*United States Department of the Interior*

# Bureau of Land Management

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# Las Cienegas Landscape Restoration
# Final Environmental Assessment

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# List of Acronyms

| | |
|---|---|
| ADEQ | Arizona Department of Environmental Quality |
| ATV | all-terrain vehicle |
| BLM | US Department of the Interior<br>Bureau of Land Management |
| BMP | best management practice |
| BOR | U.S. Bureau of Reclamation |
| CFR | Code of Federal Regulations |
| CWP | Cienega Watershed Partnership |
| DNA | determination of NEPA adequacy |
| EA | environmental assessment |
| EDRR | early detection and rapid response |
| ESA | Endangered Species Act |
| LCNCA | Las Cienegas National Conservation Area |
| MLRA | Major Land Resource Area |
| NEPA | National Environmental Policy Act |
| NHPA | National Historic Preservation Act |
| PEIS | programmatic environmental impact statement |
| RMP | resource management plan |
| SVAPD | Sonoita Valley Acquisition Planning District |
| TFO | BLM Tucson Field Office |
| USDA | US Department of Agriculture |
| UTV | utility terrain vehicle |

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# 1 INTRODUCTION

## 1.1 Background

In accordance with National Environmental Policy Act (NEPA) implementing procedures (10 Code of Federal Regulations [CFR] 1021), the Bureau of Land Management (BLM) Tucson Field Office (TFO) has prepared the Las Cienegas Landscape Restoration Environmental Assessment (EA) to evaluate impacts associated with proposed erosion control and vegetation treatments on public, private, county, and state lands within a 216,732-acre project area. This area lies 50 miles southeast of the city of Tucson, Arizona. Within the project area, land ownership is a combination of BLM, State, county, and private land (Table 1). The project area includes the BLM's 46,000-acre Las Cienegas National Conservation Area (NCA), Arizona State Trust Land, the Sonoita Valley Acquisition Planning District (SVAPD), and Pima County's Cienega Creek Natural Preserve and J-6, Bar V, Clyne, and Sand's Ranches as well as the Appleton-Whittell Research Ranch Sanctuary and several private ranches (Figure 1).

**Table 1. Land Ownership in the Las Cienegas Landscape Restoration EA Planning Area**

| Land Ownership | Project Area (acres) |
|---|---|
| BLM | 51,301 |
| State | 96,444 |
| Pima County | 10,391 |
| Private | 58,596 |
| **Total** | **216,732** |

Past land management practices coupled with long term drought have affected the character and composition of vegetation communities in southeastern Arizona (Bahre 1991). This change in the project area has occurred as an increase in woody plant species cover resulting in a decrease in perennial grass cover, with a potential for increases in soil erosion (BLM 2003, Gori and Schussman 2005).

The Cienega watershed area has a long history of public engagement and collaborative adaptive management. Partners have worked together in this area since the late 1980s when residents advocated for private lands within the Cienega watershed to be brought into BLM ownership. These lands, originally called the Empire-Cienega Resource Conservation Area, were designated as the Las Cienegas NCA in 2000. The BLM and stakeholders have used shared goals and measurable objectives in this area to implement collaborative adaptive management. Facilitated by BLM, partners come together to collect data, evaluate, and provide recommendations to the BLM on resource management.

This collaborative adaptive management approach has been used to implement vegetation treatments to restore grassland habitat and to curtail soil erosion through grant-funded erosion control workshops. Previously, the BLM completed vegetation treatments on approximately 19,401 acres using prescribed fire, chemical, and mechanical methods in the Las Cienegas NCA. Erosion control and stream restoration projects have been constructed in Los Pozos Gulch and on Cienega Creek near the agricultural fields and its confluence with Springwater Canyon (see Table 2 and Figure 2). Monitoring from these treatments has indicated that the most effective techniques in reducing woody plant cover are mechanical and cut spray with herbicide (Tiller et al. 2012a). Restored cienega wetlands have been treated to control invasive plants such as bulrush, cattail, and sapling riparian trees at four locations (Figure 2). This EA will assess a broad array of landscape restoration methods available to be applied on a landscape scale across jurisdictions both within and surrounding the BLM's LCNCA to expand the habitat restoration efforts. This EA will also assess methods for maintaining the existing treatment areas, implementing future treatments, implementing site-specific erosion control projects, and evaluating erosion control and stream restoration in the treatment areas and in designated sites (Appendix C, Figure 2). Currently, four site-specific erosion control projects are proposed to occur that would be funded by a grant from the Arizona Department of Environmental Quality (ADEQ).

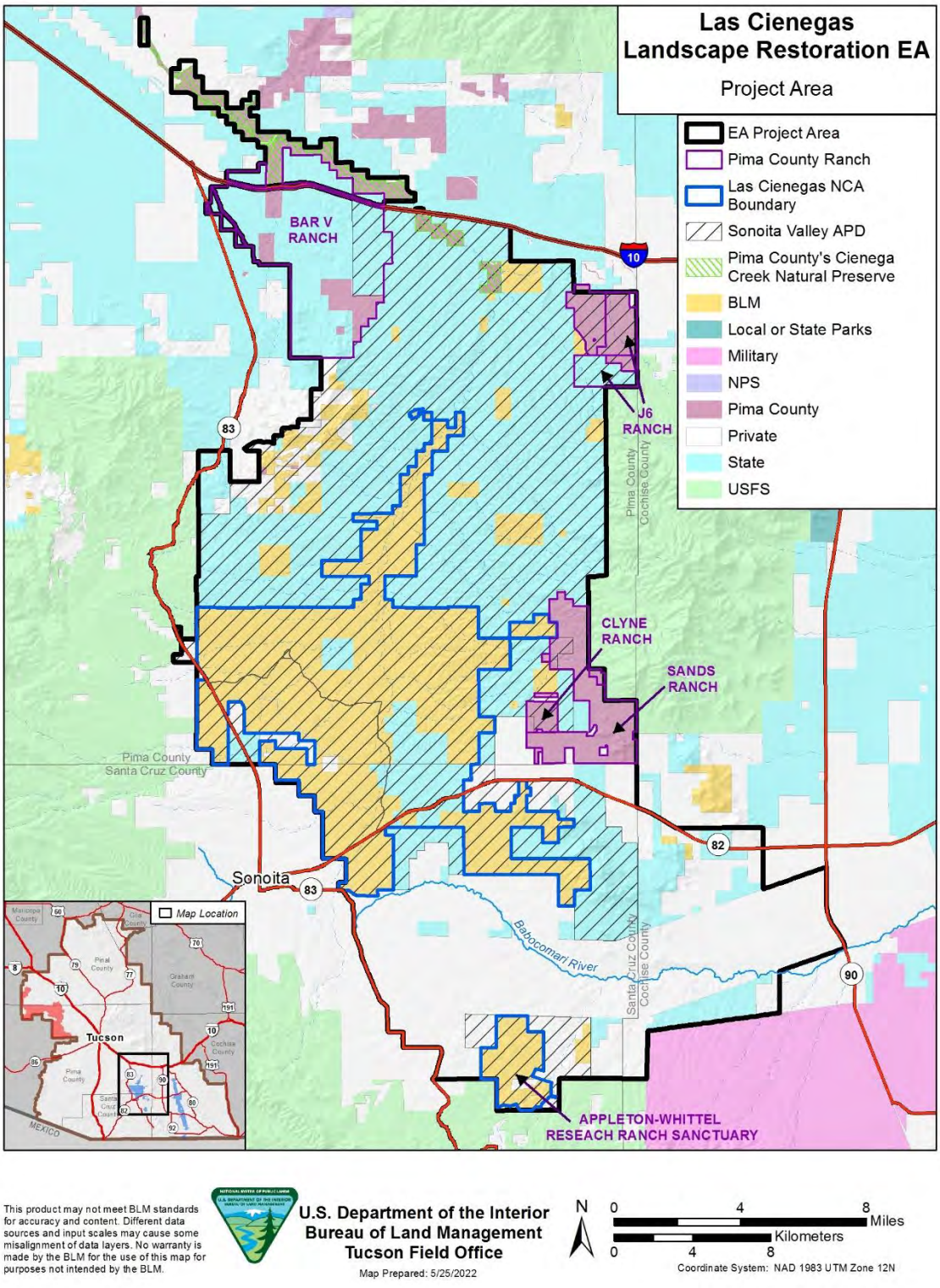


**Figure 1. Landscape Restoration EA Project Area**

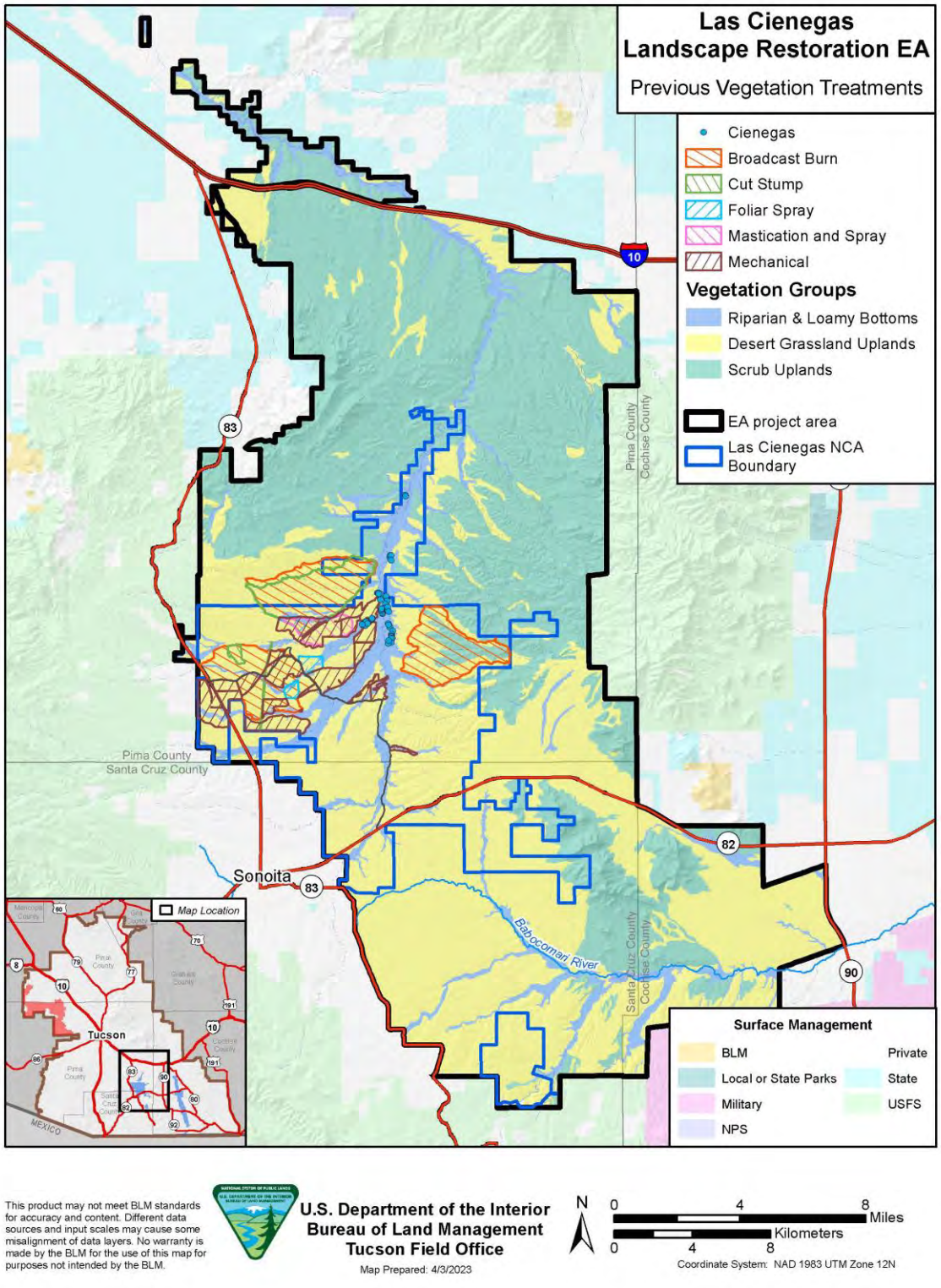


**Figure 2. Landscape Restoration EA Previous Vegetation Treatments (2007-2022)**

**Table 2. Summary of Vegetation Treatments Conducted on Las Cienegas NCA (2007-2022)**

| Vegetation Treatment Type | Acres |
|---|---|
| Prescribed fire | 9,827 |
| Chemical treatment | 1,615 |
| Mechanical treatment | 7,959 |
| **Total** | **19,401** |

## 1.2 Purpose of and Need for Action

The purpose of this project is to expand the area and methods used to treat and maintain tree- and shrub-invaded upland areas, maintain sacaton grasslands, mesquite bosques, wetlands, and riparian areas, and treat areas invaded with noxious species so that those areas meet the vegetation and watershed objectives described in the Las Cienegas Resource Management Plan (RMP) and listed in Appendix A. The purpose of this project also includes treating existing and future potential soil erosion areas with erosion control structures to mitigate and/or prevent erosion. The project is at the landscape scale to promote ecosystem processes and habitat diversity that support desired future conditions for fish and wildlife, including federally listed species.

The need for the proposed action is based on data showing that vegetation communities are departed from desired future conditions (Table 3 below) as described in the Las Cienegas RMP resource objectives and resource objectives for the surrounding areas and the documentation of areas of accelerated upland and stream channel erosion (BLM 2003).

To assess the on-the-ground conditions of the project area and to estimate areas of similar types of treatments, ecological sites have been broadly grouped into five vegetation types to facilitate vegetation management: 1) desert grassland uplands; 2) scrub uplands; 3) loamy bottoms; 4) riparian; and 5) cienegas. (Table E-1, Appendix E). An ecological site is an area of land whose dominant soil characteristics, landscape location, and rainfall conditions are uniquely grouped together. The Natural Resources Conservation Service (NRCS) has derived ecological sites to describe the potential vegetation. A full description of each ecological site is available on the NRCS website (NRCS 2019).

Multiple data sources were used to assess the current vegetation cover and the difference from the Las Cienegas RMP (2003) objectives for shrub or tree cover. Since the RMP objectives are based on expected ecological site conditions and returning to those conditions where possible, they are stepped down for certain sites based on appropriate levels of shrub or tree cover found in the ecological site description. In several instances, the RMP already specified a total tree cover maximum (e.g. desert grasslands) thus that value was used.

**Table 3. Vegetation communities and departure estimates for tree and shrub cover**

| Vegetation Community | Description (e.g. ecological site names) | Data Sources | Tree/Shrub Objective | Acres Not Meeting Objective | Total Acres | Percent Not Meeting Objective |
|---|---|---|---|---|---|---|
| Scrub Uplands | Granitic Hills, Granitic Upland, Limestone Hills, Limy Slopes, Volcanic Hills | NRCS Ecological Sites | *<10% total tree cover AND <15% total shrub cover* | 68,918 | 93,667 | 74% |
| Desert Grassland Uplands | Loamy Slopes, Loamy Swale, Loamy Upland, Sandy Loam Uplands, Clayey Swales, | NRCS Ecological Sites | *<5% total tree cover AND <15% total shrub cover* | 36,425 | 104,894 | 35% |

| Vegetation Community | Description (e.g. ecological site names) | Data Sources | Tree/Shrub Objective | Acres Not Meeting Objective | Total Acres | Percent Not Meeting Objective |
|---|---|---|---|---|---|---|
| | Clayey Uplands, Basalt Hills, Clay Loam Upland | | | | | |
| Riparian | Sandy Wash | NRCS Ecological Sites USFS R3 Riparian | | -- | 1,457 | -- |
| Mesquite Bosque (grouped into loamy bottoms) | Loamy Bottoms | NRCS Ecological Sites, Tiller et al. 2012b, USGS 2019 | *Maintain cover of 25-65% cover. Tree density of 200-500 trees per hectare* | 10,560 | 16,397 | 64% |
| Sacaton Grasslands (grouped into loamy bottoms) | | NRCS Ecological Sites, Tiller et al. 2012b, USGS 2019 | *<10% total tree cover* | | | |
| Cienegas | Southwest Interior Marshland located in Loamy Bottoms, Sandy Wash | BLM, DBG 2016 | | 12 | 317 | 4% |

**Desert Grassland & Scrub Uplands**

To estimate the total acreage of treatments that would potentially be completed in the planning area, a broadscale GIS-based vegetation departure analysis was conducted to give a coarse idea of the status of treatable acres. LANDFIRE (2019) data for Existing Vegetation Communities (EVC) was chosen as the best available dataset that covered the spatial extent of the project area. LANDFIRE has been used in similar applications across the United States (see https://www.landfire.gov/lf_applications.php). The LANDFIRE data has a 30-meter spatial resolution and indicates tree or shrub cover percentage at every pixel. The benchmarks for these two groups were derived from the Las Cienegas RMP objectives, which were determined to be greater than 5% tree or shrub cover for desert grasslands, and greater than 15% tree or shrub cover for scrub uplands (see Appendix A). These benchmarks when compared to the shrub and tree cover in the remote sensing data indicated that 35% of grassland sites and 74% of shrubland sites were departed from the shrub/tree cover objectives of the RMP.

In the desert grassland and scrub uplands vegetation communities when shrub cover crosses the 35% threshold, the site is now in a shrubland state where restoration may be impractical (Gori and Enquist 2003). According to the LANDFIRE data, approximately 11% of the desert grasslands and 20% of the scrub uplands have crossed this 35% threshold and transitioned into the shrubland state.

**Loamy Bottoms (Mesquite Bosque & Sacaton Grasslands)**

The loamy bottom ecological site departure was identified using site-specific assessments because this site has two different site potentials (mesquite bosque and sacaton grasslands) and thus two different

possible sets of objectives to consider when identifying departure. This is best shown in the modified state and transition model developed by Tiller et al. (2012b, see Figure E-1 in Appendix E). The difference between these two potentials is dependent on the local hydrologic properties of the individual site. A depth to water of less than 20 feet, as well as some degree of flooding, is required to reach the sacaton grassland potential. If a site's hydrologic conditions have changed such that it no longer has the ability to reach its original potential, then a change in vegetation may be classified as departure when in reality the site is transitioning to the new potential. Considering this, estimates on loamy bottom treatment acreages is based on site-specific investigations (see Tiller et al. 2012b & Norman et al. 2019) that covered a combined 4,940 acres, which represent 30% of the sites in the project area. These results were extrapolated to the rest of the planning area. It is important to note that the sites identified in the field investigations were chosen for their high potential for the grassland state. Other parts of the project area (specifically below 4,300 feet elevation) may have a forestland, or bosque, site potential that makes up a greater proportion of the loamy bottom sites. Applying the percentages from the Tiller (2012) study to the rest of the project area would then likely overestimate the number of treatment acres (for sacaton grasslands) that would occur in the project area.

