draft range of alternatives to the public, cooperating agencies, and other stakeholders to solicit feedback (**Table 4-5**).

Table 4-5
Alternatives Development Public Meetings

Date	Topic	Number of Attendees
February 22, 2014	Alternatives development public strategy meeting: recreation, fish and wildlife, and cultural resources	22
March 22, 2014	Alternatives development public strategy meeting: range, water resources, upland vegetation, and riparian vegetation	22
July 22, 2014	Adaptive management education forum	13
May 19, 2015	Draft range of alternatives public strategy meeting	42
	Total	**99**

The agency solicited written input on the draft alternatives by June 10, 2015, and received 39 comments. In July 2014, the BLM also held an educational forum on adaptive management. Notes of all meetings are available on the SPRNCA RMP website.

4.2.3 Wild and Scenic Rivers Public Input Process

The following summarizes the eligibility and suitability phases for WSRs. Additional details are included in the SPRNCA Wild and Scenic River Eligibility Report (BLM 2016) and Draft Wild and Scenic Rivers Suitability Report (see **Appendix M**).

Previously, in the Safford RMP (BLM 1991), the BLM completed the eligibility phase of the WSR study for specific portions totaling 44 miles of the San Pedro River on BLM-administered lands. The segments were identified as eligible for inclusion in the NWSRS, with a tentative classification as recreational, as defined by the WSRA. A suitability determination done as part of the Arizona Statewide WSR Legislative EIS (BLM 1994) found the 44-mile, BLM-administered portion of the San Pedro River to be suitable as recreation and for inclusion in the NWSRS. Congress has not designated the San Pedro River as part of the NWSRS.

Due to changed circumstances affecting the San Pedro River's ORVs, its eligibility and suitability are being revisited in this RMP. All other decision area streams were also evaluated for eligibility in this RMP; the only other river that meets the eligibility criteria is the Babocomari River. The SPRNCA Draft WSR Suitability Report (**Appendix M**) details the San Pedro River and Babocomari River segments determined to be eligible for inclusion in the NWSRS, as well as the draft suitability determinations for each segment.

This Draft RMP incorporates each of the eligible rivers into one or more alternatives (**Chapter 2**). **Chapter 3** is an assessment of the potential impacts of recommending each eligible segment as either suitable or not suitable for inclusion in the NWSRS.

The BLM will accept public review and comment on the Draft RMP/EIS. A final determination of suitability, as well as protective management measures, will be issued in the ROD for this RMP. Congressional action is required for actual designation and final classification of suitable river segments.

Public involvement for this WSR evaluation process was included as part of scoping for the RMP, from April 30 through September 27, 2013 (see **Section 4.2.1**).

The BLM presented an overview of the WSR process and a preliminary draft inventory map at the August 17, 2013, education forum (**Table 4-2**). The BLM presented the draft results of its initial identification process, provided educational materials regarding the WSR process, and solicited comments from the public and government agencies. The public was invited to submit comments via mail, facsimile, or email, and the BLM accepted comments until September 27, 2013. It received eight comments specific to WSR during scoping (refer to the SPRNCA RMP Scoping Report [BLM 2014] for more information).

4.2.4 Project Website

The BLM maintains an interactive website to provide the public with the latest information about the RMP/EIS process: https://go.usa.gov/xnTuM. It provides the following:

- Background information about the project
- An RMP timeline
- Planning area maps
- Public meeting materials and summaries
- Field trip meeting summaries
- Contact information
- Copies of public information documents, such as the NOI, historical management documents, enabling legislation, and resource reports

The site also provides a link to the comment forms for submitting scoping comments and for comments on the route inventory for the travel management plan.

4.2.5 Newsletters

Public outreach after the scoping period included the following SPRNCA RMP newsletters:

- November 2013, providing information about the RMP process, preliminary planning issues, and how to get involved
- January 2014, announcing the availability of the scoping report and summarizing the scoping comments and key planning issues
- March 2015, summarizing the current project phase (alternatives development), public outreach conducted to date, and future public involvement opportunities

Newsletters were mailed or emailed to the following:

- 368 individuals
- Industry
- Members of the Arizona legislature and US Congress
- Cooperators, lessees, and permittees
- Arizona Resource Advisory Council members
- Educational institutions
- City, county, federal, and state agencies and tribal governments

- News media
- Organizations
- Others requesting to be included on the general mailing list

4.2.6 Mailing List

The BLM initially compiled a mailing list of over 250 individuals, agencies, and organizations that had participated in past BLM projects. Attendees at all public meetings were added to the mailing list if they wanted to receive or continue to receive project information. In addition, all individuals or organizations that submitted scoping comments were added to the mailing list.

Through this process, the BLM was able to revise the mailing list to remove undeliverable addresses and to add new interested parties. The mailing list currently includes approximately 368 entries. Requests to be added to or to remain on the official SPRNCA RMP distribution list will continue to be accepted throughout the planning process.

4.2.7 Future Public Involvement

Public participation will be ongoing throughout the remainder of the SPRNCA RMP planning process. One substantial part of the process is providing an opportunity for the public to comment on this Draft RMP/EIS during the comment period. In the Proposed RMP/Final EIS, the BLM will respond to all substantive comments received during the 90-day comment period. The BLM will issue the ROD after the release of the Proposed RMP/Final EIS, the governor's consistency review, and any resolution of protests received on the Proposed RMP/Final EIS.

4.3 CONSULTATION AND COORDINATION

Federal laws require the BLM to consult with certain federal and state agencies and entities and Native American tribes during the NEPA decision-making process (40 CFR 1502.25). The BLM is also directed to integrate NEPA requirements with other environmental review and consultation requirements to reduce paperwork and delays (40 CFR 1500.4-5).

The BLM has implemented an extensive collaborative outreach and public involvement process that has included coordinating with tribes and cooperating agencies. It is also working closely with the BLM Arizona Resource Advisory Council. The BLM will continue to meet with interested agencies and organizations throughout the planning process, as appropriate, and will continue coordinating closely with cooperating partners. Cooperating agencies are discussed in **Chapter 1**, **Section 1.7**, Collaboration.

4.3.1 Native American Tribe Consultation

The BLM has initiated government-to-government consultation with 14 Native American tribes who claim cultural affiliation to or traditional use of the SPRNCA RMP planning area, therein inviting tribal participation in RMP development (see **Appendix D**). Consulting tribes are the Ak-Chin Indian Community, Fort McDowell Yavapai Nation, Fort Sill Apache Tribe, Gila River Indian Community, Hopi Tribe, Mescalero Apache Tribe, Pascua Yaqui Tribe, Pueblo of Zuni, Salt River Pima-Maricopa Indian Community, San Carlos Apache Tribe, Tohono O'odham Nation, Tonto Apache Tribe, White Mountain Apache Tribe, and Yavapai-Apache Nation. Consultation and coordination will continue throughout the RMP/EIS process to ensure adequate consideration of Native American concerns.

4.3.2 Arizona State Historic Preservation Office Consultation

The BLM has also invited the Arizona SHPO to participate in RMP development, and the SHPO will be given the opportunity to review and comment on the Draft RMP/EIS. Consultation and coordination will continue throughout the RMP/EIS process for potentially interested and affected parties to offer input on cultural resources management, identification of important resource sites and areas, and any other broad-scope resource management considerations.