The objective in the RMP for loamy bottoms concerning habitat for breeding grasshopper sparrow and wintering Baird's sparrow establishes that two thirds of loamy bottom sites have less than 10% shrub cover (see Appendix A). When the RMP was written, this two-thirds proportion was determined to be the potential for these loamy bottom sites. Considering this and the lack of data to represent the hydrologic factors, we concluded that the remaining highly departed grasslands (C1 & C2 from the modified state and transition model) would be split such that a percentage of them would be considered to have a grassland potential and the remainder would have the forestland potential. This difference was determined by adding the lesser departed grassland acreages and determining the required acres to bring those sites up to two thirds, or 66.7%. This in turn meant that 36% of the highly departed sacaton grasslands (C1 & C2) have the site potential of the grassland state and the remainder of the sites have the potential for a forestland state.

**Riparian Areas and Cienegas**

For riparian areas and cienegas, the departure has not been identified and treatments in this EA would be based on site-specific knowledge.

## 1.3 Decision to Be Made

Based on the analysis contained in this EA, the BLM will determine whether to implement the proposed erosion control and vegetation treatments, prepare an EIS, or take no action.

## 1.4 Conformance with Applicable Land Use Plans

### *1.4.1 Safford District Resource Management Plan and Environmental Impact Statement, 1991*

The proposed action (see Section 2) is in conformance with the Safford District Resource Management Plan and Final Environmental Impact Statement, approved in 1991, as amended (BLM 1991a). The BLM reviewed the proposed action to determine if it conforms to terms and conditions of the land use plan required by 43 CFR 1610.5 and BLM MS 1617.3.

### *1.4.2 Phoenix Resource Management Plan and Final Environmental Impact Statement, 1988*

The proposed action is in conformance with the Phoenix Resource Management Plan and Final Environmental Impact Statement, approved in 1988, as amended (BLM 1988). The BLM reviewed the proposed action to determine if it conforms to the land use plan terms and conditions required by 43 CFR 1610.5, BLM MS 1617.3.

### 1.4.3 Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management and Record of Decision, 2004

The proposed action is in conformance with the Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management and Record of Decision, approved in 2004, to determine if the proposed action conforms to the land use plan goals and objectives required by 43 CFR 1610.5 and the BLM NEPA Handbook (H-1790-1).

### 1.4.4 Las Cienegas Resource Management Plan and Record of Decision, 2003

The proposed action is in conformance with the Las Cienegas RMP and Record of Decision, approved in 2004, to determine if the proposed action conforms to the land use plan goals and objectives required by 43 CFR 1610.5 and the BLM NEPA Handbook (H-1790-1). See Appendix A for a complete list of resource objectives.

## 1.5 Relationship to Statutes, Regulations, and Other Plans

In this EA, the BLM has responded to Secretarial Order 3362 on Improving Habitat Quality in Western Big-Game Winter Range and Migration Corridors. The proposed action would improve habitat for desert mule deer as well as pronghorn.

50 CFR §402.01 directs federal agencies to carry out conservation programs for listed species under the Endangered Species Act. Conservation is "...to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures of pursuant to this Act are no longer necessary." The BLM and other federal agencies are responsible for assisting the U.S. Fish and Wildlife Service (USFWS) with actions that support the recovery of threatened and endangered species [Section 7(a) 1]]. This project is designed to improve ecosystem processes and conditions that support federally listed species and designated critical habitats and lessen the need to list species in the future.

This project conforms to the goals and objectives of the Sonoran Desert Conservation Plan, Pima County (2001) through the maintenance and improvement of ecosystem structure and functions necessary to ensure the long-term survival of the full spectrum of plants and animals that are indigenous to Pima County. Specifically, the pertinent objectives of the Sonoran Desert Conservation Plan include:

1. Promote recovery of federally listed and candidate species to the point where their continued existence is no longer at risk.
2. Where feasible and appropriate, re-introduce and recover species that have been extirpated from this region.
3. Maintain or improve the status of unlisted species whose existence in Pima County is vulnerable.
4. Identify biological threats to the region's biodiversity posed by exotic and native species of plants and animals, and develop strategies to reduce these threats and avoid additional invasive exotics in the future.
5. Identify compromises to ecosystem functions within target plant communities selected for their biological significance and develop strategies to mitigate them.
6. Promote long-term viability for species, environments, and biotic communities that have special significance to people in this region because of their aesthetic or cultural values, regional uniqueness, or economic significance.

## 1.6 Scoping and Public Involvement

### 1.6.1 Public Scoping

The BLM has held multiple meetings with partner organizations and stakeholders on the proposed project and issues to be analyzed. On April 18, 2019, the agency presented an outline of the project description at the Spring Biological Planning meeting held on the Las Cienegas NCA. The BLM held a follow-up

meeting on May 9, 2019, to allow for additional discussion and input on the proposed action and issues to be analyzed.

The BLM released Chapters 1 and 2 of the EA for a 15-day formal public scoping period in July and August 2019. The BLM received four comment letters during the 2019 formal public scoping period. Those comments helped inform the issues that were brought forward for detailed analysis and were also addressed in the draft EA. In January and February 2020, the BLM released the draft EA for a 15-day public comment period. The BLM received 16 comment letters in response to the 2020 draft EA which were primarily in support of the project. The BLM has been working with the USFWS since 2020 on the Section 7 consultation for this project. Through the Section 7 consultation process, the BLM made several revisions to the proposed action. As a result, the BLM released a revised version of the draft EA in April and May 2022. The BLM received four comment letters which were parsed into 38 substantive comments. The responses to those comments are in Appendix H.

### *1.6.2 Internal Scoping*

The BLM held an initial interdisciplinary team meeting on October 10, 2018, to scope issues internally. Additional internal scoping occurred in May 2019, when the BLM broadened the proposed action to include riparian and mesquite bosque vegetation treatments, erosion control, and stream restoration (see Section 2).

### *1.6.3 Issues Considered but Eliminated from Detailed Analysis*

The following list outlines resource issues that were considered through internal or external scoping and were eliminated from further analysis with a brief rationale that describes why the associated impacts would not be significant.

**How would the proposed action affect air quality in the project area airshed?**

> **Rationale for elimination**: Dust generated during fuel reduction treatments would not be produced in sufficient quantities to affect air quality. Mesquite shrublands in the Chihuahuan Desert have been shown to have greater amounts of wind erosion than grasslands sites (Gillette and Pitchford 2004), thus maintenance of grasslands with the removal of mesquite through the proposed action may lead to reductions in wind erosion and improvements in air quality. Prescribed burning activities (pile burning) are permitted through the ADEQ which would ensure that thresholds for regulated air pollutants are not crossed. Implementation of best management practices (BMPs) Air Quality (AQ)-01 through AQ-04, would further reduce impacts (Appendix B).

**What would be the impact of the proposed action on livestock grazing in the project area?**

> **Rationale for elimination**: The BLM has a good working relationship with the grazing lessees in the proposed treatment area. These lessees have been actively involved in the planning and comment process and support the proposed treatment projects to improve the health of the land. Working together with the lessees, the BLM would consider the grazing system and rotation that is used and can plan the implementation without hindering the grazing operation.
>
> The BLM would work with the grazing lessees to develop an implementation plan that would work with each of their grazing schedules. For grazing deferments both prior to and following treatments, the BLM and lessee would work together to ensure that the treatment would not cause unnecessary stress to the grazing operation.

**How would the use of heavy equipment for the mechanical removal of target species affect the potential spread of nonnative invasive weed infestations?**

> **Rationale for elimination**: Some invasive and/or noxious weeds are present in previously disturbed areas, including along existing roads and drainages. Ground-disturbing activities can create conditions that could increase the potential for introduction and/or establishment of nonnative plants. However, because BLM would comply with all federal, state, and local weed

control regulations, including the project BMPs listed in Appendix B, the potential for spread of invasive and/or noxious weeds would be very low. Given the challenges associated with Lehmann lovegrass control, effects from the spread of this species are analyzed in detail (see Section 1.6.4 and Section 3.2).

**How would the proposed action affect cultural resources in the project area?**

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

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

**How would the proposed action impact paleontological resources in the project area?**

**Rationale for elimination**: Before implementing watershed improvement or vegetation treatment projects, the BLM would review statewide potential fossil yield classification (PFYC) data. Proposed ground-disturbing activities located within geologic units classified as having high or very high fossil potential (PFYC 4 or 5) would be subject to further evaluation by a qualified paleontologist. The BLM's primary and preferred method to protect significant fossil resources is avoidance of impacts through redesign or relocation of proposed activities and/or facilities. Should impacts be unavoidable, the BLM would implement mitigation (typically via data recovery) in accordance with the Paleontological Resources Protection Act (PRPA; 16 U.S.C. § 470aaa 1-11).

**Would the project affect soil and water resources from constructing erosion control and stream restoration structures?**

**Rationale for elimination**: Implementing erosion control and stream restoration techniques would have a net benefit on soil and water resources. For instance, similar upland structures in neighboring watersheds were found to trap sediment and increase infiltration (Polyakov et al. 2014; Nichols et al. 2016; Norman et al. 2017; Norman et al. 2019). The impacts from temporary access roads used in construction are expected to be minimal and short term with implementation of the BMPs (Appendix B). A Clean Water Act Section 404 permit and 401 certifications would be acquired for projects located within waters of the U.S., or their applicable tributaries. The projects would conform to the standard and supplemental stipulations noted in the permits.

**How would the project affect Tribal uses or interests?**

**Rationale for elimination**: The BLM initiated government-to-government consultation with 10 Native American Tribes who claim cultural affiliation to and/or traditional use of the project planning area. Letters summarizing the proposed action were sent to the Fort Sill Apache Tribe, Hopi Tribe, Mescalero Apache Tribe, Pascua Yaqui Tribe, San Carlos Apache Nation, Tohono O'odham Nation, Tonto Apache Tribe, White Mountain Apache Tribe, Yavapai-Apache Nation, and Zuni Tribe on October 1, 2021.

The Tohono O'odham Nation responded via phone message on October 5, 2021, therein requesting additional information on the proposed plan and expressing interest in receiving copies of future, related cultural and biological resources assessments for review and consultation. The Yavapai-Apache Nation responded via email on October 18, 2021, stating that the Tribe had no concerns or comments, therein deferring to the San Carlos and Mescalero Apache Tribes. The White Mountain Apache Tribe responded via letter dated October 22, 2021, stating that the proposed plan posed no adverse effect to the Tribe's cultural heritage resources and/or traditional cultural properties. The Hopi Tribe responded via letter dated October 23, 2021, requesting hard copies of the proposed plan and draft EA, along with their interest to develop an Assistance Agreement to participate in implementation-level resource studies. To date, no other responses or comments have been received; however, Tribal consultation is considered ongoing and will continue throughout plan implementation.

Currently, there are no known or likely impacts to any culturally significant plants, items, sites, or landscapes. Any new information provided by consulting Tribes could prompt issue(s)-analysis and/or alternatives development. Likewise, the BLM may later apply additional or edited terms and conditions of project implementations or require mitigation to protect or restore culturally significant resource values.

### *1.6.4 Issues Identified for Analysis*

The following lists the issues that were identified in either internal or external scoping efforts. They are analyzed in detail in Chapter 3 to either make a reasoned choice between alternatives or to determine the significance of the impact.

#### Soils and Water

- What would be the impact of large-scale vegetation treatment techniques, particularly prescribed fire and herbicide application, on downstream water quality?
- How would the change in vegetation communities affect runoff and sediment yields?
- What are the impacts of mechanized equipment, both those with tracks and with rubber tires, on soils, particularly in loamy bottom ecological sites?

#### Vegetation

- How would the proposed vegetation treatments and erosion control projects affect upland and riparian vegetation communities across different timescales?
- What would be the impact of the proposed vegetation treatments on nontarget native vegetation?
- How would the proposed treatments increase the spread of Lehmann lovegrass?
- How would the proposed treatments affect wetland plant communities and the Huachuca water umbel?

#### Wildlife/Threatened and Endangered Species

- How would heavy equipment, chain saw noise, and associated human activity affect migratory bird, general wildlife, and threatened, endangered, and sensitive species behavior, health, and distribution?
- How would the removal of vegetation, including upland, wetland, and riparian, affect habitat (breeding habitat, nesting habitat, hiding cover, and thermal cover) for migratory birds, general wildlife species, and specifically threatened, endangered, and sensitive species?
- What impact would the proposed vegetation management and treatments and erosion control projects have on wetland plant communities, aquatic habitat, aquatic (fish, amphibians, and aquatic reptiles) species, including threatened and endangered species and their critical habitats?
- How would upland treatments change sediment load and water quality in Cienega Creek and Empire Gulch?

## Visual Resources

- How would the impact from large-scale vegetation treatment techniques affect the viewshed of riparian and upland communities in the project area?

## Recreation

- How would the proposed action affect special recreation permittees, such as bird dog user groups and endurance horse riders?
- How would the impacts of the proposed vegetation treatments affect dispersed recreation users, such as hunters, campers, and OHV users?

# 2 PROPOSED ACTION AND ALTERNATIVES

## 2.1 Proposed Action

The proposed action is for the BLM, in coordination with adjacent landowners, to implement landscape-scale mechanical, chemical, and prescribed fire treatments to achieve vegetation management objectives. Additionally, the proposed action is also to implement erosion control projects designed to reduce or eliminate accelerated erosion in the project area (Figure 3). The vegetation management objectives are outlined in Appendix A.

The BLM, in cooperation with various partner agencies and organizations, would implement vegetation treatments throughout the Las Cienegas Restoration project area, by using one or more of the following methods:

- BLM owned or rented equipment and agency personnel
- Vegetation treatment contracts, including stewardship and service contracts
- Resources from other federal, state, county, city, and private landowners, nonprofit groups, businesses, and permittees (with in-kind services, matching funding) using interagency agreements, memorandums of understanding, and multi-agency or multi-landownership partnerships

Specific integrated vegetation management practices could be implemented individually or in combination to meet objectives. Adaptive management strategies would be used to administer appropriate treatment methods. Treatments would be designed to use the least impactful methods first, then treatment effectiveness would be evaluated, and methodologies would change to more intensive methods if treatment objectives are not met. If effectiveness monitoring indicates that re-seeding or erosion control or soil compaction mitigation is required, those rehabilitation methods would be prescribed for each future treatment.

### *2.1.1 Proposed Annual Treatment Acreages and Unit Selection*

Based upon the total estimate of acres that are not meeting the objectives of the RMP (Table 3), the maximum annual acres of treatments are provided below. In many cases these are overestimations of the actual annual treatments, but they are necessary to understand the spatial scope of the proposal and to assess the impacts to natural resources. In designing treatments, vegetation communities that share borders may be treated provided the treatment type is applicable to both vegetation communities. For instance, a prescribed fire in the uplands may be designed to encompass a nearby loamy bottom site if a necessary containment road encompasses both communities in the burn area.

**Table 4. Maximum Acres of Each Vegetation Community Treated Per Year**

| | | Maximum Acres Treated Per Year | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Initial Treatment | | Maintenance Treatment | | | | |
| Vegetation Community | Target Species | Herbicide | Mechanical (Grubbing) | Prescribed Fire | Manual | Targeted Grazing | Total | Percent of Total Area |
| Scrub Uplands | Creosote Acacia | 5,000 | -- | 3,000 | -- | -- | 8,000 | 9% |
| Desert Grassland Uplands | Mesquite | 2,000 | 3,000 | 10,000 | -- | -- | 15,000 | 14% |
| Riparian | Tamarisk Vinca | 5 | -- | -- | 2 | -- | 7 | 0.5% |
| Loamy Bottoms | Mesquite | 500 | 125 | 2500 | -- | -- | 3,125 | 19% |
| Cienegas | Bulrush* Johnson Grass | 8 | Infrequent (IF) | 3 | 4 | 11 | 26 | 8% |

## Treatment Unit Selection

### Criteria Across All Vegetation Communities

Treatment units would be selected and designed based on an interdisciplinary team review. At a minimum, team members would review the following criteria to determine if a treatment is appropriate:

- Based on the most current land cover models and field observations, is the proposed treatment unit meeting the applicable objectives described in the RMP objectives or objectives from plans of other relevant jurisdictions (Appendix A)?
- Is the proposed treatment meeting the site-specific objectives for applicable ecological sites within the treatment area (such as those developed by Pima County)?
- Is the proposed treatment method the most appropriate, based on target species, soil type, topography, weather, and other site characteristics?
- Does the proposed treatment area have culturally sensitive areas that need to be avoided or need additional design features to eliminate or mitigate impacts?
- Have considerations for threatened and endangered wildlife and other special status species been taken into account when designing the treatment unit and selecting the appropriate treatment method and timing? Has the treatment unit been presented to USFWS at an annual meeting?
- Are native seed sources available in the proposed treatment unit and are they in sufficient quantities to allow natural vegetation reestablishment?
- Does this area have remnant patches or communities of native perennial grasses and other desirable species that could be affected or improved by treatments?
- In loamy bottom sites, has depth to water and occurrence of flooding been considered when considering treatment objectives?
- Would the treatment predispose the proposed treatment unit to invasion by exotic plants, particularly Lehmann lovegrass?
- In areas with grazing allotments, can livestock management be structured to allow recovery of the treatment unit to meet rangeland health standards, including hydrologic function, soil stability, and biotic integrity?

**Selection Criteria Specific to Vegetation Community**

Scrub Uplands

Treatments in the ecosites grouped under scrub uplands would be identified primarily based on whether adequate perennial grass cover is present to allow for a prescribed fire. It is assumed that many of these sites would not have the required perennial grass cover thus an initial herbicide treatment would be required to reduce shrub cover and increase perennial grass cover. Once sufficient grass cover is established, prescribed fire would be used as a maintenance treatment. It is estimated that roughly 5,000 acres per year of herbicide treatment (broadcast aerial) and 3,000 acres per year of prescribed fire (for maintenance) would be used in these sites.