4.3.3 US Fish and Wildlife Service Consultation

To comply with Section 7(c) of the ESA, the BLM contacted the USFWS early in the planning process. It will consult with the USFWS to identify ESA issues and to develop the draft biological assessment.

4.3.4 Resource Advisory Council Collaboration

A Resource Advisory Council is a committee established by the Secretary of the Interior to provide advice or recommendations to BLM management (BLM Land Use Planning Handbook H-1601-1; BLM 2005). The council is generally composed of 15 members of the public, representing different areas of expertise. As provided for by the FLPMA, the DOI established the Resource Advisory Council program in 1995 as a forum for local citizens to provide advice and recommendations on managing public lands. Council members serve a 3-year term, which is staggered among members such that one-third of the membership is subject to appointment in any given year.

The members of the Resource Advisory Council develop recommendations for the BLM on preparing, amending, and implementing land use plans for the BLM-administered lands and resources under the council's jurisdiction. It also advises the BLM on developing recommendations for implementing ecosystem management concepts, principles, and programs. Members assist the BLM in establishing landscape goals and objectives.

The BLM provides the Resource Advisory Council with regular briefings during quarterly meetings to ensure consistency with other local, state, and federal plans. The Gila District Manager provided updates to the council before the release of the NOI and periodically throughout preparation of the Draft RMP/EIS.

4.3.5 Interest Groups

The BLM has an open-door policy for meeting with interest groups and members of the public.

4.4 LIST OF PREPARERS

Name	Role/Responsibility
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David McIntyre	Former RMP Project Manager; public safety
Amy Marksein	RMP Planner; ePlanning; public safety
Scott Feldhausen	Gila District Manager
Jayme Lopez	Field Manager
Eric Baker	Soils; upland vegetation; livestock grazing
Evan Darrah	GIS
Zach Driscoll	GIS
Sharisse Fisher	GIS
Phil Gensler	Paleontological resources

Name	Role/Responsibility
Michael Johnson	Socioeconomics and environmental justice
Elroy Masters	Fish and wildlife, vegetation
Francisco Mendoza	Visual resources; wilderness characteristics; recreation; travel management; special designations
Dan Moore	Geology; energy and minerals
Dave Murray	Air quality and climate; water resources
Mark Pater	Wildland fire
Dan Quintana	Wildland fire
Kim Ryan	Cultural resources; tribal interests
Jeff Simms	Vegetation; fish and wildlife (including special status species); invasive species; priority habitats and vegetation
Leslie Uhr	Lands and realty; GIS; ePlanning
Bill Werner	Vegetation; fish and wildlife (including special status species)
BLM National Operations Center	
Josh Sidon	Socioeconomics and environmental justice
EMPSi – Environmental Management and Planning Solutions, Inc.	
Chad Ricklefs, AICP	Project Manager; recreation; travel management
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Annie Daly	Air quality and climate
Kevin Doyle	Cultural resources; paleontological resources; tribal interests
Melissa Estep	Water resources
Zoe Ghali	Wildland fire; livestock grazing; socioeconomics and environmental justice; public safety
Peter Gower, AICP, CEP	Lands and realty and withdrawals; recreation; travel management
Derek Holmgren	Geology; soils; water resources; visual resources
Jenna Jonker	GIS
Katie Patterson	Energy and minerals
Kevin Rice	Fish and wildlife (including special status species); special status plants
Marcia Rickey	GIS
Cindy Schad	Word processor and ADA Section 508 compliance
Morgan Trieger	Vegetation
Drew Vankat	Recreation; travel management
Randolph Varney	Technical editor
Liza Wozniak	Fish and wildlife (including special status species)
Meredith Zaccherio	Vegetation; special status plants

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Glossary

Activity plan. A type of implementation plan (see *Implementation plan*), an activity plan usually describes multiple projects and applies best management practices to meet land use plan objectives. Examples of activity plans are interdisciplinary management plans, habitat management plans, recreation area management plans, and grazing plans.

Actual use. Means where, how many, what kind or class of livestock, and how long livestock graze on an allotment or on a portion or pasture of an allotment (43 USC 315).

Adaptive management. A type of natural resource management in which decisions are made as part of an ongoing science-based process. Adaptive management involves testing, monitoring, and evaluating applied strategies and incorporating new knowledge into management approaches that are based on scientific findings and the needs of society. Results are used to modify management policy, strategies, and practices.

Administrative access. Travel related access for official use by BLM employees and agency representatives during the course of their duties. Access is for resource management and administrative purposes and may include fire suppression, cadastral surveys, permit compliance, law enforcement, and resource monitoring or other access needed to administer BLM-managed lands or uses.

Air basin. A land area with generally similar meteorological and geographic conditions throughout. To the extent possible, air basin boundaries are defined along government boundary lines and include both the source and receptor areas.

Air pollution. The addition to the atmosphere of any material that may have a deleterious effect on life.

Air quality standard. The specified average concentration of a pollutant in ambient air during a specified period, at or above the level where public health may be at risk. National ambient air quality standards have been set for the following criteria pollutants: carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, lead, and two categories of particulate matter (that with an aerodynamic diameter of 10 microns or less [PM_{10}] and that with an aerodynamic diameter of 2.5 microns or less [$PM_{2.5}$]).

Allotment. An area of land in which one or more operators graze their livestock. Allotments generally consist of BLM-administered lands but may include other federally managed, state-owned, and private lands. An allotment may include one or more separate pastures. Livestock numbers and periods of use are specified for each allotment.

Allotment management plan (AMP). A concisely written program of livestock grazing management, including supportive measures, if required, designed to attain specific, multiple-use management goals in a grazing allotment. An AMP is prepared in consultation with the permittees, lessees, and other affected interests. Livestock grazing is considered in relation to other uses of the range and to renewable resources, such as watershed, vegetation, and wildlife. An AMP establishes

seasons of use and the number of livestock to be permitted, the range improvements needed, and the grazing system used.

Alluvial soil. A soil developed from recently deposited alluvium (see below) and exhibiting essentially no horizon development or modification of the recently deposited materials.

Alluvium. Clay, silt, sand, gravel, or other rock materials transported by moving water. It was deposited in comparatively recent geologic time as sorted or semi-sorted sediment in rivers, floodplains, lakes, and shores and in fans at the base of mountain slopes.

Ambient air. Any unconfined portion of the atmosphere; the outside air.

Ambient air quality. The state of the atmosphere at ground level, as defined by the range of measured or predicted ambient concentrations of all significant pollutants for all averaging periods of interest.

Animal unit month (AUM). The amount of forage necessary for the sustenance of one cow or its equivalent for one month.

Aquatic. Living or growing in or on the water.

Aquifer. A water-bearing bed or layer of permeable rock, sand, or gravel capable of yielding large amounts of water.

Aquifer recharge. Adding water to an aquifer; a process that occurs naturally from the infiltration of rainfall and from water flowing over earth materials that allow it to infiltrate below the land surface.

Areas of critical environmental concern (ACEC). Special area designation established through the BLM's land use planning process (43 CFR 1610.7-2). An ACEC is where special management attention is required, when such areas are developed or used or where no development is required, to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards. The level of allowable use in an ACEC is established through collaborative planning. Designation of an ACEC allows for resource use limitations to protect identified resources or values.