Desert Grasslands

Treatments in the ecosites grouped as desert grasslands would require a variety of treatment techniques based on their location, mesquite cover, and mesquite growth form. Areas with high perennial grass cover and low mesquite cover would be treated with prescribed fire. As the amount of mesquite increases and the individual tree size increases a more extensive toolbox of treatment techniques would be required. Approximately 11% of these sites have crossed the 35% threshold (Gori & Enquist 2003), these sites either would not be treated, or they would require intensive treatment techniques and considerably more time. Estimates on annual acreages are based upon past treatments' success, on the ground knowledge, and expert opinion. Therefore, it is estimated that 2,000 acres per year would be treated with herbicide (cut-stump, basal bark, foliar spray, or broadcast ground), 3,000 acres per year would be mechanically treated, and 10,000 acres would be treated as maintenance with prescribed fire.

Loamy Bottoms (Mesquite Bosque & Sacaton Grasslands)

The treatments in loamy bottom ecological sites depend on whether the site potential is to be a grassland (sacaton), or forestland (mesquite bosque). Site specific data was available for areas of the NCA for this specific ecological site, thus information from those studies is used to determine percentages and annual acreages for each treatment technique. Treatment areas outside of the field inventoried acres would undergo a similar exercise to determine treatment prescription before treatment (see evaluation criteria section). This includes an assessment of depth to water, flooding potential, sacaton cover, and mesquite cover and growth form.

It is anticipated that sacaton grassland sites that are consistent with the historical climax plant community (HCPC) or with low mesquite cover (A, B1 sites from Tiller et al. 2012b, see Figure E-1, Appendix E,) would only require prescribed fire as a maintenance treatment. Areas with larger mesquite cover (B2 & B3) would require additional treatment types including herbicide (cut-stump, basal bark, foliar spray, or broadcast ground) in addition to prescribed fire. The areas labeled as sacaton-mesquite (C1 & C2) have larger growth form mesquites and therefore, these are the areas of the loamy bottom sites (8.3% of the total) that would require the use of mechanical methods in addition to the herbicide and prescribed fire. E1 and E2 would only require prescribed fire as a maintenance treatment.

Treatments in mesquite bosque sites would consist of thinning to reduce the densities of mesquite to be within the density objectives while still maintaining the canopy cover. The methods described above for manual, mechanical, prescribed fire, and herbicide in the upland areas would also be used to meet the objectives in loamy bottom ecological sites. These objectives and treatments are to promote a historical density of approximately 220 trees per acre, or a distance between trees of 16 to 20 feet (The Nature Conservancy 2018a). Mesquite bosque density data for the project area is not available to make an estimate of the departure of these sites. Potential treatment acreages are therefore based on the heavily departed sacaton grassland sites that have transitioned to a forestland site because of an assumed higher-than-the-objective density as these sites transition. Based on the departure analysis in Section 1, around 14.6% of the areas are estimated to be highly departed sacaton grassland sites (C1 & C2) that have transitioned over to a forestland, or mesquite bosque, potential community. It is completely possible that ecosites that are classified as being in the B1 and B2 state would not have the hydrologic properties

necessary for successful sacaton grassland restoration, these areas would be identified in pre-treatment field investigations.

It is estimated that a maximum of 2,500 acres of loamy bottom sites would be treated annually with prescribed fire, a maximum of 500 acres would be treated annually with herbicide, and a maximum of 125 acres would be treated mechanically annually. Since cienegas, or wetlands, are associated with sacaton grasslands, wetlands located in loamy bottom ecological sites would be burned as a single unit.

Riparian

Contained mostly within sandy wash ecological sites, riparian is defined here as forested cottonwood-willow-ash (or similar) sites near perennial or intermittent stream reaches. A state and transition model for typical sites was developed specific to the Las Cienegas NCA in 2008 (see Bodner and Simms 2008). The proposed treatments in these areas include tree plantings, selective hinge-felling, and invasive plant removal (manually or with herbicide). The best available data that captures the extent of the riparian in the project area is from the US Forest Service Region 3 Riparian Potential dataset (Triepke et al. 2018). This dataset indicates an acreage of 1,457 acres in the project area. A departure analysis across the project area is not available. The previously mentioned 2008 study on riparian forest status in the Las Cienegas NCA indicated improvement in general riparian health in the NCA from the mid 1990's to 2008. Therefore, treatments in these areas would be limited to site-specific areas of currently known invasive species presence such as vinca removal near Empire Gulch Spring, and tree plantings near potential future sites vulnerable to disturbance (e.g., fire), or in conjunction with other treatments (erosion control/stream restoration as described below).

Cienegas

Annual acres for each treatment technique are determined by goals and objectives related to the establishment or maintenance of suitable habitat for priority species at individual cienegas. Cienegas outside of the Las Cienegas NCA are likely to have the same treatment prescription used to meet similar objectives. Cienegas to be treated would be evaluated for surface water depth (summer), plant community composition, presence of invasive plants (e.g., bulrush, cattail, Goodding's willow, Johnson grass, etc.), and emergent plant cover in open water. Treatments in wetland areas would be limited to site-specific areas of currently known invasive species presence such as Johnson grass removal from Cieneguita Wetlands and the three wetland exclosures, and Spring Water Wetland. Bulrush and cattail control would occur at these same locations with the addition of Cinco Wetlands.

Fire would be applied to all the loamy bottom floodplain wetlands adjacent to Cienega Creek and lower Empire Gulch when that option is available as part of prescribed fire for grassland management. It is anticipated that 3 acres of cienega would be burned as part of a 3–5-year fire rotation.

When considering herbicide treatments, active ingredients that are not BLM-approved for use in riparian and aquatic areas would require the use of minimum herbicide-free buffers based on the application method: 100 feet for aerial applications, 25 feet for vehicle applications, and 10 feet for hand spraying applications. Greater herbicide-free buffers may be utilized if the risk assessment guidance for each proposed active ingredient dictates it is needed or if deemed necessary during the IDT review process based on topography, soil type, and target species of a planned treatment area.

**Treatment Method Selection**

The BLM would determine, in collaboration with other partner jurisdictions where relevant, a treatment method by considering such factors as the treatment unit size, effectiveness of the treatment, impact of the treatment, and the resources available for that treatment method. Treatment locations and acreages to be treated within any one year would depend on availability, need, and funding. Future treatment areas could be identified when the need arises to meet resource objectives.

Once the BLM has evaluated a proposed treatment using these criteria, it would review the treatment through a Determination of NEPA Adequacy (DNA) to ensure NEPA compliance with this EA. This DNA

review would ensure that the specific potential impacts of the proposed treatment have been sufficiently analyzed. If the BLM determines a proposed treatment to have impacts that have not been analyzed in this EA, the BLM would prepare a new NEPA document.

### 2.1.2 Annual Coordination with Fish and Wildlife Service

The BLM would coordinate annually with USFWS on site-specific implementation of vegetation treatment and erosion control projects in the action area. This coordination would occur prior to implementation of any treatment activities to identify site-specific measures to protect federally listed species and ensure compliance with the Biological Opinion (BO) from USFWS.

### 2.1.3 Application of Best Management Practices and Conservation Measures

The BLM has developed best management practices (BMPs) specific to the Gila District over time, through the planning and implementation of various land treatment projects and consultation with USFWS. These BMPs would be applied to the proposed action, when applicable, to minimize potential impacts on resources. An IDT would identify the proposed treatment units and associated treatment methods and then determine which BMPs and Conservation Measures (CMs) are applicable for each treatment.

### 2.1.4 Treatment Methods

#### Prescribed Fire Treatments

Prescribed fire treatments to modify, thin, reduce, or remove fuels and reduce or remove undesirable woody plant species in treatment units are as follows:

Broadcast burning - Using handheld or aerial ignition devices, apply prescribed fire treatments across the landscape to meet resource objectives. To minimize the need for hand line construction, burn plan boundaries would be aligned with natural and man-made features, such as roads, washes, areas with naturally sparse fuels, and rocky areas. Areas of ground disturbance, such as hand line construction and staging areas, would be subject to individual cultural and paleontological resources assessment prior to implementation.

Since prescribed fire treatments in the Cienega watershed area depend largely on continuous fine fuels (grasses) to carry fire, it would be necessary to defer grazing beforehand. Deferment periods would be at a minimum of one growing season before treatment. This would be done to allow for an adequate amount of fine fuels growth in the treatment unit. Following the prescribed fire treatment, cattle would be excluded from the treatment unit for a minimum of two growing seasons (July-December) or until resource conditions are met as outlined in this EA and the Las Cienegas RMP to allow for perennial grasses to grow and drop seed before cattle enter the unit. The BLM would coordinate with the grazing lessees to develop an implementation plan that would work with each of their grazing schedules. For grazing deferments both prior to and following a prescribed fire treatment, the BLM and lessee would work together to ensure that the treatment would be at the appropriate time and would not cause unnecessary stress to the grazing operation.

Slash pile burning - Using handheld devices, apply prescribed fire treatments to hand- or mechanically-assembled slash piles generated during treatments. Hand- or machine-assembled slash burn piles would be in areas that limit or remove the potential for fire or heat to affect canopy, structures, or other surrounding vegetation. Slash is generally burned during the fall and winter, when cooler temperatures and higher humidity reduce the potential of fire spreading into adjacent fuels.

Wetland burning - Using handheld or aerial ignition devices to apply fire over discrete areas encompassing one or more wetland patches in a wetland complex. Wetlands and associated plant communities may be burned simultaneously. Wetlands are generally burned when dry and brown in fall or winter.

All prescribed fire treatments (broadcast and pile) would be conducted under a site-specific prescribed fire burn plan. This plan would specify the weather and fuel conditions, fire behavior modeling, holding resources, and preparation, such as what sites would be protected and line construction needed to meet the treatment objectives safely and efficiently. The burn plan would identify any agencies, permittees, or other interested parties to be notified concerning the prescribed fire project. It would include other land management agencies, when applicable, to work cooperatively across ownership boundaries. It also would identify any potential receptor sites and smoke management mitigation measures necessary to minimize impacts on the airshed and receptor sites. Hand- or machine-assembled slash burn piles would be in areas that limit or remove the potential for fire or heat to affect canopy, structures, or other surrounding vegetation. Slash is generally burned during the fall and winter, when cooler temperatures and higher humidity reduce the potential of fire spreading into adjacent fuels.

## *Mechanical Treatments*

Mechanical treatments would modify, thin, reduce, or remove vegetation using heavy equipment. This could be done using tracked and rubber-tired vehicles, such as track hoes, backhoes, front-end loaders, skid steers, and trucks, all outfitted with special attachments suited for the specific treatment action. Low ground pressure tires and tread would be used on soils where warranted to reduce the potential for soil compaction (i.e., on moist soils with a high clay content). Mechanical treatment techniques include the following:

Mastication - Using equipment with special attachments for mulching, chipping, mowing, grinding, or thinning.

Grubbing - Using rubber-tired or tracked equipment for removing entire plants and root balls.

Thinning - Using rubber-tired or tracked equipment to thin trees, remove dead and down fuels, gather and move slash into piles or windrows, and remove slash from treatment site.

Wetland site and wildlife pond treatment - Grubbing or thinning of vegetation (trees or bulrush root balls) would only be done in instances where bulrush or cattail root balls have occluded open water and cannot be removed by hand or handheld equipment. On soft or saturated soils, soil compaction would be reduced or prevented using wood mats or other tread pressure reducing devices (e.g., excavator pads, crane mats, swamp mats, tundra mats, etc). This work would be conducted between October 1 and March 15. Treatments would typically last one day per site and two days for larger wetlands.

## *Manual Treatments*

Manual vegetation treatments aim to modify, thin, reduce, or remove vegetation using hand tools. These could be hand tools, such as Pulaskis, McLeods, axes, shovels, and hand saws, or power tools, such as chainsaws, weed trimmers, field and brush mowers, and other specialized equipment. Although the manual method of vegetation treatment is relatively labor intensive and costly, it can be extremely species selective and well suited to areas with sensitive habitat, cultural resources, or where vehicular access may be restricted.

Hand tools and chainsaws would be used to remove salt cedar (tamarisk), periwinkle (*Vinca major*), Johnson grass, and riparian trees invading cienegas and other wetland types. Hand-, gas-, or battery-powered weed eaters would be used in or near wetlands to control invasive stands of bulrush, cattail, invasive riparian trees, and Johnson grass. Locations where these treatments are necessary include, but are not limited to, the three restored wetland ponds in the Cieneguita Wetlands, the Spring Water Wetland, wildlife ponds in the action area, and the Cinco Canyon wetlands. Invasive wetlands plants may be pulled or cut by hand on banks and underwater. These treatments may also be used on ponds and

wetlands on Pima County properties such as Hospital Tank on Clyne Ranch, Goat Well on Sands Ranch, various ponds/tanks at Bar V Ranch, or other locations. Submersible weed eaters may be employed to cut bulrush and cattails below the surface. This work would occur during the growing season from May 1 to September 1 annually to control herbaceous vegetation. Treatments may occur three to five times annually per wetland. Treatments are expected to last about one day per site but may take multiple days on the largest wetland sites treated.

Hinge-felling of willows may be used in incised channels to promote vertical growth across the middle of the stream course. This would help capture flow and sediment, reduce incision, and increase wetted stream length.

### *Herbicide Treatments*

Herbicide treatments would modify, thin, reduce, or remove targeted vegetation through application of chemical herbicides. Herbicides could be applied in either liquid or granular form within treatment units. All proposed herbicides (Table 5) have been approved for use on BLM-administered public lands as documented in the Programmatic Environmental Impact Statement (PEIS) for Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States (BLM 2007) and PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Lands in 17 Western States (BLM 2016a). Various manufacturers offer multiple products under varying trade names that include the active ingredients listed in Table 5. The BLM conducted risk assessments prior to approving each active ingredient (USDI BLM 2007; 2016a). The risk assessment for each active ingredient discloses potential impacts to resources and the mitigation measures that must be followed when using the active ingredient, including Best Management Practices (BMPs) as described in Appendix B.

Herbicides are categorized as selective or non-selective: selective herbicides kill only a specific type of plant, and non-selective herbicides kill all types of plants the herbicide contacts. Some herbicides are post-emergent, which means they can be used to kill existing vegetation, while others are pre-emergent, which stops vegetation from growing above the soil surface.

Adjuvants (Table 6) may be used with these herbicides to approve application and herbicidal activity. The ratio of adjuvant to herbicide varies as determined by the BLM and by the species of vegetation to be controlled, application method, application technique, and label requirements. Table 6 lists the proposed adjuvants.

Treatment of invasive species in upland, wetland, and riparian sites would be on a case-by-case basis dependent on regular field and post-treatment monitoring. Any invasive species identified in the future in Arizona Department of Agriculture or US Department of Agriculture (USDA) weeds lists would also be considered for early detection rapid response (EDRR) and control/eradication, using BLM-approved herbicides (see BLM 2007, BLM 2016a).

Herbicides may be applied in liquid or granular form via the following application methods:

**Spot treatment**—Herbicides would be applied selectively to only target species in a localized manner. This is generally done as an on-the-ground treatment on only the target species. Spot treatment applications can be applied by a handheld bottle sprayer, backpack sprayer, UTV-mounted sprayer, vehicle mounted sprayer, herbicide roller, or paintbrush. Spot treatment methods include the following:

- Cut-stump—Herbicides would be applied directly to cambium layer of the fresh, flush-cut stump of various tree and shrub species. Herbicides are spot applied using a backpack sprayer, a handheld bottle sprayer, an herbicide roller, or a paintbrush.
- Basal bark—Herbicides would be applied directly to the basal area of small tree, shrub, and grass species; this technique is generally used on saplings, re-sprouts, or low-growing species with thin bark. Herbicides are spot applied using a handheld bottle sprayer, a backpack sprayer, or a sprayer mounted on a regular vehicle or a utility terrain vehicle/all-terrain vehicle (UTV/ATV).

- Foliar—Herbicides would be applied directly to the foliage of target species; this technique is generally used on the canopy layer of small trees and shrubs that are no taller than 6 feet, or on non-native invasive grasses and forbs. For spot application, herbicides could be applied using a handheld bottle sprayer, a backpack sprayer, or a sprayer mounted on a regular vehicle or a UTV/ATV.
- Aquatic system spot application—Herbicides approved for use in aquatic systems would be used to spot treat salt cedar (tamarisk; *Tamarix* spp.), periwinkle (*Vinca major*), Johnson grass (*Sorghum halepense*), and invasive riparian trees encroaching on cienegas, other wetland types, and wildlife ponds. Potential areas include but are not limited to: Cienega Creek (on BLM-administered and Pima County Regional Flood Control District lands); Empire Gulch, Mattie Canyon, and Gardner Canyon on BLM-administered lands; and Davidson Canyon on Pima County lands.

**Broadcast Application** – Broadcast application of pelletized tebuthiuron, i.e. Spike 20P, would be applied at a rate of 0.5 pound (lb) active ingredient (a.i.)/acre (0.56 kilogram (kg) a.i./hectare) or less to the soil to treat creosote bush and white thorn acacia in the scrub upland community (Table 4). Site-specific buffers would be developed for each treatment (see BMP WR-01 in Appendix B.11). At a minimum, areas within 984 feet (300 meters) on both sides of perennial waterways, 100 feet (30.5 meters) on both sides of other drainages, 100 feet (30.5 meters) buffers around springs and wells, and any areas with a slope greater than 15% would be excluded from broadcast herbicide treatment. According to label specifications, tebuthiuron is most effective when applied before the primary growing season or before expected seasonal rainfall. To avoid herbicide runoff during monsoon storms, tebuthiuron would be applied to the soil in fall through early spring (10/1-3/31) before low-intensity winter rainstorms for incorporation into the soil for root uptake by shrubs in the spring. Tebuthiuron would be broadcast with ground (truck, UTV, or ATV-mounted spreader) or aerial (rotor-wing or fixed-wing aircraft) applicators with a global positioning system (GPS) and calibrated emitters to ensure only intended areas are treated and that the intended volume of herbicide is applied.

**Table 5. List of Proposed Herbicides (active ingredients) and Potential Target Species**

| Mesquite | Salt Cedar | Creosote/Acacia | Vinca |
|---|---|---|---|
| Triclopyr<br>Clopyralid<br>Aminopyralid | Imazapyr<br>Glyphosate | Tebuthiuron | Glyphosate<br>Imazapyr |

**Table 6. List of Proposed Adjuvants[1]**

| Adjuvant | Description |
|---|---|
| Colorant | A dye added to herbicide mixtures to identify where herbicides have been sprayed. |
| Suspension agent | This helps active herbicide ingredients stay suspended in the formulation and prevent caking or settling at the bottom of the container. |
| Emulsion agent | This is a substance that can dissolve in oil or water; and allows oil to be uniformly dispersed in water as an emulsion. |
| Non-ionic surfactant | This is a surfactant used in herbicide mixtures to help break down the surface tension of plants and trees to promote herbicide absorption. |
| Methylated seed oil | This product is derived from the reaction of a fatty acid (from seed oils) with methyl alcohol and usually contains emulsifiers and surfactants. Its primary use is with systemic post-emergent herbicides, insecticides, and fungicides. |
| Crop oil | Crop oil or crop oil concentrates are petroleum-based additives used to increase the efficacy of herbicides in agricultural applications. |
| Water | Water can be used in place of or in combination with oils to increase the efficacy of herbicides. |

[1] Any substance in a herbicide formulation or added to the spray tank to improve herbicidal activity or application characteristics.

## *Planting and Seeding*

This treatment involves the planting and seeding of native riparian and flood plain species where the percentage of riparian vegetation below potential natural community and groundwater levels is enough for plant species survival. Irrigation may be used, if necessary, for establishment.

- Reseeding/planting sacaton plugs and erosion control structures in areas that are not meeting RMP objectives in loamy bottom sites, particularly bare ground cover, and where the depth to water is less than 16 feet.

## *Targeted Livestock Grazing in Wetlands*

Livestock grazing in selected wetlands and wildlife ponds would be used to treat invasive and crowding species such as bulrush, cattail, and Johnson grass in or near wetland and wildlife ponds to maintain native wetland plant diversity, open water habitat for fish and frog species, and habitat diversity for wetland and aquatic species. This method of control would not be used in Cienega Creek or Mattie Creek. It would be limited to restored and artificially created wetlands and ponds (Table 7).

- Livestock would be allowed entry to grazing exclosures with critical habitat and/or occupied habitat only to control unwanted vegetation and for a maximum of 4 weeks (typically treatments would take 2 weeks) between March 1 and August 30. The livestock would be removed promptly after treatment objectives (acres of unwanted vegetation are removed) are achieved. The treatment objectives would depend on the size of the area (anywhere from 1 to 30 acres) being treated. Number of livestock would be limited to the minimum number of livestock needed to achieve objectives. Specific goals and guidelines would be written and clearly communicated to the lessee prior to the treatment. Vegetation and livestock would be monitored by BLM Rangeland Management Specialist(s) and a BLM Biologist until the treatment objective is met.

- At Egret, Heart, and Crescent wetlands, livestock would be allowed entry to the area within the exclosure but not within the fences directly around the three ponds (each pond has its own fence around it and the livestock would not be allowed within those individual pond fences).

- Temporary or permanent fencing would be used to control the extent of the grazing. The primary species that need to be controlled are Johnson grass, bulrush, and cattail. These plant species are very palatable to livestock and grow tall enough to make them preferred over most other species (Simms 2019).

- Livestock would be excluded from any populations Huachuca water umbel, Arizona eryngo, or Canelo Hills ladies' tresses.

- Targeted livestock grazing treatments may require further treatments such as herbicide application, hand removal, or mechanical removal alone or in combination.

**Table 7. Potential wetland/pond locations for targeted livestock grazing treatments.**

| Wetland / Pond | Location (Lat., Long) | Acres (approximate) |
|---|---|---|
| Egret, Heart, Crescent wetland (Cieneguita) | 31.795342, -110.597946 | 30 |
| Cottonwood pond | 31.761209, -110.619608 | 1 |

## *Erosion Control and Stream Restoration*

The proposed action for reducing accelerated erosion in the project area is to implement erosion control and induced meandering treatments of various types, such as rock/vegetation and earth works, with different manual and mechanical methods. Figure 3 indicates some initial areas where these types of treatments would occur. These treatments could occur in all ecological sites including within stream channels and potentially across jurisdictional boundaries.

Outlined below are the purpose and general descriptions of each treatment method. Appendix C contains site-specific information for treatment areas with design plans.

**Upland Manual Treatments**

In smaller upland tributary drainages, the treatment is the placement of rocks or wood by hand in erosional features or channels. This prescription involves minor earth work with hand tools to reduce the grade of features or to prepare sites for treatment. Rock or wood structures would be similar to one-rock dams, Zuni bowls, rock rundowns, media lunas, baffles, vanes, wicker weirs, or log mats similar to those outlined in Zeedyk and Clothier (2009). (See Appendix C for site-specific designs and additional information on treatment techniques.)

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

**Upland Mechanical Treatments**

In a limited number of areas, where the above manual treatments are not practical, specifically on larger head-cuts (>4 feet deep) and erosion features, the treatment prescription would involve the use of heavy equipment to reduce the grade of erosional features before a protective layer is put in place. This layer could be made up of properly placed plant material, rocks, mulch, or soil tackifiers.

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

Hydro-seeding, defined as a combination of mulch, seed, and water applied across a large area, may also be required in areas with extensive sheet erosion. This would include reseeding/planting of native grasses appropriate to the site.

**Stream Restoration**

The goal of the stream restoration is to return a stream channel to a former, or better, functioning state by increasing floodplain connectivity and geomorphic complexity. In general, techniques that promote natural processes would be preferred. These include in-stream structures composed of natural materials, principally wood and rock, and created by hand. These are identified in Appendix C.

In a limited number of areas experiencing vertical or lateral erosion, cross vanes and weirs composed of rock or wood, as illustrated in Appendix C, would be used. Previous successful treatments in Cienega Creek near the agricultural fields consisting of cross vanes built with 24 to 48-inch diameter boulders were constructed in 1997. Like the previous treatments, these techniques can require mechanized equipment and temporary access roads for construction.

The BLM would use cross vanes and weirs, composed of boulders or sufficient diameter logs, or other techniques proven to be effective to control vertical and lateral erosion. The BLM also would use such techniques to improve habitat in mainstream courses: Cienega Creek, Empire Gulch (head cut below the 900 road crossing), Gardner Canyon, and Mattie Canyon. These techniques require mechanized equipment and temporary access roads. (See Appendix C for an example of a cross vane and for proposed stream restoration treatments). These restoration techniques would be applied at other

locations as the need arises. Additional NEPA analysis or environmental compliance would be necessary for activities with additional disturbances not analyzed within this EA.

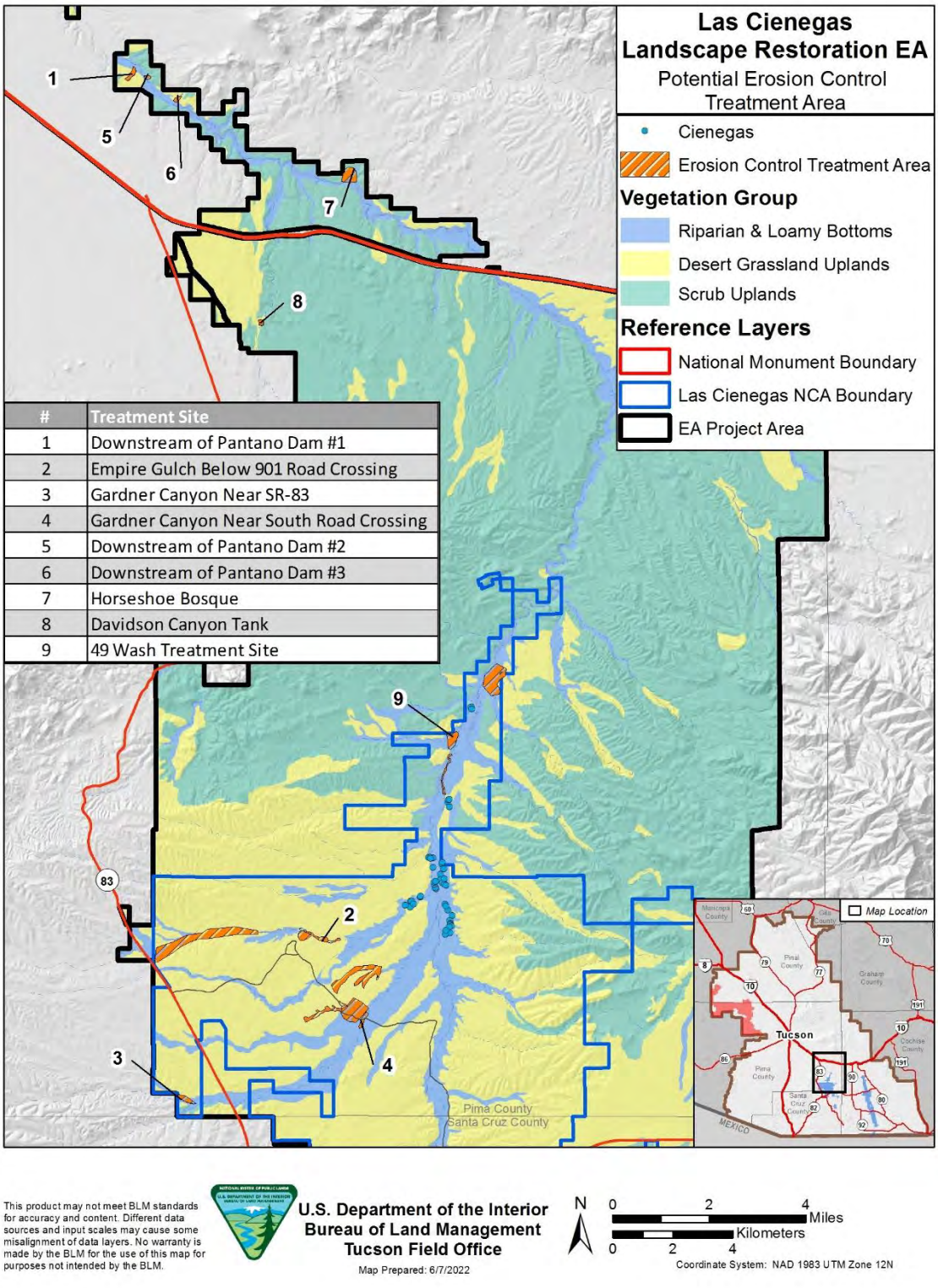


**Figure 3. Landscape Restoration EA – Location of Proposed Erosion Control Projects**

## Erosion Control & Stream Restoration Treatment Areas

### Erosion Control Project Areas

Several initial erosion control projects have been designed and those areas are indicated in Figure 3. Summaries of the site designs for the proposed erosion control projects are detailed below.

- Downstream of Pantano Dam #2 (number 5 on Figure 3) – This 1.5-acre property would require approximately 36 rock structures constructed with 125 cubic yards of rock. The construction would occur with a crew of 8 people over the course of 8 to 10 days. Rock would be delivered by vehicular access along Cienega Creek.
- Downstream of Pantano Dam #3 (number 6 on Figure 3) – This treatment would construct 100 rock structures on the 3.5-acre parcel with 125 cubic yards of rock. The construction would be completed with a crew of 8 over a course of 6 to 8 days. Rock would be delivered by vehicular access along Cienega Creek.
- Horseshoe Bosque (number 7 on Figure 3) – This treatment would use approximately 50 brush structures (media lunas and weirs) constructed from dead mesquite limbs. Treatment would involve 8 people with one chainsaw operator over the course of one week.
- Davidson Canyon Tank (number 8 on Figure 3) – This treatment would implement approximately 15 rock structures downstream of the stock tank. The rock would be delivered via gravel road access directly to the tank.
- 49 Wash (number 9 on Figure 3) – This treatment would utilize approximately 60 rock structures (zuni-bowls, media lunas, one-rock dams) to treat head cuts on BLM lands in the Las Cienegas NCA. It would take the use of 200 cubic yards of rock deposited just off access road 6907A (49 Wash road).
- Downstream Pantano Dam #1 (number 1 on Figure 3) – This 10.5-acre site would have approximately 110 rock structures (media lunas and one-rock dams). This treatment would use 150 cubic yards of rock and 3 people for 20 days.
- Empire Gulch below 6901 Crossing (number 2 on Figure 3) – This treatment would utilize 150 cubic yards of rock to construct approximately 80 rock structures (zuni bowls and one rock dams). The treatment would consist of 3 people over the course of 20 days.
- Gardner Canyon near State Route 83 (number 3 on Figure 3) – This treatment would utilize approximately 75 rock structures (zuni bowls, one-rock dams, and media lunas). This treatment would utilize 150 cubic yards of rock deposited near the access road. The treatment would consist of 3 people for 20 days.

Other Erosion Control / Stream Restoration Areas:

- These areas are identified in Figure 3 that are depicted as “Erosion Control Treatment Areas” in the legend but do not have a number associated with them. They indicate areas that have been identified as needing treatment either in the past (e.g., Ag Fields Group Site), explicitly mentioned in the RMP (e.g., Wood Canyon), or identified in preparing this EA. The methods used in these areas will be the same as those highlighted above.

### Erosion Control / Stream Restoration Treatment Acreages & Future Estimates

The total acreage from the erosion control and stream restoration projects identified above is 864 acres. In addition to these identified sites, erosion control measures identified above may be used as part of a vegetation treatment. It is expected that 1% of the vegetation treatment acreage (see Table 4 above) would require re-seeding or planting of native grasses for erosion control purposes. Under the assumption that the maximum number of treatments would be completed, and that 1% of the vegetation treatment acreage would require re-seeding or planting, it is expected that 32 acres of loamy bottoms, 80 acres of scrub uplands, and 150 acres of desert grassland would need re-seeding or planting every year. Furthermore, it is expected that a separate 1% of the vegetation treatment acreages would require other mechanical or manual erosion control treatment techniques implemented at the same time, or slightly after.

**Table 8. Maximum Annual Erosion Control and Stream Restoration Treatment Acres by Vegetation Community**

| Vegetation Community | Acreage of Erosion Control Project Areas | Vegetation Treatment Acreage that Requires Re-seeding/ Planting | Vegetation Treatment Acreage that Requires Manual/ Mechanical Erosion Control | Total Erosion Control/Stream Treatment Acres |
|---|---|---|---|---|
| Scrub Uplands | 20 | 80 | 80 | 180 |
| Desert Grassland Uplands | 409 | 150 | 150 | 709 |
| Riparian | 36 | 5 | >1 | 41 |
| Loamy Bottoms | 399 | 32 | 32 | 464 |
| **Total** | **864** | **269** | **262** | **1,394** |

### *2.1.5 Treatment Site Monitoring, Rehabilitation, and Maintenance*

## Pre-Treatment and Post-Treatment Monitoring

The treatment units identified for each of the treatment methods are based on monitoring data taken at each ecological site. The BLM will use Assessment, Inventory, and Monitoring (AIM) Protocols (BLM 2017 and 2019e) to assess the pre-treatment level of departure and post-treatment effectiveness.

In upland erosional features, the BLM would establish photo points before treatment and would monitor the points to determine treatment effectiveness and maintenance requirements.

## Post-Treatment Rehabilitation

Post-treatment rehabilitation is contingent on immediate post-treatment monitoring. Ingress/egress routes would be rehabilitated before the monsoon season. The BLM also would conduct surveys for ground-nesting birds before rehabilitation. If soil is eroding or is expected to erode, then rehabilitation would involve erosion control techniques similar to those described below: using rock structures, contour ripping, reseeding, and hydro mulching.

## Treatment Site Maintenance

*Upland Sites*

The BLM would maintain units (including past units listed in the background section) to control resprouts and new growth of mesquite. The preference would be to use prescribed fire where applicable, but maintenance could be via herbicides or mechanical treatments. Maintenance of other vegetation treatments with different targets would also be completed in addition to control of mesquite. Maintenance treatments would also follow the same criteria described below under *Vegetation Treatment Unit Selection* to determine if a treatment is appropriate, including completing all applicable surveys and monitoring.

Vegetation maintenance would be required every 3 to 5 years on a unit-by-unit basis. It would be accompanied by a Determination of NEPA Adequacy (DNA) and pesticide use proposal (if using herbicide) and with an appropriate nest and burrow survey done before treatment.

*Wetland Sites*

The BLM would maintain treated wetlands units to control resprouts and new growth of Johnson grass, bulrush, cattail, vinca and other invasive species. Maintenance could be mechanical treatments, targeted grazing, herbicide or prescribed fire where applicable. Maintenance would be required every 2 to 5 years when using fire, annually when using herbicides, or as frequently as semi-annually when done manually (i.e. handheld implements and power-tools).

*Erosion Control Sites*

Maintenance would be based on monitoring data but would happen at least once in the first 5 years of installation. Maintenance could include using spot treatments with on-site materials or completely rebuilding structures with additional materials. Structures designed to trap sediment would need to be revisited, and new structures would be placed on top of the old to continue increasing bed elevations.

### *2.1.6 Sequencing, Timing, and Overlap of Treatments*

Vegetation treatments generally consist of an initial treatment followed by maintenance treatments to ensure the vegetation community meets its objectives. For example, in mesquite invaded sacaton grasslands, mesquite bosques, and desert grassland upland vegetative communities, treatments to achieve a lower tree density would follow the sequence below.

**Example:**

- Year 1: Mechanical grubbing to reduce mesquite density and cover
- Years 3-4: Herbicide treatment to eliminate resprouted mesquite
- Years 8-9: Second herbicide application to treat resprouting mesquite
- Years 8-12: Prescribed fire to treat resprouting mesquite

Treatments in riparian areas would also follow this sequence if target species are persistent over time. If the initial treatment method effectively eliminates the target species (e.g., tamarisk in riparian habitat), then subsequent maintenance treatment would not be required. However, in most instances, follow-up maintenance treatments are needed. Treatment units that require maintenance treatments receive multiple treatment actions over time.

## 2.2 No Action Alternative

Under this alternative, the BLM would not implement the proposed vegetation treatments or erosion control projects, nor would it maintain previous vegetation treatment areas. The agency could implement vegetation treatments that are identified under existing NEPA documentation (EA # 420-2006-19).

## 2.3 Alternatives Considered but Eliminated from Detailed Study

### *2.3.1 Maintain past treatments but don't implement additional or new treatments*

**Rationale:** The BLM considered an alternative under which past treatments would be maintained but additional treatments would not be implemented. This alternative was eliminated because it would not meet the purpose and need described in Section 1.2, as the vegetation and watershed objectives in the RMP would not be achieved.

### *2.3.2 Remove livestock grazing from Las Cienegas NCA*

**Rationale:** The BLM considered an alternative under which livestock grazing would be removed from Las Cienegas NCA in response to comments that suggested removing livestock would improve the vegetation condition. Public Law (PL) 106-538, which established the Las Cienegas NCA, states: "The Secretary of the Interior shall permit grazing subject to all applicable laws, regulations, and Executive orders consistent with the purposes of this Act." Thus, livestock grazing is a use that was accounted for in the enabling legislation for the Las Cienegas NCA. This alternative was eliminated from further analysis

because permitted livestock grazing is adjusted when needed to comply with the Arizona Standards for Rangeland Health. This assessment and adjustment process is completed in association with livestock grazing lease renewals and is therefore not included in this analysis.