Potential ACECs are areas determined to meet the relevance and importance criteria, as defined by 43 CFR 1610.7-2(a)(1) and (2) and guidance in BLM Manual 1613, Areas of Critical Environmental Concern (BLM 1988).

Arizona Standards for Rangeland Health and Guidelines for Grazing Administration. Standards and guidelines developed collaboratively by the BLM and the Arizona Resource Advisory Council to address the minimum requirements of the Department of the Interior's final rule for Grazing Administration, effective August 21, 1995 (BLM 1997).

Atmospheric deposition. Air pollution produced when acid chemicals are incorporated into rain, snow, fog, or mist and fall to the earth. Sometimes referred to as acid rain, it comes from sulfur oxides and nitrogen oxides, which are the products of burning coal and other fuels, and from certain industrial processes. If the acid chemicals in the air are blown into wet weather areas, the acids can fall to earth in

the rain, snow, fog, or mist. In areas where the weather is dry, the acid chemicals may become incorporated into dust or smoke.

Attainment area. A geographic area in which levels of a criteria air pollutants meet the health-based National Ambient Air Quality Standard for that specific pollutant.

Authorized access/use. Travel related access for users authorized by the BLM or otherwise officially approved. Access may include motorized access for permittees, lessees or other authorized users, along with approved access across BLM-administered public lands for other state and federal agencies.

Avoidance/avoidance area. An area identified through resource management planning to be avoided but that may be available for locating a right-of-way, with special stipulations.

Backcountry setting. Areas with undeveloped, primitive, and self-directed visitor experiences without provisions for motorized or mechanized access, except for identified routes.

Base flow (discharge). The portion of stream discharge derived from such natural storage sources as groundwater, large lakes, and swamps but not derived from direct runoff or flow from stream regulation, water diversion, or other human activities.

Baseline. The condition of a defined area or resource that can be quantified by appropriate measurements. During environmental reviews, the baseline is considered the affected environment at the time of the reviews begin. It is used to compare predictions of the impacts of the proposed action or a reasonable range of alternatives.

Best management practice (BMP). A technique that guides or may be applied to management actions to aide in achieving desired outcomes. BMPs are often developed in conjunction with land use plans, but they are not considered planning decisions unless the plans specify that they are mandatory.

Big game. Indigenous, hoofed wildlife species that are hunted, such as elk, deer, bison, bighorn sheep, and pronghorn antelope.

Biodiversity (biological diversity). The variety of life and its processes and the interrelationships in and among various levels of ecological organization. Conservation, protection, and restoration of biological species and genetic diversity are needed to sustain the health of biological systems. Federal resource management agencies must examine the implications of management actions and development decisions on regional and local biodiversity.

BLM sensitive species. Those species that are not federally listed as endangered, threatened, or proposed under the Endangered Species Act but that are designated by the BLM State Director under 16 USC 1536(a)(2) for special management consideration. By national policy, federally listed candidate species are automatically included as BLM sensitive species. Sensitive species are managed so they will not need to be listed as proposed, threatened, or endangered under the Endangered Species Act.

Candidate species. Species for which the US Fish and Wildlife Service has sufficient information on their status and threats to propose them for listing as endangered or threatened under the Endangered Species Act, but for which issuing a proposed rule is currently prevented by higher priority listing

actions. Lists for plants, vertebrate animals, and invertebrate animals are published periodically in the *Federal Register* (BLM 2008).

Carbon dioxide equivalents (CO_2e). A term for describing different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO_2e signifies the amount of CO_2 that would have the equivalent global warming impact.

Carbon monoxide (CO). A colorless, odorless toxic gas produced by incomplete combustion of carbon in fossil fuels.

Channel. A natural or artificial watercourse with a definite bed and banks to confine and conduct continuously or periodically flowing water.

Channelization. The process of rebuilding the natural course of a stream to make it flow into a restricted path.

Channel morphology. Relating to the form and structure of channels.

Ciénega. A type of wetland resulting from a specific combination of a permanent water source, topography, and water-bearing soils.

Closed area. An area where off-road vehicle use is prohibited. Use of off-road vehicles in closed areas may be allowed for certain reasons; however, such use is made only with the approval of the BLM Authorized Officer (43 CFR 8340.0-5[h]).

Collaboration. A cooperative process in which interested parties, often with widely varied interests, work together to seek solutions with broad support for managing public and other lands. Collaboration may take place with any interested parties, whether or not they are a cooperating agency.

Communication site. Sites that include broadcast types of uses, such as television, AM/FM radio, cable television, and a broadcast translator; and non-broadcast uses, such as commercial or private mobile radio service, cellular telephone, microwave, local exchange network, and passive reflector.

Condition class (fire regimes). Fire regime condition classes measure the degree of departure from historical fire regimes, possibly altering key ecosystem components, such as species composition, structural stage, stand age, canopy closure, and fuel loadings. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, livestock grazing, introduction and establishment of exotic plant species, or introduced insects or disease.

Conformance. A proposed action should be specifically provided for in the land use plan or, if not specifically mentioned, should clearly conform to the goals, objectives, or standards of the approved land use plan.

Conservation plan. The recorded decisions of a landowner or operator, cooperating with a conservation district, on how the landowners or operators plan, within practical limits, to use their land according to its capability. Conservation plans also cover how they treat the land according to its needs for maintaining or improving the soil, water, animals, plants, and the air.

Conservation strategy. A strategy outlining current activities or threats that are contributing to the decline of a species, along with the actions or strategies needed to reverse or eliminate such a decline or threat. Conservation strategies are generally developed for species of plants and animals that are designated as BLM sensitive or that the US Fish and Wildlife Service or National Oceanographic and Atmospheric Administration-Fisheries has determined to be a federal candidate under the Endangered Species Act.

Cooperating agency. Assists the lead federal agency in developing an environmental assessment or environmental impact statement. This can be any agency with jurisdiction by law or special expertise for proposals covered by the National Environmental Policy Act of 1969 (40 CFR 1501.6). Any tribe or federal, state, or local government jurisdiction with such qualifications may become a cooperating agency by agreement with the lead agency.

Council on Environmental Quality (CEQ). An advisory council to the president, established by the National Environmental Policy Act of 1969. It reviews federal programs to analyze and interpret environmental trends and information.

Criteria pollutant. The US Environmental Protection Agency uses six criteria pollutants as indicators of air quality: ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead. It has established for each of them a maximum concentration above which there may be adverse effects on human health. These threshold concentrations are called National Ambient Air Quality Standards.

Cultural resources. Locations of human activity, occupation, or use. Examples are archaeological, historic, or architectural sites, structures, or places with important public and scientific uses and locations of traditional cultural or religious importance to specific social or cultural groups.

Cumulative effects. The direct and indirect effects of a proposed project alternative's incremental impacts when they are added to other past, present, and reasonably foreseeable actions, regardless of who carries out the action.

Decision area. Lands and federal mineral estate in the BLM-administered planning area.

Deferment. A period when livestock are not grazed during part of the growing season.

Deferred/deferred use. To set aside, or postpone, a particular resource use or activity on the public lands to a later time. Generally, when this term is used, the period of the deferral is specified. Deferments sometimes follow the sequence time frame of associated serial actions; for example, Action B would be deferred until Action A is completed.

Designated roads and trails. Specific roads and trails identified by the BLM or other agency where some type of motorized or nonmotorized use is appropriate and allowed, either seasonally or year-round (BLM 2005).