### 2.3.3 Significantly reduce the amount of livestock grazing on Las Cienegas NCA

**Rationale:** The BLM considered an alternative under which livestock grazing would be reduced on Las Cienegas NCA in response to public comments that suggested reducing livestock grazing would restore Las Cienegas NCA resources. Permitted livestock grazing is adjusted when needed to comply with the Standards for Rangeland Health. This assessment and adjustment process is completed in association with livestock grazing lease renewals and is therefore not included in this analysis. In addition, the BLM collects robust upland monitoring data every fall on Las Cienegas NCA, compares the monitoring data results to the Las Cienegas RMP objectives, and considers the monitoring data results in upcoming management decisions. This continuous feedback of monitoring data allows the BLM to make adjustments to the permitted livestock grazing on Las Cienegas NCA in response to resource concerns.

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# 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Note that all tables referenced in this chapter can be found in Appendix E: Figures and Tables. The analyses for the no action alternative and proposed action address issues listed for each resource. These issues are addressed separately for the proposed action analysis but are combined for the no action alternative analysis.

### Analysis Assumption

Proposed vegetation treatments in the upland scrub and desert grassland sites for all techniques (mechanical, fire, and herbicide) would be estimated to occur on a maximum of 23,000 acres annually, based on past treatment acreage and professional judgement.

## 3.1 Soil and Water Resources

- Issue 1: What would be the impact of large-scale vegetation treatment techniques, particularly prescribed fire and herbicide application, on downstream water quality?
- Issue 2: How would the change in vegetation communities affect runoff and sediment yields?
- Issue 3: What are the impacts of mechanized equipment, both those with tracks and with rubber tires, on soils, particularly in loamy bottom ecological sites?

### *3.1.1 Affected Environment*

Soil and water resources are analyzed together here because of the inherent link between the soil conditions and hydrologic processes that are affected by the proposed action. This section establishes the baseline conditions of the affected environment for these resources in the project area as it relates to the issue statements above.

### Soil Resources

The development of soils and their properties are a function of their parent material, topographic location, climate, and biotic community. These factors are interlinked and work across many timescales; thus, soil properties vary greatly across the landscape (Brady and Weil 2008). Because of this heterogeneity, soils with similar properties are often grouped into map units characterized by the dominate soil properties. Ecological sites are used to determine ecological potential for a given soil map unit, physical setting, and rainfall amount.

Major Land Resource Areas (MLRAs) are large geographic areas characterized by a particular pattern of soils, climate, water resources, land uses, and type of farming. Within the proposed project area, there are 215,587 acres in the Southeastern Arizona Basin and Range MLRA and 1,144 acres in the Sonoran Basin and Range MLRA (BLM GIS 2019). Ecological sites fall within MLRAs and are distinctive areas that produce different types and amounts of vegetation, depending on several factors such as soil properties, geology, and ability to respond to management actions and natural disturbances. Most of the ecological sites in the proposed action area are listed in Hernandez et al. 2013, including the ecological sites in MLRA 41, the Southeastern Arizona Basin and Range.

The ecological sites in the project area, as further described in the vegetation section (Section 3.2), have been broadly grouped into three vegetation types to facilitate vegetation management: desert grassland uplands; drainages, lowlands, and others; and scrub uplands. Soil orders and suborders in the project area are listed for the three vegetation types in Table E-3. Alfisols (0.4% of the project area) result from weathering processes that leach clay and minerals and other constituents out of the surface layer and into the subsoil, where they can hold and supply moisture and nutrients to plants. They form primarily under forest or mixed vegetation cover. Aridisols (68.4% of the project area) are too dry for the growth of terrestrial plants that are neither adapted to particularly dry nor particularly wet environments. The lack of moisture limits most soil development processes to the upper part of the soils. Entisols (12.3% of the

project area) occur in areas where erosion or deposition rates are faster than the rate of soil development. Mollisols (18.9% of the project area) are quite fertile and have a moderate to pronounced seasonal moisture deficit (BLM GIS 2019; USDA undated). Wetland soils examined by USGS soil scientists indicated that several wetlands had an O horizon located below overlying sediment (BLM 2006). This horizon was identified as an aquent histisol that is saturated and likely occurs on less than 1% of the Las Cienegas NCA.

Soils can be 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. Soil series in the project area and their erosion hazard ratings are listed for the vegetation types in Table E-4. The soils are susceptible to erosion because of slope or texture. The erosion hazard ratings are soil interpretations from the Natural Resources Conservation Service (NRCS) Web Soil Survey. NRCS Erosion Hazard (off-road, off-trail) interpretation calculates this rating based on an assumed soil surface exposure from disturbance of 50-75%. A rating of “slight” indicates that erosion is unlikely under ordinary climatic conditions. A rating of “moderate” indicates that some erosion is likely and that erosion-control measures may be needed. A rating of “severe” indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised.

The erosion hazard within the proposed project area is severe for 18,646 acres, moderate for 73,066 acres, and slight for 124,546 acres (see Table E-4). This represents 9%, 34%, and 57% of the project area, respectively. Nearly all the soils with a severe erosion hazard are in the scrub uplands. The soil series that cover the largest areas are Bernardino-Hathaway association, rolling (15.21% of the project area), Deloro-Andrada complex, 5-35% slopes (10.16% of the project area), and Powerline-Kimrose family complex, 10 -35% slopes (7.67% of the project area). None of these have a severe erosion hazard rating.

The deep clay and loamy soils immediately next to portions of Cienega Creek and some of the major tributaries are highly susceptible to gully erosion and soil piping. One such area, Lower Wood Canyon, has severe gully erosion and piping on more than 200 acres. Several areas have large active gullies and deep holes resulting from continuing soil movement. In 1993, a large flood (greater than 100-year flood by volume) scoured Cienega Creek (MacNish et al. 1993), creating a 5-foot-deep head cut south of Springwater Canyon. This head cut was stabilized in 1994 (BLM 2002).

## Water Resources

The project area is in the southern extent of the basin and range physiographic province, which is comprised of generally north-south trending mountain ranges with basins composed of pre-Basin and Range formation sediments and sediments eroded from weathering of the nearby ranges. These two fill components comprise the general basin fill system, which consists of heterogeneous layers of sand, gravel, and clay lenses (Anderson et al. 1989; Huth 1997). Another unit consisting of recent deposition with likely higher hydraulic conductivity sitting on top of the basin fill is known as near-stream alluvial aquifer. Conceptually, the groundwater system is comprised of water in the pore spaces of the basin fill and near-stream alluvial aquifer and in the fracture systems of surrounding bedrock mountain ranges and basin floor. In general, groundwater flow starts as recharge in the mountains then percolates through the aquifer until it is discharged as streamflow or consumed by near-stream riparian vegetation. Recent studies in parts of the upper Cienega Creek watershed have indicated that the water in the basin fill is primarily from mountain-front recharge and that surface water and shallow alluvial aquifer are primarily composed of water from this basin fill aquifer (Tucci 2018, Gray 2018). Pima Association of Governments has defined shallow ground water areas (depth to water less than 50 feet) for Pima county. In the planning areas these areas are lower, middle, and upper Cienega Creek, lower and upper Davidson Canyon, Barrel Canyon, and Gardner Canyon (Pima Association of Governments 2012). These shallow groundwater areas roughly correlate to the same areas as the Drainages and Lowlands Vegetation grouping and include the major surface water features described below. Precipitation, evapotranspiration, and groundwater pumping influence streamflow.

There are five watersheds in the project area. They are summarized in Table E-5.

Cienega Creek is one of the main drainages in the project area, with major tributaries of Gardner, Empire Gulch, Springwater, and Mattie Canyons in the upper portion and major tributaries of Davidson and Wakefield canyon in the lower portion. Cienega Creek originates in the Canelo Hills and continues roughly 50 miles toward north where it becomes the Pantano Wash in the Tucson Metropolitan Area. Bedrock emerges from the alluvium at the narrows causing perennial flow and serves to divide the upper and lower basins. Lower Cienega Creek continues northward through the lower alluvial basin until it bends west/northwest near Anderson and Wakefield Canyons. A bedrock below Interstate 10 forces flow upward again at the Cienega Creek Natural Preserve.

The Babocomari River is in the southeastern portion of the project area with its upper watershed in the Whetstone and Huachuca Mountains and the Canelo Hills. The 25-mile Babocomari River is one of the main tributaries to the San Pedro River to the east. It is classified as a predominantly ephemeral stream, but has perennial stretches that are supported by the regional groundwater system. O'Donnell Creek is in the planning area and is a tributary to the Babocomari River that supports roughly two miles of perennial surface water.

Significant springs in the Las Cienegas NCA include Cold Spring, Upper Empire Gulch Spring, Apache Spring, Post Canyon, Smitty Spring, Nogales Spring, and Little Nogales Spring. Perennial ponds include Clyne's Pond (Northwest Reservoir), Cienega Ranch Marsh, and five ponds in Cinco Canyon: #1, #2, #3, #4, and #7. Most developed springs have not been maintained and are used seasonally by wildlife and livestock (BLM 2002). Significant springs outside the Las Cienegas NCA but still in the proposed action area include Mescal Spring, Bobo Spring, Wakefield Spring, Apache Spring, and Cottonwood Spring (NHD [National Hydrography Dataset] GIS 2019). Within the proposed project area, there are 35 acres of perennial lakes/ponds and about 64 acres of intermittent lakes/ponds (BLM GIS 2019).

According to the USGS NHD stream classifications in the proposed project area, there are 20 miles of perennial streams, 312 miles of intermittent streams, and 1,267 miles of ephemeral streams (BLM GIS 2019). From 2006 to 2016, when GPS technology was employed to inventory surface water on an annual basis, total wetted stream varied between 4.7 and 7.8 miles for Cienega Creek and tributaries on the Las Cienegas NCA. Stream lengths in June (the minimum flow period) are as follows:

- Lower Cienega Creek is 1.2 miles (the average from 2014 to 2018), compared with roughly 7.2 miles for May 1990 (Pima Association of Governments 2018; Montgomery & Associates 1995).
- Upper Cienega Creek is 6.3 miles (the average from 2014 to 2018), compared with 9.98 miles in 1990 (BLM 2019a).
- Upper Babocomari River is 4.6 miles (2018) (The Nature Conservancy 2018b).
- O'Donnell Creek is less than 2 miles (2018) (The Nature Conservancy 2018b).

Cienega Creek, from its confluence with Gardner Canyon to the USGS gaging station at Pantano Wash (#09484600; approximately 28.3 river miles), is an outstanding Arizona water, which means it is a surface water that is classified as an outstanding state resource water (Arizona Department of Environmental Quality 2016). A portion of Lower Cienega Creek in the preserve is designated as a "Unique Water of Arizona" by ADEQ (Northern Arizona University 2019).

A disturbance ratio has been used before to indicate the initial disturbed acres versus those that are impacted by the structures overtime through changes in geomorphology (Ciotti 2020). This later area also defined as the 'zone of influence' of a structure or complex of structures on the stream channel and floodplain (Wheaton et al. 2019). Following this, treatments on smaller tributaries have a much smaller and comprise a much smaller 'zone of influence' than on mainstem areas of Cienega Creek. Thus, the acreage presented for treatments is not just physical area of the structures on the ground, but the general area impacted by construction and the general zone of influence expected from them.

### 3.1.2 Impacts from the No Action Alternative

## Direct and Indirect Impacts

Under this alternative, the BLM would not implement the proposed vegetation treatments or erosion control projects, and it would not maintain previous vegetation treatment areas. The agency could implement vegetation treatments that are identified under existing NEPA documentation (EA # 420-2006-19, EA # DOI-BLM-AZ-G020-0021, and EA # DOI-BLM-AZ-G020-2011-0028). The existing environmental compliance covers limited upland vegetation treatments in the original 20,000 acres identified in the Las Cienegas RMP (2003) and wetland vegetation maintenance by hand. Ongoing impacts on soil and water resources, as described in those existing NEPA documentations, would continue. The no action alternative would impact <1% of the project area with direct impacts from vegetation treatments and erosion control treatments.

There would be no new impacts on soil and water resources, and current impacts would continue involving large-scale vegetation treatments (implemented under existing NEPA documentation) and water quality; vegetation communities, runoff, and sediment yields; and mechanized equipment and soils. For example, not implementing treatments in areas outside the existing NEPA documentation would continue to allow those areas to transition further from the reference condition in their respective ecological site's state and transition model. This transition towards a more departed state is typically characterized as a shrub dominated or eroded state that has higher hydrologic susceptibility and thus increases in runoff and sediment loss for a given rain event (Williams et al. 2016, NRCS 2019).

## Cumulative Impacts

The five watersheds overlapping the proposed action area (Table E-5) are the geographic scope of the analysis area for cumulative impacts.

Past, present, and future actions that have affected and would affect soil and water resources (water quality, runoff, water supply, and soil disturbance and compaction) include vegetation treatments, wildfires, livestock grazing, climate change, Forest Service vegetation treatments within a 90,000-acre project area (though not all acres would be treated) in the upper part of the watershed, restoration and erosion control projects on Pima County lands in the Cienega Creek Natural Preserve, off-road vehicle travel, and mining. Previously, the BLM completed vegetation treatments on approximately 19,500 acres (see Table 2) using prescribed fire, chemical, and mechanical methods in the Las Cienegas NCA. Erosion control and stream restoration projects have been constructed in Los Pozos Gulch, Mattie Canyon, and on Cienega Creek near the agricultural fields and its confluence with Springwater Canyon. Also, both the number of new wells drilled and the amount of pumping throughout the entire Cienega watershed have increased significantly since 2000 (Powell 2013, Cienega Watershed Partnership 2018).

Construction and operation of the Rosemont Copper Mine have the potential to change surface water discharge to Davidson Canyon and Cienega Creek. It also has the potential to increase sediment and pollutant transport to surface water features and degrade water quality (Shafiqullah et al. 2017). Modeling of groundwater drawdown from construction and operation of the open-pit mine indicates a potential reduction in streamflow in Davidson Canyon, Empire Gulch, and Cienega Creek (USDA 2017).

Past, present, and future actions have affected and would affect soil and water resources by removing vegetation, altering the composition of vegetation, disturbing the soil surface, and reintroducing beaver that alter water flow and sources. In addition, changing conditions such as increases in temperature and shifts in precipitation patterns that support vegetation health and spread would also affect soil and water resources. Because there would be no new direct and indirect impacts from the no action alternative, there also would be no new cumulative impacts from the no action alternative.

## 3.1.3 Impacts from the Proposed Action

### Direct and Indirect Impacts

#### *Issue 1: What would be the impact of large-scale vegetation treatment techniques, particularly prescribed fire and herbicide application, on downstream water quality?*

Broad prescribed fire and herbicide use temporarily remove all the vegetation and lead to the creation of a contaminant source in the form of exposed soil, ash, debris, and possibly herbicides. Selection of treatment areas for the proposed action would follow considerations listed in Section 2.1.1 under Proposed Annual Treatment Acreages and Unit Selection and best management practices in Appendix B: Best Management Practices, discussed immediately below.

Appendix B for the proposed action contains management practices to minimize the degree of potential negative impacts, to the extent possible. These practices, for example, would leave a buffer between treated hillslopes and drainages to aid in minimizing sediment and herbicide transport to these areas. Furthermore, surface runoff would decrease over time as vegetation becomes reestablished in areas treated by broad prescribed fire and herbicides.

**Prescribed Fire**

As part of a prescribed fire, hand lines may be constructed to control the planned burn area. Hand line construction involves the direct removal of vegetation and top layers of soil using typical hand tools. This type of surface disturbance can increase the potential for erosion and can alter water movement involving infiltration and runoff. The area of this type of impact is relatively minimal compared to the acreage of a typical burn unit. Furthermore, burn units are typically demarcated by already defensible controls such as roads, thus the length of hand line creation is further minimized.

The erosion hazard within the proposed project area is severe for 18,646 acres, moderate for 73,066 acres, and slight for 124,546 acres (see Table E-4). This represents 9%, 34%, and 57% of the project area, respectively. Nearly all the soils with a severe erosion hazard are in the scrub uplands, and 93% of the soils with a moderate erosion hazard are also in the scrub uplands. The desert grassland uplands contain 76% of the soils with a slight erosion hazard. Surface disturbances, such as from prescribed fire, would have the most impact in areas with severe and moderate erosion hazards.

The heat from a wildfire has the potential to sterilize soil, increase soil hydrophobicity, and inhibit vegetation growth. This typically occurs with high fuel loads, longer burn times, and limited soil-moisture availability (Neary et al. 2008). A study that included prescribed burning practices in the Santa Rita Experimental Range did not find any visible indications of impacts on soil minerals or soil hydrophobicity from the fire (Fields et al. 2011). Depending on the vegetation and seasonal timing of the prescribed fires, impacts on soils from excessive heat may occur in limited areas where fuels have accumulated under dense shrub or tree patches.

Regarding post-fire runoff, prescribed fire is expected to reduce vegetation cover and consume accumulated litter in the short term. The reduction in vegetation can allow for the more water to be stored in soil as transpiration is temporarily reduced (Fields et al. 2011). A study with burn plots in the Santa Rita Experimental Range and Empire-Cienega found more water can be stored in soil following a fire due to the absence of vegetation (Seyfried and Wilcox 2006). Also, Neary et al. (2008) indicate that prescribed fires with low-intensity burns typically do not alter watershed conditions enough to cause a significant increase in peak flows. A study in the Santa Rita Experimental Range found runoff and sediment delivery within the natural range of variability of the unburned plot after a controlled burn, concluding that rainfall variability was an essential component to determining erosion rates (Emmerich and Cox 1992). For proposed action areas with higher slopes than the noted study, a short-term decrease in vegetation cover could cause increases in rainfall-induced runoff and sediment delivery downstream.

Robinett (1994) studied how frequently fires can burn the major range sites at Fort Huachuca without long-term negative impacts on the soils or plant communities. The four range sites sampled included loamy upland, sandy loam upland, loamy hills, and granitic hills. All but loamy hills are in the Las Cienegas proposed action area. In loamy upland, the surface needs to be protected by grass or gravel, or both, to prevent accelerated erosion from fire. This is because the site naturally produces a lot of runoff. In sandy loam upland, there is little runoff and no signs of accelerated erosion from fire. In granitic hills, areas with thick tree cover typically do not have adequate grass cover to protect the soil from significant erosion following a fire. Table E-6 further characterizes the baseline erosion and runoff conditions for ecological sites. These conditions influence how surface disturbances, such as prescribed fire, would affect erosion and runoff.

Ash can settle on surface waters during active burning, be carried there by wind, and be transported by runoff. Excessive amounts of ash can increase the pH of surface waters and, along with sediment, increase turbidity (Neary et al. 2008). The degree to which water quality is degraded depends on multiple factors, including the extent and intensity of the fire, post-wildfire precipitation, watershed topography, and local ecology (USGS 2019).

**Herbicide**

The impacts from herbicide application as described in the proposed action to soil and water resources are described below. In essence the BLM relies on the analysis in the 2007 and 2016 BLM Herbicide PEIS and would use BMPs (Appendix B) to minimize and reduce impacts.

The BLM would follow the Record of Decision (ROD) for the Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (BLM 2007), which is incorporated here by reference. That ROD states the following regarding impacts on soil and water (page 4-7):

> None of the herbicides commonly used by the BLM appear to result in adverse impacts to soil. Of the herbicide active ingredients most often used by the BLM, picloram and tebuthiuron are persistent in soil for a year or more, while clopyralid, glyphosate, and 2,4-D are relatively non-persistent in soil. Potential effects to soil and soil organisms from these herbicide active ingredients and the new herbicide active ingredients appear to be minor. Several herbicide active ingredients have been identified as groundwater contaminants (e.g., 2,4-D, glyphosate, picloram, simazine). The BLM will adhere to herbicide product labels with regards to application restrictions associated with groundwater protection and will use other SOPs and mitigation measures to further reduce risks to groundwater. Effects to surface water would be minor, and herbicide concentrations in surface water should not exceed safe levels for human health. There is potential for herbicides to be transported in surface water and impact non-target vegetation and the BLM will use buffers to reduce or avoid this risk.

The BLM would follow the ROD for the Final Programmatic Environmental Impact Statement (PEIS) for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Lands in 17 Western States (BLM 2016a), which is incorporated here by reference. That ROD states (page 4-2):

> All three of the new herbicides, have relatively short half lives in soil, although aminopyralid can be persistent under certain site conditions and plant materials, and residues that have been treated with aminopyralid may continue to release the active ingredient into the soil until they have decomposed. Potential effects to soil and soil organisms from the three new herbicide active ingredients appear to be minor. Although not currently identified as groundwater contaminants, the three new herbicides have the potential to become groundwater contaminants. The BLM will adhere to herbicide product labels with regards to application restrictions associated with groundwater protection and will use other SOPs and mitigation measures to further reduce risks to groundwater. Fluroxypyr and rimsulfuron have a low risk of surface water runoff. Aminopyralid has a high risk of surface water runoff, but is of low toxicity to aquatic systems. The BLM will maintain suitable buffers between treatment areas and surface water bodies, dependent on herbicide- and site-specific criteria.

In Tebuthiron treatments of creosote in New Mexico, infiltration rates were higher immediately post treatment, this is speculated to be from higher litter amounts caused by vegetation defoliation (Perkins and McDaniel 2005). Aerial herbicide use can also remove all vegetation in a treated area. Reclaim (clopyralid) and Remedy (triclopyr) are moderately residual in soil, plants, and water sources. This requires precautions to prevent spray drift (Tiller et al. 2012a).

The proposed action includes a maximum of 15,503 acres per year of prescribed fire as maintenance treatments that would impact a maximum of 7% of the planning area annually. Similarly, the proposed action includes a maximum of 7,513 acres per year of prescribed fire as maintenance treatments that would impact a maximum of 3.5% of the planning area annually. The impacts to water quality from prescribed fire and herbicide treatments, as described above would occur both within and downstream of the project area.

### *Issue 2: How would the change in vegetation communities affect runoff and sediment yields?*

The proposed action would change the composition of vegetation communities in the proposed project area. As a result, the amount of water available as runoff would change. This is because runoff is affected by a variety of factors, including infiltration, the uptake of water by vegetation, the physical coverage of the soil surface by vegetation, and soil being held in place by vegetation. Grass, forb, or litter canopy can protect bare ground (soil) beneath them from the erosive impacts of raindrops (Gori and Schussman 2005). Both infiltration and resistance to flow are higher on grasslands than on shrublands. Where shrubland has replaced grassland during the past century, the ground surface has become more exposed to raindrop impact and overland flow has increased in volume and velocity. Increased runoff and erosion in inter-rill areas occur because of decreased resistance to overland flow and decreased run-on infiltration (Abrahams et al. 1995). These changes have resulted in accelerated erosion in the form of rill development, widespread stripping of the topsoil, and the formation of desert pavement in inter-shrub areas (Abrahams et al. 1994; Abrahams et al. 1995). Landscape restoration actions would restore vegetation conditions that reduce runoff and sediment transport.

According to Weltz et al. (2014), for many arid and semiarid western rangeland soils, the sustainable soil loss rate is estimated to be less than or equal to 2.2 tons per hectare per year due to their shallow depth, low organic matter content, and the slow rate of soil formation in erratic and dry climates. Weltz et al. (2014) propose that soil loss rates of 2.2 to 4.5 tons per hectare per year put the long-term sustainability of these rangelands at risk and that soil loss rates of greater than 4.5 tons per hectare per year be considered unsustainable. The ecological sites found in both Hernandez et al. (2013) and Table E-6 cover approximately 78% of the proposed action area. Of the ecological sites not found in Hernandez et al. (2013), the loamy bottom sites have both the most area and potential for erosion in the proposed action area based on Table E-6. Maintaining grass coverage and preventing sites from entering eroded states would maintain these levels of sediment yield. Where possible, it would also maintain sites in their reference state (Williams et al. 2016). Treatments that result in Lehmann lovegrass (*Eragrostis lehmanniana* Nees) expansion may have increased sediment yields compared to a reference state with native bunchgrasses (Polyakov et al. 2010).

Average annual soil erosion rates and their variabilities for ecological sites are identified in Figure 8 in Hernandez et al. (2013), which is incorporated here by reference. It relies on the rangeland hydrology and erosion model using Natural Resources Conservation Service National Resources Inventory data. The clayey slopes 12- to 16-inch precipitation zone ecological site has the highest erosion rate within the first and third quartile, but it is not in the proposed action area. Except for this ecological site, all the ecological sites within the first and third quartile in Hernandez et al. (2013) have erosion rates less than 2.2 tons per hectare per year. Sites with clay are more susceptible to soil erosion because of their fine soil texture, while upland gravelly loam sites have considerable rock fragments that reduce erosion potential (see Table E-6).

The proposed action would change the composition of vegetation communities in the proposed project area. This would affect water supplies because different plants use different amounts and sources of water. Vegetation in the uplands do not have access to groundwater. Evapotranspiration is, therefore,

limited by precipitation and not vegetation. In the uplands, vegetation treatments such as mesquite removal would not increase water supplies. This is because of the high potential evapotranspiration[2] rate; however, mesquite removal in the lowlands could increase streamflow.

Vegetation in the lowlands has access to shallow groundwater and, therefore, potential evapotranspiration rates are dependent on vegetation type and not precipitation. Grassland relies primarily on recent precipitation (Scott et al. 2000). This is because herbaceous vegetation has a shallower effective rooting depth. As a result, the amount of soil water potentially available for transpiration is reduced and more is available for deep drainage (Seyfried and Wilcox 2006) and subsequent use by mesquite. Mesquite obtains water from deeper in the soil profile (Scott et al. 2000). Streamflow is expected to decline as a result of woody plant encroachment in landscapes dominated by subsurface flow regimes. Encroachment of woody plants can be expected to produce an increase in the fractional contribution of bare soil evaporation to evapotranspiration in semiarid ecosystems (Huxman et al. 2005). The replacing of mesquite with grass can result in an increase in water supplies due to changes in evapotranspiration rates (Leenhouts et al. 2006).

### *Issue 3: What are the impacts of mechanized equipment, both those with tracks and with rubber tires, on soils, particularly in loamy bottom ecological sites?*

Mechanized equipment can involve the use of either tracks or rubber tires. These forms of locomotion affect soils differently. Their use would vary based on site conditions and the type of work being performed.

Vegetation treatments that use ground-disturbing equipment create impacts on soil resources by displacing vegetation and decreasing vegetation ground cover, causing compaction and displacement of soil due to vehicle tracks and uprooting of trees and shrubs. Soil compaction decreases total pore space, water infiltration rates, and gas exchange, all of which are important for healthy functioning soil. This leads to a reduction in soil productivity and an increase in ponding and runoff rates and the associated soil erosion by water. Vegetation treatments using rubber-tired vehicles and tracked vehicles compact soils differently. Tracked vehicles may compact the soil to a higher degree but would compact less area. This is because tracked vehicles can pull or push a tree over from a single position. Rubber-tired vehicles are lighter and compact the soil less, but they lack power and require multiple approaches from various sides to pull or push a tree over, thereby compacting soil in a greater area. Low ground pressure tires and tracks would be used on heavy equipment to lower or eliminate compaction risk.

Due to slope and soil conditions, the runoff-generating process in the uplands of the semiarid basins is dominated by infiltration excess[3] (rather than saturation excess). Compaction in the uplands can further reduce the infiltration capacity and cause more runoff per precipitation event. Tiller et al. (2012b) found that ground surfaces at grubbed sites had 12.3% and 5.3% soil disturbance. In the lowlands, the fine soils with their high silt and clay content and greater water-holding capacity are more vulnerable to erosion and soil compaction, making some ground-disturbing mechanical treatments unsuitable (Tiller et al. 2012a). Vehicle use in the lowlands would have a greater impact on compacting soil than in the uplands.

It is important to note that only select areas would be treated using mechanical grubbing. Mechanical grubbing is effective at reducing mesquite cover and lowering rates of resprouting, but it creates brush piles and soil disturbance in rough proportion to the amount of original mesquite cover on a site (Tiller et al. 2012b). In the short term, mechanical grubbing (particularly involving large root ball removal) would disturb the soil profile and infiltration rates, leading to increased runoff rates and soil erosion. These impacts would lessen as grasses become established and the site approaches reference conditions. Site characteristics, such as slope, would influence the use of mechanical grubbing.

Desert soil surfaces are generally covered with biological soil crusts that are vital in creating and maintaining soil fertility in desert soils (Belnap 2003). Soil crusts are fragile and have relatively slow recovery times. The main threats to crust integrity include heavy livestock grazing, high-severity fires, and

[2] The amount of evaporation that would occur if a sufficient water source were available.
[3] Ponding and runoff occur when precipitation exceeds the infiltration capacity of the soil.

mechanical disturbance such as off-road vehicle traffic, especially when occurring during or followed by a dry period (Forest Service 2017). Grazing has limited the presence of biological soil crusts in the proposed action area. Vehicle traffic compacts biological soil crusts. Compaction influences soil water and nutrient-holding capacity. Surface disturbance also decreases water infiltration and increases runoff (Belnap et al. 2001).

### Cumulative Impacts

The five watersheds overlapping the proposed action area (Table E-5) are the geographic scope of the analysis area for cumulative impacts. Past, present, and future actions are described above under Section 3.1.2: Impacts from the No Action Alternative.

Past, present, and future actions have affected and would affect soil and water resources by removing vegetation, altering the composition of vegetation, disturbing the soil surface, and reintroducing beaver that alters water flow and sources. In addition, changing conditions such as increases in temperature and shifts in precipitation patterns that support vegetation health and spread would also affect soil and water resources. Over the long term, the proposed action would restore vegetation communities and would not degrade landscape conditions. The proposed action would have countervailing cumulative impacts on soil and water resources because it would reduce the impacts from past, present, and future actions by restoring the landscape over the long term.

## 3.2 Vegetation

- Issue 1: How would the proposed vegetation treatments and erosion control projects affect upland, riparian, and cienega vegetation communities across different timescales?
- Issue 2: What would be the impact of the proposed vegetation treatments on nontarget native vegetation?
- Issue 3: How would the proposed treatments increase the spread of Lehmann lovegrass?
- Issue 4: How would the proposed treatments affect wetland plant communities and the Huachuca water umbel?

### *3.2.1 Affected Environment*

The planning area supports a variety of plant communities, many of which have been altered from their historical extent and composition due to human development, historic overgrazing, changes in climate, and other impacts. Within the planning area, there are 33 different ecological sites spanning three precipitation zones, in addition, the planning area includes five of the rarest vegetation communities in the desert Southwest: semidesert grasslands, sacaton riparian grasslands, cienegas, mesquite bosques, and cottonwood-willow riparian communities (BLM 2003; NRCS 2019). Table E-1 and Figure 4 provide an overview of major vegetation types in the project area. National Resources Conservation Services ecological sites describe the potential vegetation, and a full description of each ecological site is available on the National Resources Conservation Services website (NRCS 2019). The ecological sites have been broadly grouped into four vegetation types to facilitate vegetation management: 1) deciduous riparian; 2) desert grassland uplands; 3) loamy bottoms; and 4) scrub uplands (Table E-1). In addition, wetland/cienega vegetation community has been mapped on 38 acres of the project area (Table E-7).

### Existing Vegetation Condition

#### *Scrub Uplands*

This vegetation community often occurs as invasive upland shrublands, with mesquite (*Prosopis* spp.) and other deep-rooted shrubs, such as whitethorn acacia and creosote, able to exploit deep-soil moisture that is unavailable to grasses and cacti. Vegetation is typically dominated by velvet mesquite, whitethorn acacia, and succulents. Grass cover is typically low and composed of desert grasses such as false fluffgrass (*Dasyochloa pulchella*), Porter's muhly (*Muhlenbergia porteri*), and tobosa grass (*Pleuraphis mutica*).

### *Desert Grassland Uplands*

Common grass species of the semidesert grasslands include tobosa (*Pleuraphis mutica*), three-awn (*Aristida purpurea*), muhlys (*Muhlenbergia* spp.), and gramas (*Bouteloua* spp.). Shrubs include velvet mesquite (*Prosopis velutina*), acacias (*Acacia* spp.), mimosa (*Mimosa* spp.), and creosote bush (*Larrea tridentata*) (Arizona Important Bird Areas Program 2018). This vegetation community provides important habitat for many species, such as pronghorn, serves as a habitat corridor linking adjacent mountain ranges, and is maintained by natural processes such as fire (Gori and Enquist 2003).

Native semidesert grasslands are rare in the region, covering only 15% of the areas where such communities once occurred. The composition and structure of semidesert grasslands have been altered in many areas due to shrub encroachment, loss of perennial grass cover, and nonnative species spread, such as Lehmann lovegrass. Most shrub-invaded grasslands with the potential for restoration are located on public land, providing a substantial opportunity to improve conditions on BLM-administered lands (Gori and Enquist 2003). During the last century, the area occupied by this system has decreased through conversion of desert grasslands to shrublands as a result of drought, overgrazing and honey mesquite seed dispersion by livestock, and/or decreases in fire frequency (NatureServe 2019).

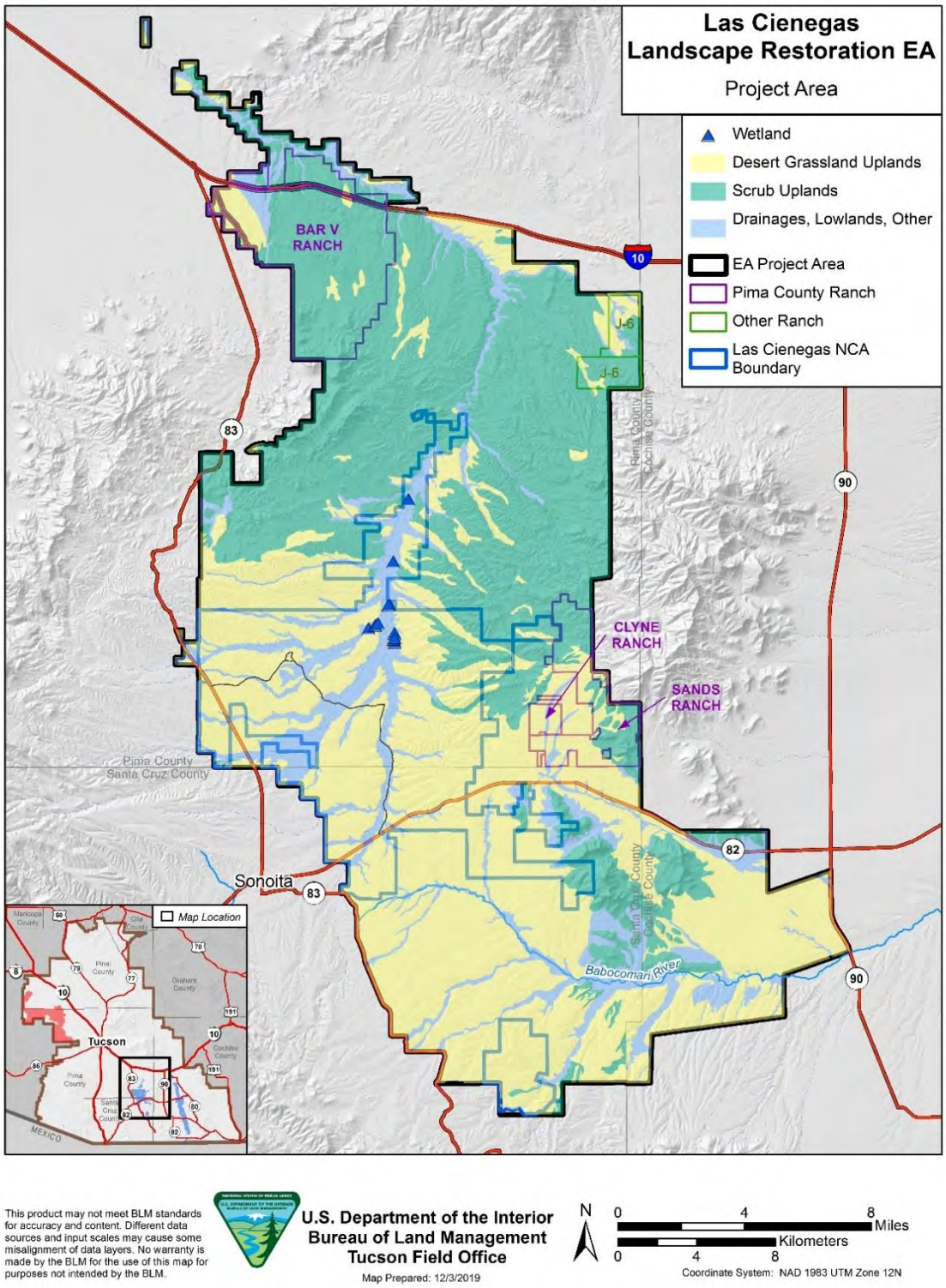


**Figure 4. Vegetation types in the planning area.**

## *Drainages, Lowlands, and Other Vegetation Communities*

Cienegas are characterized by permanently saturated, highly organic, reducing soils and vegetation communities dominated by low-statured herbaceous hydrophytes (water-loving plants), with occasional patches of trees. In shallow water, typical species include those of the *Carex*, *Juncus*, and *Schoenoplectus* genera. Dense stands of sedges and charophytes fill shallow, braided channels between pools, while deeper, narrow, vertical-walled channels may be heavily vegetated with *Rorippa nasturtium-aquaticum, Ludwigia natans,* and other macrophytes. In adjacent deeper waters, vegetation is limited to low, shallow-rooted, semiaquatic sedges such as *Eleocharis* spp., *Juncus* spp., *Carex* spp., a few grasses, and more rarely, cattails (*Typha* spp.). Forbs include watercress (*Rorippa nasturtium-aquaticum*), whorled pennywort (*Hydrocotyle verticillata*), and creeping primrose-willow (*Ludwigia repens*), which can be rooted in patches of gravel below the organic root zone in pool bottoms. Few trees and shrubs may be present but may include Goodding's willow (*Salix gooddingii*), Fremont cottonwood (*Populus fremontii*), Arizona ash (*Fraxinus velutina*), and buttonbush (*Cephalanthus occidentalis*). Trees are scarce, limited to Goodding's willow (*Salix gooddingii*), coyote willow (*Salix exigua*), and swamp willow (*Salix lasiolepis*), which can tolerate saturated soils (NatureServe 2018).