Desired outcome. A type of land use plan decision expressed as a goal or objective.

Direct impact. Caused by an action or implementation of an alternative; direct impacts take place at the same time and place.

Diversity. The relative abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area.

Easement. A right afforded a person or agency to make limited use of another's real property for access or other purposes.

Ecological site description. This provides a system for comparing existing vegetation conditions to potential or desired future conditions. An ecological site is a unit of land occupying a specific environmental zone and that can support a native plant community. Ecological sites are delineated by such criteria as topographic position, percent slope, soils and parent geologic material, precipitation, and elevation.

Ecosystem services. Human benefits resulting from appropriate ecosystem structure and function.

Eligible river segment. Qualification of a river for inclusion in the National Wild and Scenic Rivers System by determining that it is free flowing and, with its adjacent land area, has at least one river-related value considered to be outstandingly remarkable.

Endangered species. Any species that is in danger of extinction throughout all or a significant portion of its range (BLM 2008). Under the Endangered Species Act in the United States, "endangered" is the more protected of two categories; the other is "threatened." Designation as endangered or threatened is determined by the US Fish and Wildlife Service under the Endangered Species Act.

Endangered Species Act (ESA) of 1973 (as amended). Designed to protect critically imperiled species from extinction because of economic growth and development, untempered by adequate concern and conservation. The US Fish and Wildlife Service and the National Oceanic and Atmospheric Administration administer the ESA. Its purpose is to protect species and the ecosystems that they depend on (16 USC 1531–1544).

Enhance. The improvement of habitat by increasing missing or modifying unsatisfactory components or attributes of the plant community to meet objectives.

Entrenchment. The process by which a stream erodes downward (incision), creating vertical, often eroding banks and abandoning its floodplain. Entrenched streams are often referred to as gullies.

Environmental impact statement (EIS). A detailed statement, prepared by the responsible official, in which a major federal action that significantly affects the quality of the human environment is described, alternatives to the proposed action are provided, and impacts are analyzed (BLM 2001).

Environmental justice (Executive Order 12898). The fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences of industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.

Ephemeral stream. A stream or portion of a stream that (1) flows only in direct response to precipitation, (2) receives little or no water from springs or no long continued supply from snow or other sources, and (3) has a channel that is always above the water table.

Exchange. A transaction whereby the federal government receives land or interests in land in exchange for other land or interests in land.

Exclusion area. An area identified through resource management planning that is not available for a right-of-way under any conditions.

Existing routes. The roads, trails, or ways used by operators of motorized vehicles, such as jeeps, all-terrain vehicles, and motorized dirt bikes, or by those engaged in mechanized uses, such as mountain bikes, wheelbarrows, and game carts, or by pedestrians (hikers), and horseback riders. Existing routes are, to the best of the BLM's knowledge, in existence at the time a resource management plan/environmental impact statement is published.

Extensive recreation management area (ERMA). Administrative units that require specific management to address recreation use, demand, or visitor services. ERMAs are managed to support and sustain their principal recreation and their associated qualities and conditions. ERMA management is commensurate with, and considered in context with, the management of other resources and resource uses.

Federal Land Policy and Management Act of 1976 (FLPMA). Public Law 94-579, October 21, 1976, often referred to as the BLM's Organic Act, which provides most of its legislated authority, direction policy, and basic management guidance. Section 302 of the FLPMA allows for the issuance of easements, leases, and permits for any use that is not specifically authorized under other laws or regulations and not specifically forbidden by law. Examples of permits are for commercial filming, apiaries, temporary storage yards, military uses, and agricultural uses.

Fire frequency. A general term referring to the recurrence of fire in a given area over time.

Fire management plan (FMP). The purpose of the fire management plan is to lay out how fire management strategies and tactics will protect values and provide tools to meet resource goals and objectives.

Fire suppression. All work and activities connected with control and fire extinguishing operations, beginning with discovery and continuing until the fire is completely extinguished.

Flood frequency. Natural Resources Conservation Service (NRCS) flood frequency classes are based on the interpretation of soil properties and other evidence gathered during soil survey fieldwork. The NRCS uses the following flood frequency classes listed in the NRCS Soil Survey Handbook to indicate the number of times flooding occurs over a period of time: very frequent, frequent, occasional, rare, very rare, or none. Some soils in the soil survey data were interpreted to have a flood frequency of common, or having a 50 percent chance of flooding in all months in any year. "Common" is not a defined flood frequency class in the NRCS Soil Survey Handbook, so its attributes were combined with the frequent class to depict one frequent flood frequency class. (NRCS National Soil Survey Handbook Section 618.30 [NRCS 2018]). The classes are defined as follows:

- Very Frequent—Flooding is likely to occur very often under usual weather conditions; more than a 50 percent chance of flooding in all months of any year
- Frequent—Flooding is likely to occur often under usual weather conditions; more than a 50 percent chance of flooding in any year (i.e., 50 times in 100 years), but less than or equal to a 50 percent chance of flooding in all months in any year
- Occasional—Flooding is expected infrequently under usual weather conditions; 5 to 50 percent chance of flooding in any year or 5 to 50 times in 100 years
- Rare—Flooding is unlikely but is possible under unusual weather conditions; 1 to 5 percent chance of flooding in any year or nearly 1 to 5 times in 100 years
- Very Rare—Flooding is very unlikely but is possible under extremely unusual weather conditions; less than one percent chance of flooding in any year or less than one time in 100 years but more than one time in 500 years.
- None: No reasonable possibility of flooding; one chance out of 500 of flooding in any year or less than once in 500 years

Floodplain. A geographic area of relatively level land that is occasionally subject to inundation by surface water from rivers or streams.

Forage. All browse and herbaceous foods that are available to grazing animals.

Forage base. The amount of vegetation available for wildlife and livestock use.

Fugitive dust. Airborne soil particles resulting from direct surface disturbance, such as from construction equipment, or from natural sources, such as wind.

Gaining stream. A stream that gains water from the inflow of groundwater, because the channel bottom is lower than the level of the surrounding groundwater table.

Gauging station. Particular site on a stream, canal, lake, or reservoir where systematic observations of height or discharge are obtained.

Geographic information system (GIS). A system of computer hardware, software, data, people, and applications that capture, store, edit, analyze, and display a potentially wide array of geospatial information.

Geologic erosion. The natural rate of erosion occurring gradually over long periods, with episodic periods of locally high rates in response to rains, runoff, and flooding. Geologic erosion can vary by slope steepness, with steeper slopes resulting in higher rates of erosion.

Goal. A broad statement of a desired outcome; it is usually not quantifiable and may not have established time frames for being achieved.

Grandfathered use. The right to use in a nonconforming manner because it existed before conforming terms and conditions were established.

Grant. Any authorization or instrument, such as an easement, lease, license, or permit, that the BLM issues under Title V of the Federal Land Policy and Management Act (43 USC 1761 et. seq.) and those authorizations and instruments that the BLM and its predecessors issued for like purposes before October 21, 1976, under the existing statutory authority. It does not include authorizations issued under the Mineral Leasing Act (43 USC 185).

Grazing system. Scheduled grazing use and non-use of an allotment to reach identified goals or objectives by improving the quality and quantity of vegetation. Grazing systems include developing pastures, utilization levels, grazing rotations, timing and duration of use periods, and necessary range improvements.

Greenhouse gas (GHG). A gas in an atmosphere that absorbs and emits radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect. The primary greenhouse gases in earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone.

Ground-disturbing activity. An action that alters the vegetation, surface/near surface soil resources, or surface geological features beyond natural site conditions and on a scale that affects other public land values. Examples of ground-disturbing activities are operating heavy equipment to construct well pads, roads, pits and reservoirs; installing pipelines and power lines; and conducting several types of vegetation treatments, such as prescribed fire. Ground-disturbing activities may be either authorized or prohibited.

Groundwater. Water held underground in soil or permeable rock, often feeding springs and wells.

Guidelines. Actions or management practices that may be used to achieve desired outcomes, sometimes expressed as best management practices. Guidelines may be identified during the land use planning process; however, they are not considered a land use plan decision unless the plan specifies that they are mandatory. Guidelines for grazing administration must conform to 43 CFR 4180.2.

Habitat. An environment that meets a specific set of physical, biological, temporal, or spatial characteristics that satisfy the requirements of a plant or animal species or group of species for part or all of their life cycles.

Hazardous material. A substance, pollutant, or contaminant that, due to its quantity, concentration, or physical or chemical characteristics, poses a potential hazard to human health and safety or to the environment if released.

Historic climax plant community (HCPC). This means that the vegetation community contains the key species for the historic climax plant community, based on the ecological site. State 1 is the least departed from HCPC and State 4 is the most departed from HCPC.

Historic properties. Cultural resources that meet specific criteria that make them eligible for listing on the National Register of Historic Places.

Impact. The effect, influence, alteration, or imprint caused by an action.

Impairment. The degree to which a distance of clear visibility is degraded by human-made pollutants.

Implementation decisions. Decisions that take action to implement land use planning; generally appealable to Interior Board of Land Appeals under 43 CFR 4.410.

Implementation plan. An area- or site-specific plan written to implement decisions made in a land use plan. Implementation plans include both activity plans and project plans.

Indicators. Factors that describe resource conditions and changes and can help the BLM determine trends over time.

Indirect impacts. Result from implementing an action or alternative but usually occur later in time or are removed in distance and are reasonably certain to occur.

Intermittent stream. A stream that flows only at certain times of the year, when it receives water from springs or from some surface sources, such as melting snow in mountainous areas. During the dry season and throughout minor drought periods, these streams do not flow. The characteristics of such streams are not well defined and are often inconspicuous. In the absence of external limiting factors, such as pollution and thermal modifications, plant and animal species are scarce and are adapted to the wet and dry conditions of the fluctuating water level.

Invertebrate. An animal lacking a backbone or spinal column, such as insects, snails, and worms. The group includes 97 percent of all animal species.

Invasive plants. Nonnative plants that have been introduced into an environment in which they did not evolve; they can establish sustaining populations in areas beyond their natural range. These plants are characteristically adaptable and aggressive and lack natural enemies to limit their reproduction and spread. Their vigor, rapid growth, and high reproductive capacity allow them to outcompete native plants for key resources. This can result in their dominance of both human-influenced and native ecosystems. Once established, invasive plants can cause significant harm to environmental and economic values.

K factor erosion risk rating. Erosion factor K appears in the Universal Soil Loss Equation (Wischmeier and Smith 1978) as a relative index of susceptibility of bare cultivated soil to sheet and rill erosion by rainfall. The ratings are as follows: low = 0.05 to 0.20, medium = 0.21 to 0.40, high = 0.41+. Soils high in clay and coarse texture soils have low K values because they resist detachment. Medium-textured soils, such as fine sandy loams, have moderate K values because they are moderately susceptible to detachment and runoff.

Land tenure adjustments. Landownership or jurisdictional changes. To improve the manageability of BLM-administered lands and their usefulness to the public, the BLM has numerous authorities for repositioning lands into a more consolidated pattern, for disposing of lands, and for entering into cooperative management agreements. These land pattern improvements are completed primarily using land exchanges but also through land sales, jurisdictional transfers to other agencies, and the use of cooperative management agreements and leases.

Land treatment. All methods of artificial range improvement arid soil stabilization, such as reseeding, brush control (chemical and mechanical), pitting, furrowing, and water spreading.

Land use allocation. The identification in a land use plan of the activities and foreseeable development that are allowed, restricted, or excluded for all or part of the planning area, based on desired future conditions (BLM 2005).

Land use plan. A set of decisions that establish management direction for land in an administrative area, as prescribed under the Federal Land Policy and Management Act; an assimilation of land use plan level decisions developed through the planning process outlined in 43 CFR 1600, regardless of the scale at which the decisions were developed. The term includes both resource management plans and management framework plans (BLM 2005).

Land use plan decision. Establishes desired outcomes and actions needed to achieve them. Decisions are reached using the planning process in 43 CFR 1600. When they are presented to the public as proposed decisions, they can be protested to the BLM Director. They are not appealable to the Interior Board of Land Appeals.

Lentic. Pertaining to standing water, such as lakes and ponds.

Long-term effect. The effect could occur for an extended period after an alternative is implemented. The effect could last several years or more.

Lotic. Pertaining to moving water, such as streams or rivers.

Management decision. A decision made by the BLM to manage public lands. Management decisions include both land use plan decisions and implementation decisions.

Mine. An underground opening or open pit for extracting minerals.

Mineral entry. The filing of a claim on public land to obtain the right to any locatable minerals it may contain.

Mineral estate. The ownership of minerals, including rights necessary for access, exploration, development, mining, ore dressing, and transportation.

Mitigation. Specific means, measures, or practices that could reduce, avoid, or eliminate adverse impacts. Mitigation can apply to the following:

- Avoiding an impact altogether by not taking a certain action or parts of an action
- Minimizing an impact by limiting the magnitude of the action and its implementation
- Rectifying an impact by repairing, rehabilitating, or restoring the affected environment
- Reducing or eliminating an impact over time by preservation and maintenance operations during the life of the action
- Compensating for an impact by replacing or providing substitute resources or environments

Monitoring (plan monitoring). The process of tracking the implementation of land use plan decisions and collecting and assessing data necessary to evaluate the effectiveness of those decisions.

Motorized travel. Moving by means of vehicles that are propelled by motors, such as cars, trucks, off-highway vehicles, motorcycles, snowmobiles, aircraft, and boats.

Motorized vehicles or uses. Vehicles that are motorized, such as jeeps, trail motorcycles or dirt bikes, aircraft, and all-terrain vehicles, such as four-wheelers and three-wheelers.

Multiple use. There are many definitions of multiple use, as follows (BLM 2016):

- The management of the public lands and their various resources, in the combination that will best meet the present and future needs of the American people
- Making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide for periodic adjustments to changing needs and conditions
- The use of some land for less than all of the resources
- A combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific, and historic values
- Harmonious and coordinated management of the various resources without permanent impairment of the land productivity and the quality of the environment, with consideration given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output

National Environmental Policy Act of 1969 (NEPA). Public Law 91-190. Establishes environmental policy for the nation. In part, NEPA requires federal agency officials to consider environmental values in decision-making.