Cienegas are perpetuated by permanent, scarcely fluctuating sources of water, yet are rarely subject to harsh winter conditions. They are close enough to headwaters that the probability of scouring from flood is minimal. The system is controlled by a permanently saturated condition, which precludes colonization by any but specialized organisms. Soils contain thick deposits of organic sediments. Pools often have vertical walls of organic sediments and undercuts below root systems. Submerged macrophytes are commonly rooted in local, gravelly substrates.

The channel passing through cienega stream segments tend to be broad and indistinct with centrally located trench pools. A state and transition model for sites that have cienega wetland expression versus lotic riparian was developed specific to the Las Cienegas NCA in 2008 (see Bodner and Simms 2008). Drivers that lead to and maintain cienega habitat include fire, beaver activity, and site stability that prevents channel incision. Without suppression of trees (e.g., Goodding's willow), cienegas can revert to wooded swamp. Open water and plant diversity are maintained by disturbance in the form of flooding in Cienega Creek, and fire or grazing in cienegas situated within loamy bottom grasslands on floodplains.

Locations of cienegas were inventoried by Salywon and Tiller (DBG 2016). Four cienegas were restored in 2013 and vegetation established. Open water in cienegas with a perennial groundwater source have been identified. Reestablishing and/or maintaining this characteristic which supports federally listed plants, fish, amphibians, and aquatic reptiles is key to their conservation. Cienega habitat is highly variable as to its composition of dense marshland and open water and is usually encountered as a gradient.

Immediate surroundings of cienegas often are rendered saline through capillarity and evapotranspiration. As such, halophytes such as salt grass (*Distichlis spicata*), yerba mansa (*Anemopsis californica*), and numerous species of Chenopodiaceae and Compositae live along the salt-rich borders of these riparian marshlands. Extensive stands of sacaton (*Sporobolus airoides*) also are common on adjacent flatlands. Upslope, and where soil aeration and salinities allow, broad-leaved lotic woodlands often develop. Typical riparian species of the region (such as seep willow [*Baccharis salicifolia*], Fremont cottonwood [*Populus fremontii*], Arizona sycamore [*Platanus wrightii*], Arizona ash [*Fraxinus pennsylvanicus* var. *velutina*], and walnut [*Juglans major*]) border such saturated areas, replaced in more xeric places by mesquite (*Prosopis velutina* and *P. glandulosa*) (Hendrickson and Minckley 1984).

Sacaton riparian grasslands are dominated by big sacaton (*Sporobolus wrightii*) and historically occupied millions of acres in the desert Southwest. While these grasslands now occupy less than 5% of their original distribution, the upper Cienega Creek watershed is known to harbor extensive stands of big sacaton habitat (Tiller et al. 2012b). Causes of decline include historical downcutting of rivers and consequent reductions in the overbank flow, dropping water tables from groundwater and stream diversion, sheet erosion, overgrazing, and shrub encroachment (Tiller et al. 2012b).

Mesquite bosque vegetation communities occur along riparian corridors along perennial and intermittent streams in the desert Southwest. Dominant trees include mesquites (*Prosopis* spp.), such as velvet mesquite. Shrub dominants include seep willow (*Baccharis salicifolia*), net-leaf hackberry (*Celtis reticulata*), and velvet ash (*Fraxinus velutina*). Woody vegetation is relatively dense, especially when compared with drier washes. Groundwater is essential to this community, and mesquites especially are dependent on the annual rise in the water table for growth and reproduction (NatureServe 2019).

Broad-leaved deciduous riparian communities occur along stream channels. The species composition may vary but include Fremont cottonwood, Goodding's willow (*Salix gooddingii*), net-leaf hackberry (*Celtis reticulata*), velvet ash (*Fraxinus velutina*), false indigo (*Amorpha fruiticosa*), Mexican elderberry (*Sambucus caerulea var mexicana*), Arizona black walnut (*Juglans major*), and yew willow (*Salix taxifolia*). Bordering broadleaf deciduous tree communities in more xeric places on upper banks or floodplains are sacaton grasslands and mesquite bosques. Tree diversity is low, but age class and structural diversity are high. Surface and subsurface hydrology are essential to this community, and groundwater pumping, damming, and diversions have been cited as threats (Stromberg 1993).

## Historical Vegetation Conditions

A variety of anthropogenic and naturally occurring factors have altered historical vegetation communities in the planning area. A history of overgrazing, fire suppression, non-native plant infestations, and drought have contributed to a decrease in desired plant cover and an increase in invasive plant cover. More specifically, the encroachment of velvet mesquite and introduction of Lehmann lovegrass have acted to shift the extent and composition of historical climax communities away from desired future conditions as defined in the Las Cienegas RMP (BLM 2003; Petrakis et al. 2019; Tiller et al. 2012b).

Pantano Wash (Spanish for swamp) and its largest tributary, Cienega Creek, was likely the most extensive cienega system in the Rillito basin. Only small remnants persist today (Hendrickson and Minckley 1984). These remnants are located both on the Pima County Cienega Creek Natural Preserve and Las Cienegas NCA. Cienega Creek itself probably took its name from Ciénega de Los Pimas. In historic time, the area had been described as having abundant springs, which furnished a large volume of water, abundant grass, and a valley "quite boggy in the middle," a succession of meadows thickly covered with sacaton and salt grass where mesquite grew only in gulches (Hendrickson and Minckley 1984). In Arizona and New Mexico there are approximately 127 cienegas. Fewer than half (44%) of known ciénegas in Arizona are functional or restorable, while 56% have no potential for restoration or are dead from a lack of groundwater (Minckley and Brunelle 2007). The degradation of cienega wetlands resulted from activities associated with purposeful draining and channelization to reduce the threat of malaria or for agriculture, the removal of beaver from regional streams, development of wagon trails and train tracks, extensive wood cutting for homes and mines, intensive grazing on watersheds and within riparian zones and wetlands that led to down-cutting of river channels with cienegas (Hastings and Turner 1965, Dobyns 1981, Bahre 1992, Minckley et al. 2013). Factors that reduce stream flow and surface water needed to maintain cienega vegetation in southern Arizona include groundwater overdraft and climate change with some additional loss from changes in the vegetation community (Leenhouts et al. 2006). These factors are at play in the Cienega Creek basin (PAG 2014). Over the past 130 years, an estimated one-third of historical grassland in the region in and surrounding the Las Cienegas NCA have been lost to shrub conversion, and half of what remains is shrub-encroached (BLM 2010; van Leeuwen et al. 2012). Previous vegetation treatments covering approximately 19,500 acres have occurred in the planning area, and monitoring within the Cienega Creek watershed has shown a decrease in shrub cover as a result of previous vegetation treatments (Cienega Watershed Partnership 2018). The historical condition of Cienega Creek is described in depth in Hendrickson and Minckley (1984).

Since 2007, the BLM has been using a suite of vegetation treatments with an adaptive management framework to assess the effectiveness of vegetation treatments at reducing mesquite cover in the planning area, while evaluating the overall response of grassland vegetation and soil substrates (van Leeuwen et al. 2012; Tiller et al. 2012a). Within the Las Cienegas NCA, mechanical treatments (mastication and grubbing), chemical treatments (stump and foliar spray), and prescribed fire have been used alone and in combination to reduce the cover of mesquite, bulrush, and cattails on approximately 19,500 acres through 2022 (BLM GIS 2022). The most effective vegetation treatments in the Las

Cienegas NCA were found to be grubbing (removing mesquite by the roots with a backhoe), masticating, and hand cutting and spraying (BLM 2018). Prescribed fire provides variable levels of mesquite reduction and had been the least effective vegetation treatment for mesquite reduction (Tiller et al. 2012a).

Some isolated cienegas have been restored and vegetation treated to maintain open water. Treatment methods include hand cutting and employing a weed eater designed specifically for aquatic applications to remove invasive species that choke open water (for example, bulrush, cattail, and riparian trees). These methods have resulted in the desired maintenance of open water and a diverse wetland plant community. In one case, authorized livestock were used in a targeted livestock grazing treatment to arrest the spread of Johnson grass in a wetland area undergoing vegetation conversion to the invasive plant.[4]

Along with mesquite, Lehmann lovegrass is an important invasive plant species; at least 358,300 acres of semidesert grassland in southern Arizona have been invaded since its introduction in 1932 (Anable et al. 1992). Monitoring within the Las Cienegas NCA has shown a significant increase in the spread of Lehmann lovegrass, particularly in the sandy loam ecological sites (Gori and Schussman 2005).

Coupled with plant invasions, wildfire is a significant source of vegetation disturbance in the planning area. Wildfire in the Cienega Creek watershed has increased dramatically, and approximately 50,000 acres burned in 2017, which is more than in all fires in the preceding decade (Cienega Watershed Partnership 2018). Wildfire also contributes to the spread of Lehmann lovegrass, which responds to severe fire by increasing dominance in mixed stands (Uchytil 1992). In contrast, fire suppression has allowed wetlands to develop thick, impenetrable stands of bulrush and cattail where cattle grazing has ceased.

Soil erosion from historical land use practices has affected vegetation communities within riparian areas, particularly sacaton grasslands, cottonwood-willow riparian areas, and mesquite bosques. Due in part to the reduction of perennial grass cover and the spread of wood plant species, soil erosion has been increasing, which has increased impacts on riparian vegetation. Soil erosion within streambeds creates incised channels that limit the spread of water; consequently, water available from recharge associated with flood events that augment base flow and raise groundwater elevations to adjacent vegetation communities is reduced. The southern bottomlands (areas below 4,600 feet) are particularly prone to soil erosion due to low plant or litter cover, or both, and past soil erosion projects have occurred primarily in these areas (Gori and Schussman 2005; Tiller et al. 2012a).

Within the Cienega Creek Valley, much of the watershed is in good to very good condition with respect to soil cover, grass density, and litter. Many of the dry washes that are tributaries to Cienega Creek are in exceptionally good condition while others are in very poor condition. Areas affected by accelerated erosion include Pump Canyon, Wood Canyon, drying segments of Cienega Creek, and moonscapes on terraces next to Cienega Creek.[5]

### *3.2.2 Impacts from the No Action Alternative*

## Direct and Indirect Impacts

Under the no action alternative, there would be no expanded methods used to treat and maintain tree- and shrub-invaded upland areas, or to maintain sacaton grasslands, mesquite bosques, wetlands, riparian areas, and areas invaded with noxious species so that those areas meet the vegetation and watershed objectives described in the Las Cienegas RMP and listed in Appendix A. Vegetation communities would continue to trend away from reference conditions. Erosion control projects would not be constructed, and soil erosion would continue to limit water availability to riparian vegetation communities and further contribute to movement away from reference conditions. Wetlands would also continue to fill with detritus from large quantities of bulrush and cattails that invade and choke open water over time.

[4] Jeff Simms, BLM, personal communication.
[5] Jeff Simms, BLM, personal communication.

## Cumulative Impacts

The five watersheds overlapping the proposed action area (Table E-5) are the geographic scope of the analysis area for cumulative impacts; however, some of the cumulative impacts go beyond the watershed for cienega ecosystems and vegetation with regional implications.

Since cienega vegetative communities are greatly influenced by soil and water resources, see cumulative impacts under Soil and Water Resources, Sections 3.1.2 and 3.1.3. Vegetation and wetland restoration treatments have been implemented in the watershed, including seven erosion control and restoration projects completed between 1994 and 2015 on Pima County land in the Cienega Creek Natural Preserve as well as the approximately 19,500 acres of vegetation on the NCA since 2004. In addition, wildfires, current and historical livestock grazing, mining, railroads, and unpermitted woodcutting have contributed to altered vegetation communities. The Rosemont Copper Mine occurs within the vicinity of the project area and groundwater drawdown associated with mining activities would have the potential to permanently reduce the extent of riparian vegetation communities. Vegetation disturbance for restoration purposes has moved and would continue to move vegetation communities toward reference conditions. Should beaver be reintroduced into the Las Cienegas NCA, they would alter hydrology in riparian areas, resulting in increased water availability for vegetation and potentially expanding the extent of riparian vegetation communities.

Surface-disturbing activities, such as mining and unpermitted woodcutting, would be expected to contribute to moving existing vegetation communities away from reference conditions and increasing the cover of invasive plant communities, including the cover of invasive woody plants, such as mesquite, and herbaceous species, such as Lehmann lovegrass. A variety of impacts are associated with livestock grazing, depending on grazing intensity, which could prevent achieving desired conditions. For instance, grazing can spread Lehmann lovegrass or overgrazing could exacerbate impacts on vegetation. The continued suppression of fire and lack of vegetation thinning of cienegas would allow wetland vegetation to continue through ecological succession to a state where no open water may be present and the wetland may eventually fill in without disturbance from floods.

Cumulative impacts would also be expected from climate change. Climate change is expected to increase annual temperatures while decreasing winter precipitation and increasing the intensity of precipitation events (Garfin et al. 2013). Disturbances from climate change coupled with anthropogenic surface disturbance events, such as groundwater pumping, would contribute to shifting vegetation communities away from desired conditions.

### *3.2.3 Impacts from the Proposed Action*

## Direct and Indirect Impacts

### *Issue 1: How would the proposed vegetation treatments and erosion control projects affect upland and riparian vegetation communities across different timescales?*

Under the proposed action, the composition and cover of the existing vegetation community would be shifted toward the vegetation and watershed objectives described in the Las Cienegas RMP. Long-term (greater than 5 years) impacts of the proposed action would lead to vegetation communities that would support a reduced cover of woody plant species and an increased cover of perennial grass species. The increased grass cover would also lead to a decrease in bare ground.

Cienegas would be restored and maintained to a balance of open water and vegetation with a diverse plant community, including special status plants. Habitat suitability for aquatic species (such as plants, invertebrates, fish, and frogs) would improve in wetland environments. The replacement of native herbaceous vegetation by invasives such as Johnson grass or big leaf periwinkle (*Vinca major*) in wetlands and riparian areas would be arrested or reduced in key locations.

Erosion control and stream restoration treatments would increase areas available for establishment of the desired vegetation community over the long term by preventing headcuts, reducing stream grades, increasing floodplain connectivity, and capturing sediment.

Table E-2 shows the acres of each vegetation type that each erosion control and stream restoration treatment would potentially affect. The precise location, extent, and methods of treatments are not fully defined at the planning-level phase. Thus, a precise quantification of potential impacts is not feasible and impacts on vegetation are described primarily qualitatively. A quantitative analysis is provided where there is information of where treatments or projects would likely occur under the proposed action.

Currently proposed erosion control and stream restoration projects would improve approximately 864 acres of vegetation including 36 acres of riparian habitat as shown in Table E-2.

The proposed action includes a maximum of 1,394 acres per year of erosion control treatments (Table 8) that would impact less than 1% of the planning area annually. The impacts to vegetation from prescribed fire and herbicide treatments, as described above would occur across that area.

### *Issue 2: What would be the impact of the proposed vegetation treatments on non-target native vegetation?*

Broadcast application of tebuthiuron could have herbicidal effects to non-target native upland plant species within a treatment unit. Potential impacts to non-target plants include mortality, reduced productivity, and abnormal growth (BLM 2007, 4-47). For example, when applied at rates of 1.8 and 3.6 lb a.i./acre (2 and 4 kg a.i./ha) to treat juniper in sagebrush-bunchgrass community in Oregon, tebuthiuron appeared to damage non-target forbs and perennial grasses (Britton and Sneva 1981). However, that application rate is over five times more than what is proposed in this EA. Gibbens et al. 1987 found decreases in native perennial forb density but increases in native annual forb density after a treatment of 0.36 lb a.i./acre (0.4 kg a.i./ha) of tebuthiuron pellets.

Broadcast tebuthiuron treatments could impact offsite non-target native plants through drift, runoff, or accidental spills (BLM 2007, 4-47), including riparian vegetation where broadcast tebuthiuron treatment is not proposed. Broadcast tebuthiuron treatments would use solid pelletized product, which has less risk of drift compared to liquid herbicide. Risk to off-site plants from surface runoff is influenced by precipitation rate, soil type, and application area (BLM 2007, 4-55). The fall through early spring application timing mitigates the risk of runoff because winter storms in the region are frontal and gentle in nature, producing less runoff than monsoon storms. In addition, application buffers, BMPs (Appendix B), BLM herbicide handling guidelines, and low application rates proposed in this EA (maximum application rate of Spike® 20P in areas with less than 20 inches of precipitation is 5 lb a.i./acre verses less than 0.5 lb a.i./acre proposed in this EA) would greatly reduce the risk of impacts to offsite non-target native plants. Finally, actual treatment unit development (Section 2.1.1) would consider site-specific characteristics and mitigation measures to reduce or eliminate impacts to non-target vegetation from broadcast application of tebuthiuron.