National Wild and Scenic Rivers System (NWSRS). A system of nationally designated rivers and their immediate environments that have outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, and other similar values and are preserved in a free-flowing condition. The system consists of three types of streams, as follows:

- Recreation—Rivers or sections of rivers that are readily accessible by road or railroad and that may have some development along their shorelines and may have undergone some impoundments or diversion in the past
- Scenic—rivers or sections of rivers free of impoundments, with shorelines or watersheds still largely undeveloped but accessible in places by roads
- Wild—rivers or sections of rivers free of impoundments and generally inaccessible, except by trails, with watersheds or shorelines essentially primitive and waters unpolluted

Native vegetation. Plant species that were extant before Euro-American settlement and, consequently, are in balance with their ecosystems because they have well-developed parasites, predators, and pollinators.

Natural processes. Fire, drought, insect and disease outbreaks, flooding, and other events that existed before Euro-American settlement and that shaped vegetation composition and structure.

Naturalness. Consistent with what would occur without human intervention.

Nitrogen dioxide (NO_2). A molecule of one nitrogen atom and two oxygen atoms. Results usually from further oxidation of nitric oxide (NO) in the atmosphere. Ozone accelerates the conversion.

Nitrogen oxide. A gaseous mixture of nitric oxide (NO) and nitrogen dioxide (NO_2) and symbolically represented as NO_3.

Nonmotorized travel. Moving by foot, stock or pack animal, nonmotorized boat, skis, or mechanized vehicle, such as a bicycle.

Nonfunctional condition. Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or woody debris to dissipate energies associated with flows and thus are not reducing erosion or improving water quality.

Noxious weeds. A subset of invasive plants designated and regulated by state and federal laws. This is because they are known to be detrimental to agriculture, commerce, natural resources, and public health. The Arizona Department of Agriculture maintains lists of prohibited, regulated, and restricted noxious weeds through the Arizona Administrative Code (AAC R3-4-244 and -245) (ADA 2006).

Object. The resources, localities, and materials, both individually and collectively, in the context of the natural environments that support and protect them as identified in the enabling legislation that founded the San Pedro Riparian National Conservation Area.

Objective. A description of a desired outcome for a resource. Objectives can be quantified and measured and, where possible, have established time frames for being achieved.

Off-highway vehicle (OHV; also off-road vehicle). Any motorized vehicle capable of, or designated for, travel on or immediately over land, water, or other natural terrain. OHVs do not include the following:

- Any non-amphibious registered motorboat
- Any military, fire, emergency, or law enforcement vehicle while being used for emergencies
- Any vehicle whose use is expressly authorized by the BLM Authorized Officer or otherwise officially approved
- Vehicles in official use
- Any combat or combat support vehicle when used for national defense emergencies (43 CFR 8340.0-5)

Outstandingly remarkable value (ORV). Values among those listed in Section 1(b) of the Wild and Scenic Rivers Act of 1968: "scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values...." Other similar values that may be considered are ecological, biological, or botanical.

Ozone. A faint blue gas produced in the atmosphere from chemical reactions of burning coal, gasoline, and other fuels and chemicals found in such products as solvents, paints, and hairsprays.

Paleontological resource. Any fossilized remains or traces of organisms that are preserved in or on the earth's crust, that are of scientific interest, and that provide information about the history of life.

Particulate matter (PM). One of the six criteria pollutants for which the US Environmental Protection Agency established National Ambient Air Quality Standards. Particulate matter is defined as two categories: fine particulates, with an aerodynamic diameter of 10 micrometers (PM_{10}) or less, and fine particulates, with an aerodynamic diameter of 2.5 micrometers or less ($PM_{2.5}$).

Perennial stream. One that flows continuously. Perennial streams are generally associated with a water table in the localities that they flow through.

Permitted use. The forage allocated by, or under the guidance of, an applicable land use plan for livestock grazing in an allotment under a permit or lease and expressed in animal unit months (43 CFR 4100.0-5).

Permittee. A person or company permitted to graze livestock on public land.

Planning area. The area that corresponds to the Riparian National Conservation Area boundary designated by PL 100-696. The planning area for the San Pedro Riparian National Conservation Area RMP/EIS covers approximately 58,254 surface acres and includes BLM-administered, private, and state land. The subsurface mineral estate was withdrawn under PL 100-696 from all forms of entry, appropriation, or disposal; from location, entry, and patent under the US mining laws; and from disposition under all laws pertaining to mineral and geothermal leasing and all amendments thereto.

Planning criteria. The standards, rules, and other factors developed by managers and interdisciplinary teams for their use in forming judgments about decision-making, analysis, and data collection during planning. Planning criteria streamline and simplify the resource management planning actions.

Planning issues. Concerns, conflicts, and problems with the existing management of public lands. Frequently, issues are based on how land uses affect resources. Some issues concern how land uses can affect one another or how protecting resources affects land uses.

Policy. This is a statement of guiding principles or procedures designed and intended to influence planning decisions, operating actions, or other affairs of the BLM. Policies are established interpretations of legislation, executive orders, regulations, or other presidential, secretarial, or management directives.

Prescribed fire. A wildland fire planned to meet specific objectives identified in a written, approved, and prescribed fire plan for which National Environmental Policy Act requirements (where applicable) have been met.

Prevention of significant deterioration (PSD). An air pollution permitting program intended to ensure that air quality does not diminish in attainment areas. PSD sets limits on the amount of air pollution considered significant in an area. Class I applies to areas where almost any change in air quality would be significant; class II applies to areas where the deterioration normally accompanying moderate well-controlled growth would be insignificant; and class III applies to areas where industrial deterioration would generally be insignificant.

Primitive and unconfined recreation. Nonmotorized, nonmechanized (except as provided by law), and undeveloped types of recreation. Bicycles are considered mechanical transport, so their use is not considered primitive and unconfined recreation.

Primitive road. A linear route managed for use by four-wheel drive or high-clearance vehicles. Primitive roads do not normally meet any BLM road design standards.

Proclamation. A statement issued by a president on a matter of public policy intended to protect an array of scientific, biological, archaeological, geological, cultural, and historic objects.

Proper functioning condition (PFC). A term describing stream health that is based on the presence of adequate vegetation, landform, and debris to dissipate energy, reduce erosion, and improve water quality.

Public land. Land or interest in land owned by the United States and administered by the Secretary of the Interior through the BLM without regard to how the United States acquired ownership. The exception is lands on the Outer Continental Shelf and lands held for the benefit of Indians, Aleuts, or Eskimos (BLM 2005).

Range improvement. An authorized physical modification or treatment designed to improve production of forage, to change vegetation composition, to control patterns of use, to provide water, to stabilize soil and water conditions, and to restore, protect, and improve the condition of rangeland ecosystems to benefit livestock, wild horses and burros, and fish and wildlife. The term includes structures, treatment projects, and use of mechanical devices or modifications achieved through mechanical means (43 CFR 4100.0-5).

Reclamation. The suite of actions taken in an area affected by human disturbance, the outcome of which is intended to change the condition of the disturbed area to meet predetermined objectives or to make it acceptable for certain defined resources, such as wildlife habitat, grazing, and ecosystem function.

Recreation and Public Purpose (R&PP) Act leases—BLM-administered and classified land, under the terms of the R&PP Act, are leased for the benefit of state and local governments or qualified nonprofit organizations for public uses, such as campgrounds, schools, parks, fire stations, hospitals, and historic monument sites.

Recreation experiences. Psychological outcomes realized either by recreationists and tourists as a direct result of their on-site leisure engagements and recreation-tourism activity participation or by nonparticipating community residents because of their interaction with visitors and guests in their community or interaction with the BLM and other public and private recreation-tourism providers and their actions.

Recreation management zone (RMZ). An area in an SRMA or ERMA managed according to specific objectives that support desired recreation in the area.

Recreation opportunities. Favorable circumstances enabling visitors' engagement in a leisure activity to realize immediate psychological experiences and to attain more lasting, value-added beneficial outcomes.

Recreation setting characteristic. Derived from the recreation opportunity spectrum, these characteristics are categorized as physical, social, and operation components and are further subdivided into specific characteristics (attributes). These characteristics are categorized across a spectrum of classes that describe a range of qualities and conditions of a recreation setting. The classes are primitive, backcountry, middle country, front country, rural, and urban.

Rehabilitate. Returning disturbed lands as near to its pre-disturbed condition as is reasonably practical or as specified in approved permits.

Resource management plan (RMP). A land use plan prescribed by the Federal Land Policy and Management Act that establishes, for a given area of land, land use allocations and coordination guidelines for multiple use, objectives, and actions to be achieved.

Restore/restoration. Implementation of passive or active management actions designed to increase or maintain perennial herbaceous species and landscape cover of sagebrush so that plant communities are more resilient to disturbance and invasive species over the long term. A long-term goal may be to create functional, high quality habitat that is occupied by special status species. A short-term goal may be to restore the landform, soils, and hydrology and to increase the percentage of preferred vegetation, seeding of desired species, or treatment of undesired species.

Restriction/restricted use. A limitation or constraint on public land uses and operations. Restrictions can be of any kind but most commonly apply to certain types of vehicle use, temporal or spatial constraints, or certain authorizations.

Revegetation. The process of putting vegetation back in an area where it previously existed, which may or may not simulate natural conditions.

Right-of-way (ROW). The most common form of BLM land use authorization. They are issued under the regulations at 43 CFR 2800 and 2880 for the use of BLM-administered land by private, commercial, and government entities. Facilities requiring ROW grants from the BLM include those for power lines, pipelines, roads, railroads, communication, and utility-scale wind and solar energy testing and development projects.

Riparian area. A form of wetland transition between permanently saturated wetlands and upland areas. Riparian areas exhibit vegetation or physical characteristics that reflect the influence of permanent surface or subsurface water. Typical riparian areas include lands along, next to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels. Excluded are ephemeral streams or washes that lack vegetation and depend on free water in the soil.

Riparian zone. The areas bordering rivers and other bodies of surface water. They include the floodplain as well as the riparian buffers adjacent to the floodplain.

Road. A linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels and maintained for regular and continuous use.

Roadless. The absence of roads that have been constructed and maintained by mechanical means to ensure regular and continuous use.

Rotation. Grazing rotation between pastures in the allotment for the permitted time.

Routes. Multiple roads, trails, and primitive roads; a group or set of roads, trails, and primitive roads that represents less than 100 percent of the BLM transportation system. Generically, components of the transportation system.

Saturated soils. A state when the infiltration capacity of the soil is exceeded from above due to rainfall or snowmelt runoff. Soils can also become saturated from groundwater.

Scoping process. An early and open public participation process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action.

Season of use. The time during which livestock grazing is permitted on a given range area, as specified in the grazing lease.

Seeding. A vegetation treatment that includes the application of grass, forb, or shrub seed, either by air or from the ground. Seeding allows native species or placeholder species to become established and disturbed areas to be restored to a cover dominated by perennial plants, thereby decreasing the risk of subsequent invasion by exotic plant species. Seeding is used primarily as a follow-up treatment in areas where disturbance or the previously described treatments have removed exotic plant species and their residue.

Sensitive soils. Those with characteristics that, more than healthy soils, make them susceptible to impacts or that make them more difficult to restore or reclaim after disturbance.

Short-term effect. Occurs only during or immediately after implementation of an alternative.

Slope gradient. The difference in elevation between two points, expressed as a percentage of the distance between those points.

Solitude. The state of being alone or remote from habitations; isolation; a lonely or secluded place. Factors contributing to opportunities for solitude may include size, natural screening, topographic relief, vistas, physiographic variety, and the ability of the user to find a secluded spot.

Special recreation management area (SRMA). An administrative public lands unit identified in land use plans where the existing or proposed recreation opportunities and recreation setting are recognized for their unique value, importance, or distinctiveness, especially as compared with other areas used for recreation.

Special recreation permit (SRP). Authorization that allows for recreation on public lands and related waters. Issued as a means to control visitor use, to protect recreation and natural resources,

and to provide for the health and safety of visitors. Commercial SRPs are also issued to provide a fair return for the commercial use of public lands.

Special status species. As defined in BLM Manual 6840, BLM special status species are those listed, candidate, or proposed for listing under the Endangered Species Act. It is also those species requiring special management consideration to promote their conservation and to reduce the likelihood and need for future listing under the Endangered Species Act and that are designated as sensitive by a BLM state director. All federally listed candidate species, proposed species, and delisted species in the 5 years following delisting are conserved as BLM sensitive species.

Stabilize. The process of stopping further damage from occurring.

Standard. A description of the physical and biological conditions or degree of function required for healthy, sustainable lands, such as land health standards. A standard is expressed as a desired outcome (goal).

Stipulation (general). A term or condition in an agreement or contract.

Sustained yield. The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the public lands, consistent with multiple uses.

Technically/economically feasible. An action that is practical or feasible from the technical and economic standpoint and using common sense, rather than simply one that is desirable from the applicant's standpoint. It is the BLM's sole responsibility to determine what actions are technically and economically feasible. The BLM will consider whether implementation of the proposed action is likely, given past and current practice and technology. This consideration does not necessarily require a cost-benefit analysis or speculation about an applicant's costs and profit (CEQ 1981).

Temporary/temporary use. A relative term to be considered in the context of the resource values affected and the nature of the resource uses and activities taking place. Generally, a temporary activity is considered to be one that is not fixed in place and is of short duration.

Terrestrial. Living or growing in or on the land.

Threatened species. Any species that is likely to become endangered in the foreseeable future throughout all or a significant portion of its range (BLM 2008). Under the Endangered Species Act in the United States, a species deemed threatened is less protected than an endangered species. The US Fish and Wildlife Service designates a species as threatened or endangered, as directed by the Endangered Species Act.

Tier 1A species. Federally listed species, candidate species, species with a signed conservation agreement, species that require monitoring following delisting, or species that are not allowed to be harvested, known as closed season species.

Tier 1B species. Those that do not match the criteria for Tier 1A but are vulnerable in at least one of eight vulnerability categories.

Tier 1C species. Those species with insufficient information available to fully assess their status but that still require monitoring.

Total dissolved solid. Salt or salts aggregated from carbonates, bicarbonates, chlorides, sulfates, phosphates, and nitrates of calcium, magnesium, manganese, sodium, potassium, and other cations that form salts.

Total maximum daily load (TMDL). An estimate of the total quantity of pollutants (from all point, nonpoint, and natural sources) that may be allowed into waters without exceeding applicable water quality criteria.

Trail. A linear route managed for human power, such as for hiking or bicycling; stock, such as horseback riding; or off-highway vehicle forms of transportation or for enjoying an area's historic or heritage values. Trails are not generally managed for four-wheel drive or high-clearance vehicle use.

Traditional cultural property (TCP). One that is eligible for inclusion on the National Register of Historic Places, based on its association with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community.

Traditional use area. Places associated with cultural practices, such as plants, minerals, or other resources for gathering or that are important to a living community for ceremonial or religious practices.

Transmission. The movement or transfer of electric energy over an interconnected group of lines and associated equipment between points of supply and points where it is transformed for delivery to consumers or is delivered to other electric systems. Transmission is considered to end when the energy is transformed for distribution to consumers.

Transportation system. The sum of the BLM's recognized inventory of linear features (roads, primitive roads, and trails) that are formally recognized, designated, and approved as part of its transportation system.

Trespass. Any unauthorized use of public land.

Tribal interests. Native American or Native Alaskan economic rights, such as Indian trust assets, resource uses, access guaranteed by treaty rights, and subsistence uses.

Understory. That portion of a plant community growing underneath the taller plants on the site.

Unnecessary or undue degradation. Conditions, activities, or practices that are characterized as follows (43 CFR 3809.5):

- Fail to comply with one or more of the following: the performance standards in 43 CFR 3809.420, the terms and conditions of an approved plan of operations, operations described in a complete notice, and other federal and state laws related to environmental and cultural resources protection

- Are not "reasonably incident" to prospecting, mining, or processing operations, as defined in 43 CFR 3715.0-5
- Fail to attain a stated level of protection or reclamation required by specific laws in areas such as Wild and Scenic Rivers, BLM-administered portions of the National Wilderness System, and BLM-administered national monuments and national conservation areas

Utility corridor. Tract of land varying in width and forming a passageway that various commodities, such as oil, gas, and electricity, are transported through.

Valid existing rights. Documented legal rights or interests in the land that allow a person or entity to use said land for a specific purpose and that are still in effect. Such rights include fee title ownership, mineral rights, rights-of-way, easements, permits, and licenses. Such rights may have been reserved, acquired, leased, granted, permitted, or otherwise authorized over time.

Vegetation condition class (VCC). Quantifies the extent that current vegetation has departed from the simulated historical vegetation reference conditions. Three condition classes describe low departure (VCC 1), moderate departure (VCC 2), and high departure (VCC 3). VCC is calculated based on changes to species composition, structural stage, and canopy closure.

Vegetation manipulation. Planned alteration of vegetation communities through use of mechanical or chemical means, seeding, or prescribed fire or managed fire to achieve desired resource objectives.

Vegetation treatments. Management practices that change the vegetation structure to a different stage of development. Vegetation treatment methods include managed fire, prescribed fire, treatment by chemical or mechanical means, and seeding.

Vegetation type. A plant community with immediately distinguishable characteristics based on and named after the apparent dominant plant species.

Visibility (air quality). A measure of the ability to see and identify objects at different distances.

Visitor day. Twelve hours of single or multiple visits by one or more persons.

Visual resource management. The BLM system to identify and evaluate visual resources to determine appropriate levels of management.

Visual resources. The visible physical features on a landscape, (topography, water, vegetation, animals, structures, and other features) that comprise the scenery of the area.

Watershed. Topographical region or area delineated by water draining to a particular watercourse or body of water.

Wild and Scenic River. A river identified for study by Congress under Section 5(a) of the Wild and Scenic Rivers Act, or one identified for study by the Secretary of Agriculture or the Secretary of the Interior under Section 5(d)(1) of the Wild and Scenic Rivers Act. These rivers are studied under the provisions of Section 4 of the Wild and Scenic Rivers Act (BLM 2012a), as follows:

Eligible river. A river or river segment found to meet the criteria in Sections 1(b) and 2(b) of the Wild and Scenic Rivers Act of being free flowing and possessing one or more outstandingly remarkable value

Suitable river. An eligible river segment found through administrative study to meet the criteria for designation as a component of the national system of rivers, as specified in Section 4(a) of the Wild and Scenic Rivers Act

Wilderness. A congressionally designated area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, that is protected and managed to preserve its natural conditions and that has the following characteristics:

- Generally, appears to have been affected mainly by the forces of nature, with human imprints substantially unnoticeable
- Has outstanding opportunities for solitude or a primitive and unconfined type of recreation
- Has at least 5,000 acres or is large enough to make practical its preservation and use in an unimpaired condition
- May also contain ecological, geological, or other features of scientific, educational, scenic, or historic value

The definition is contained in Section 2(c) of the Wilderness Act of 1964 (78 Stat. 891).

Wilderness characteristics. Wilderness characteristics are an area's size, its apparent naturalness, and outstanding opportunities for solitude or a primitive and unconfined type of recreation. They may also include supplemental values, such as ecological, geological, or other features of scientific, educational, scenic, or historical value. Lands with wilderness characteristics have been inventoried and determined by the BLM to contain wilderness characteristics, as defined in Section 2(c) of the Wilderness Act, as follows:

- Naturalness—The degree to which an area generally appears to have been affected primarily by the forces of nature, with the imprint of people's work substantially unnoticeable
- Opportunity—A situation or condition favorable for attainment of a goal
- Outstanding—(1) Standing out among others of its kind, conspicuous, prominent; (2) superior to others of its kind, distinguished, and excellent
- Primitive and unconfined recreation—Nonmotorized, nonmechanized (except as provided by law), and undeveloped types of recreation
- Solitude—The state of being alone or remote from others, isolation; a lonely or secluded place

Wilderness inventory road. Any route outside of Wild and Scenic Areas or designated wilderness that has been improved and maintained by mechanical means to ensure relatively regular and continuous use (BLM 2012b).

Wilderness Study Area (WSA). A designation made through the land use planning process of a roadless area found to have wilderness characteristics, as described in Section 2(c) of the Wilderness Act of 1964.

Wildland fire. Any non-structure fire that occurs in the wild. The three distinct types of wildland fire that have been defined are wildfire, wildland fire use, and prescribed fire; these are defined as follows:

- Wildfire—An unplanned, unwanted wildland fire, including unauthorized human-caused fires, escaped wildland fires, escaped prescribed fires, and all other wildland fires where the objective is to put out the fire
- Wildland fire use—The application of the appropriate management response to naturally ignited wildland fires to accomplish specific resource management objectives in predefined designated areas outlined in fire management plans (operational management is described in the wildland fire implementation plan)
- Prescribed fire—Any fire ignited by management actions to meet specific objectives; a written, approved prescribed fire plan must exist, and NEPA requirements (where applicable) must be met, before the fire is started

Wildland-urban interface (WUI). The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetation fuels.

Wind erosion groups. Rate the tons per acre of soil loss potential for wind erosion on 70 percent-plus unvegetated soil. Ratings are 1 = 160–310 tons per acre per year; 2 = 134 tons; 3 and 4= 86 tons; 5 = 56 tons, 6 = 48 tons; 7 = 38 tons; and, 8 = 0 tons (USDA 1999). Wind erosion ratings between 3 and 4 are considered moderately susceptible to wind erosion, and those with ratings between 4 and 8 are considered to have a low susceptibility to wind erosion.

Withdrawal. An action that restricts the use of public land and segregates the land from the operation of some or all the public land and mineral laws. Withdrawals are also used to transfer jurisdiction of management of public lands to other federal agencies.

Xerophytic. A species of plant that has adaptations to survive in an environment with little available liquid water.

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