Herbicide spot treatments would have little to no impacts to non-target native vegetation because only the target species would be treated with herbicide. There is risk of overspray getting on non-target vegetation next to the target species. However, this would be mitigated by proper handling of herbicides and measures to reduce drift such as, not spraying during high winds, lowering spray nozzle closer to target species, and use of proper nozzle.

Prescribed fire would directly remove all vegetation by burning. Vegetation communities in the planning area are adapted to fire and over time vegetation would recover. Pre-settlement fire frequency of semidesert grassland in southeastern Arizona could have been around 4-9 years (Kaib et al. 1996). Ahlstrand 1982, found that perennial grasses in Chihuahuan desertscrub took 6-7 years to increase in cover and fully recover after burning, and hypothesizes that burning every 10-15 years would maintain reduced shrub cover in this community. Upland plant communities may experience a decrease in perennial grass cover and an increase in forb cover for several years after burning as perennial grasses recover (Kaib et al. 1996, Ladwig et al. 2014) with potential for a long-term negative impact on black

gramma grass (Killgore et al. 2009, Ladwig et al 2014). Though upland vegetation communities would incur short-term (1-6 years) impacts of vegetation loss, perennial grasses would only experience top kill and resprout from the root crown (Ahlstrand 1982, Kaib et al. 1996, Killgore et al. 2009, Ladwig et al 2014). In addition, the required minimum two years of deferred grazing in prescribed burn units would aid in native perennial grass regeneration.

Erosion control and stream restoration treatments would aid in seeding treatment success and reduce soil erosion by trapping water and sediment. Impacts to non-target vegetation include crushing, trampling, or direct removal of plants due to temporary access routes and use of heavy equipment. However, these effects would occur once, be short-lived, and be mitigated by BMPs (Appendix B) and post-treatment remediation (i.e., mulching, reseeding) described in the Proposed Action.

Targeted grazing in wetlands could impact non-target native plants through trampling and direct consumption by livestock. Careful planning of targeted livestock treatments would mitigate adverse impact to non-target native vegetation, as cattle would be promptly removed after treatment objectives are achieved. Temporary or permanent fencing would control the extent of grazing on non-target plants and rare plants such as, Huachuca water umbel, Arizona eryngo, and Canelo Hills ladies' tresses, would be excluded from any target grazing treatments.

While most of the vegetation within the project area would be available for treatment (Table 3), the actual acres of each restoration treatment would be much smaller and would occur over several days to weeks (see Section 2.1.6). As such, impacts on non-target native vegetation would be limited. Further, incorporating best management practices (Appendix B) would minimize or avoid adverse impacts on vegetation. These measures would minimize adverse effects by minimizing surface disturbance, especially in sensitive areas; mitigating herbicidal effects to non-target plants; preventing invasive plant introduction during treatments; and monitoring and treating invasive plants following treatments.

### *Issue 3: How would the proposed treatments increase the spread of Lehmann lovegrass?*

Monitoring data has shown that Lehmann lovegrass exists in many places throughout the project area. Given the difficulty in eradicating this species, restoration treatments would not likely decrease the cover of Lehmann lovegrass over the long term. There may be some potential to increase the spread of Lehmann lovegrass in the short term due to surface disturbance from mechanical treatments and prescribed fire. Erosion control treatments would result in short-term impacts, including vegetation disturbance from the harvesting of rock and operation of heavy equipment, increasing the potential for Lehmann lovegrass to spread.

While most of the vegetation within the project area would be available for treatment (Table 3), the actual acres of each restoration treatment would be much smaller and would occur over several days to weeks. As such, the likelihood to increase the spread of Lehmann lovegrass would be limited. While Lehmann lovegrass would not likely decrease, this would be offset by the long-term improvements in vegetation communities resulting from the restoration treatments. Further, BMPs (listed below in Issue 4) would minimize adverse effects.

### *Issue 4: How would the proposed treatments affect wetland plant communities and the Huachuca water umbel?*

Proposed treatments would restore and maintain cienegas (see Vegetation Issue 1). Further, treatments would improve habitat suitability for aquatic species, including aquatic plants such as the Huachuca water umbel. The Huachuca water umbel in particular is threatened by aquatic habitat degradation and competition with nonnative, invasive species (USFWS 2017). Proposed wetland vegetation treatments would improve vegetation composition and wetland function and reduce the threats to this species once treatment objectives are met.

While most wetlands within the project area would be available for treatment (Table 3), the actual acres of each restoration treatment would be much smaller and would occur over several days to weeks. As such,

the short-term degradation of wetland habitats during treatments through, for example, vegetation removal or surface disturbance would be limited. All proposed treatments that may affect the Huachuca water umbel have conservation actions that would minimize the effects on the species and may actually benefit the umbel and its habitat; therefore, the proposed action would only have localized and short-term adverse effects to the species.

Best management practices that would minimize adverse effects or surface disturbance are listed below.

- **(Vegetation) VG-03** Weed-free straw and mulch may be utilized during rehabilitation and other activities (e.g., revegetation, soil stabilization, and erosion control).
- **VG-05** Reseed or plant (disturbed areas and/or treatment areas), where appropriate, with desirable vegetation when the native plant community cannot recover and occupy the site sufficiently.
- **VG-06** When reseeding, native or sterile species for revegetation and restoration projects will be used to compete with invasive species until desired vegetation establishes.
- **(Noxious Weeds) NW-01** All equipment (e.g., contractor- and BLM-owned) utilized during and for treatments will be cleaned to remove dirt and debris to minimize the potential of transporting noxious weed seeds or plant parts, prior to arriving on-site for treatment implementation.
- **(Herbicide Treatment) HT-05** Herbicides utilized will take into account target vegetation, sensitive plant and animal species, as well as sensitive land features, such as water sources and soil characteristics.
- **HT-06** All herbicide applications will follow the stipulations outlined in the 2007 and 2016 update to the Western Vegetation PEIS (BLM 2007, 2016a) and associated Records of Decision.
- **(Soils) SO-01** Minimize or exclude herbicide treatments that have high mobility and in areas where herbicide runoff is likely, such as during periods of intense rainfall, saturated and impermeable soils, on steep slopes, and paved surfaces.
- **SO-02** Granular herbicides will not be applied on slopes of more than 15% where there is the potential of runoff carrying granules into nontarget areas.
- **SO-03** Equipment (e.g., heavy equipment, vehicles, and utility terrain vehicles) will not be used when soils are seasonally saturated or following heavy precipitation to minimize soil disturbance (e.g., rutting and compaction).
- **SO-04** Soil characteristics and topography will be considered in vegetation treatment development to reduce the potential of soil erosion.
- **(Temporary Access) TA-03** No new permanent roads will be established; all access routes to vegetation treatment units that develop two tracks may be signed with administrative access only during project implementation. (This may reduce the spread of invasive species.)
- **TA-05** Upon completion of the vegetation treatment, all temporary access routes will be evaluated for rehabilitation and closed to further traffic.
- **GM-02** Following a vegetation treatment, cattle would be excluded from the treatment unit for a minimum of two growing seasons (July-December) or until resource conditions are met as outlined in this EA and the Las Cienegas RMP to allow for perennial grasses to grow and drop seed before cattle enter the unit. Post-treatment monitoring will assist in determining the timing of the reintroduction of deferred livestock. Reintroduction timing will be based on favorable vegetation regrowth rather than on a predetermined duration.

#### 3.2.3.1 Cumulative Impacts

Cumulative impacts on vegetation under the proposed action would be similar to those described under the no action alternative, but restoration actions would have an increased capability to return vegetation communities to reference conditions. Density, composition, and structure of cienegas would create a balance of open water and diversity of plant community, including special status plant species. Habitat suitability for aquatic species (such as invertebrates, fish, and frogs) would improve in wetland environments. The replacement of herbaceous marsh vegetation in cienegas and understory vegetation in riparian areas would likely be arrested or reduced in key locations.

Under the proposed action, vegetation management would contribute to the integrity of upland areas and the reduction of target woody and herbaceous species, and it would maintain or increase the amount of

vegetation suitable for wildlife habitat. Erosion impacts would also be reduced, resulting in an increase in available water to riparian vegetation. Cumulative impacts from climate change would be the same as those under the no action alternative.

Wetlands on a regional scale (Arizona and New Mexico) would benefit from the cumulative beneficial effects to the maintenance or improvement of ecological integrity and function in the Cienega Creek basin and allow for the continued and future recovery of federally listed wetland plants. Together with other ongoing and planned restoration efforts in the basin and the region, along with those recovery efforts for listed plants across their individual ranges, the proposed action would have a large beneficial cumulative impact over time and at a regional scale.

# 3.3 Wildlife and Migratory Birds, Including Special Status Species

- Issue 1: How would heavy equipment, chain saw noise, and associated human activity affect, migratory birds, general wildlife, and threatened, endangered, and sensitive species behavior, health, and distribution?
- Issue 2: How would the removal of vegetation, including upland, wetland and riparian, affect habitat (breeding habitat, nesting habitat, hiding cover, and thermal cover) for migratory birds, general wildlife species, and specifically for threatened, endangered, and sensitive species?
- Issue 3: What would be the impact from the proposed vegetation management and treatments and erosion control projects on wetland plant communities, aquatic habitat, aquatic (fish, amphibians and aquatic reptiles) species including threatened and endangered species, and critical habitats?
- Issue 4: How would upland treatments change sediment load and water quality in Cienega Creek and Empire Gulch? (This issue is addressed by Issues 1 and 2 in Section 3.1, Soil and Water resources.)

## *3.3.1 Affected Environment*

The planning area provides habitat for over 300 species of migratory birds, 60 native mammals, and approximately 50 species of fish, reptiles, and amphibians (see Appendix D, Table D-1, List of Wildlife Species with Potential to Occur in the Las Cienegas Landscape Restoration EA Project Area). In addition, 13 federally threatened or endangered wildlife and three plants protected by the Endangered Species Act (ESA) occur or have potential to occur in the planning area. Designated or proposed critical habitat for ESA-listed species occurs for six species in the planning area (Appendix D, Table D-2, Federally Protected Species and Critical Habitat in the Project Area; USFWS 2019). Due to limited distribution, especially in the arid Arizona landscapes, riparian, cienega, and aquatic habitats provide the greatest diversity and value to wildlife, including aquatic species, migratory birds, and threatened and endangered species. The Las Cienegas NCA has five of the rarest habitat types in the southwest United States: cienegas, cottonwood-willow riparian areas, sacaton grasslands, mesquite bosques, and semidesert grasslands, making it highly valuable for a diversity of wildlife.

There are approximately 1,457 acres of riparian habitat, 98 acres of lakes/ponds, 38 acres of wetlands/cienegas, and 1,599 miles of perennial, intermittent, or ephemeral streams in the NCA that could provide habitat for a variety of native fish, frogs, and other aquatic-dependent plant and wildlife species (see Table E-7, Section 3.1, Soil and Water Resources and Section 3.2, Vegetation). There are seven major springs, 14 wildlife ponds, and over 40 wetland sites in the NCA (Desert Botanical Gardens inventoried 44 wetlands covering 38 acres on Las Cienegas NCA south of Highway 82; DBG 2016), but no National Wetland Inventory (NWI) wetlands (BLM GIS 2019).

Cienega Creek is the major biogeophysical feature within the NCA. The diversity of vegetation types within riparian and wetland areas along the creek contributes to high-value aquatic habitats. Cienega Creek maintains perennial surface flow in two reaches: from its headwaters to Gardner Canyon and from its confluence with Cold Spring to just downstream of Fresno Canyon and from the confluence with Mescal Wash to just downstream of the Colossal Cave Road crossing in Vail, Arizona. Other reaches of perennial water occur in tributaries to Cienega Creek and include Empire Spring, lower Empire Gulch, and Mattie Canyon. Perennial flow in Cienega Creek and tributaries fluctuates from year to year from a maximum of 7.8 miles to a minimum 4.8 miles (BLM Annual Cienega Creek Wet-Dry database).

Bullfrogs occupied the upper portion of the creek until 2015 when suppression efforts finally eliminated them from the watershed. Bullfrogs still threaten the area as they migrate from the Babocomari River drainage each summer during the monsoon season. There are no nonnative fishes and Cienega Creek continues to support a diverse native aquatic vertebrate community including Gila topminnow, Gila chub, longfin dace, Chiricahua leopard frog, lowland leopard frog, Sonora mud turtles, and northern Mexican gartersnake.

The entire assemblage of native fishes and native leopard frogs of the Gila River system are all biologically imperiled to various degrees and are found on federal, state, and BLM sensitive species lists (BLM 2011). Populations of aquatic species have been established at various wildlife and wetland ponds in the Las Cienegas NCA. A number of new populations have been established for the following species: Gila topminnow (9), Gila chub (1), desert pupfish (10), Chiricahua leopard frog (19), northern Mexican gartersnake (at least 3, others not inventoried), Huachuca water umbel (4). Huachuca water umbel populations exist on Cienega Creek, where the species is spreading throughout the stream system and increasing (BLM 2019a, BLM 2011). Self-sustaining Chiricahua leopard frog populations occur in Cienega Creek, Empire Gulch, Mattie Canyon, and off-channel ponds as well as four restored wetlands and 11 other locations, including newly created wildlife ponds. Gila chub are present in Cienega Creek and Mattie Canyon; an additional population has been added to Spring Water Wetland, and establishment is planned in the near future in the Las Cienegas NCA. Desert pupfish now occur in three wetland ponds and seven wildlife ponds. Two of the populations are located on the BLM portion of Appleton-Whittell Audubon Research Ranch and two more on private land (BLM 2019). Gila topminnow populations occur at Cienega Creek. Chiricahua leopard frogs and northern Mexican gartersnakes occupy perennial stock tanks, through emigration from source populations to these tanks. Other populations of lowland and Chiricahua leopard frog exist on Pima County lands (personal communication Karen Simms, BLM Parks and Natural Resources Division).

Cienegas and associated riparian areas support a variety of rare, federally listed or otherwise imperiled species (Minkley et al. 2013). In Arizona, wetland environments occupy about 2% of the land area and are critical habitat for at least 19% of the threatened, candidate, or endangered species within the state. Cienegas and riparian corridors, by providing different habitat in otherwise arid regions, may increase regional biodiversity by 50% or more (Sabo et al. 2005). Cienegas have a very high value for avian diversity, even relative to other riparian communities. Skagen et al. (1998) found more species of migrating birds in southeast Arizona use isolated cienegas than sites along a continuous riparian corridor. A study of riparian areas around the Huachuca Mountains in Arizona found several native bird species were restricted to or reached their highest densities in cienegas with cottonwood trees in a landscape dominated by grassland (Strong and Bock 1990).

Riparian habitat and wetlands are also important for a variety of migratory birds and two riparian-dependent ESA birds: western yellow-billed cuckoo and southwestern willow flycatcher. In addition, the planning area contains two important bird areas: the 7,723-acre Appleton-Whittell Research Ranch in the south and the 37,760-acre Las Cienegas NCA (Arizona Important Bird Areas Program 2011). Empire Gulch has documented nesting western yellow-billed cuckoos within the Las Cienegas NCA (Arizona Important Bird Areas Program 2011).

ESA critical habitat for northern Mexican gartersnake, jaguar, southwestern willow flycatcher, yellow-billed cuckoo, Chiricahua leopard frog, and Gila chub occurs in the planning area (Table E-8). This critical habitat is mostly centered around aquatic and riparian habitats.

Although riparian and aquatic habitats provide higher wildlife value, desert uplands and scrub uplands support numerous wildlife species, including grassland birds, rodents, jackrabbits, bats, ungulates, mountain lions, coyotes, and foxes. Trees and shrubs provide for nesting raptors and other resident breeding birds.

### 3.3.2 Impacts from the No Action Alternative

## Direct and Indirect Impacts

As described above, the project area has five of the rarest habitat types in the Southwest, making it highly important for both terrestrial and aquatic wildlife and migratory birds. Healthy grasslands, wetlands, and riparian habitats are limited on the landscape and are experiencing degradation from human and natural causes (see Section 3.1: Soil and Water Resources and Section 3.2: Vegetation).

The region is used for many purposes, including heavy recreation (which may cause inadvertent spread of invasive or noxious weed species by seed), livestock grazing, habitat preservation and restoration, endangered species recovery, collection of dead and down trees (permits required if used for personal use outside of use for campfires), mining, and ex-urban development. Other activities with the potential to affect wildlife and habitat include OHV use, wildfires, mesquite encroachment, climate change, and the spread of invasive species (Lehmann and Boer lovegrasses, Johnson grass, Bermuda grass, and bulrush and cattails in wetland habitats) (Arizona Important Bird Areas Program 2011; Cienega Watershed Partnership 2018).

Under the no action alternative, impacts from heavy equipment, chain saw use and associated human activity would not occur, because the BLM would not implement proposed vegetation treatments or erosion control projects. Previous vegetation treatment areas would not be maintained; therefore, there would be no direct impacts on wildlife or migratory bird species from new activities in these areas. However, lack of vegetation management and treatments in these areas may have impacts to wildlife or migratory birds through further encroachment of invasive or noxious weed species, erosion of soils, or spread of unnatural fire. Wildlife habitat that is not suitable for occupation by federally listed aquatic species would remain unsuitable for the species if vegetation is not managed in cienega habitats.

The agency could, however, implement vegetation treatments that are identified under existing NEPA documentation (EA# 420-2006-19, EA#: DOI-BLM-AZ-G020-0021, and EA# DOI-BLM-AZ-G020-2011-0028), and ongoing impacts on wildlife and migratory birds from those vegetation treatments would continue, as described in the associated EAs.

Current management would indirectly result in continuing degradation of important wildlife habitats as a result of erosion, encroachment of woody species, encroachment of herbaceous species in wetlands, spread of invasive species. Recent ecological reports have documented that collaboration and restoration efforts have been successful in the Las Cienegas NCA in decreasing woody species encroachment, controlling invasive species, and improving grassland and riparian habitats (Caves et al. 2013; Cienega Watershed Partnership 2018; Tiller et al. 2012a; Tiller et al. 2013; Bodner and Simms 2008; Gori and Schussman 2005; BLM 2015). Without active management and cross-jurisdictional coordination to implement vegetation treatments and erosion control projects, important wildlife habitats, especially cienegas and riparian and desert grassland ecosystems, would be less resilient to adverse impacts and would continue to decrease in the region.

## Cumulative Impacts

The five watersheds overlapping the proposed action area (Table E-5) are the geographic scope of the analysis area for cumulative impacts; however, some of the cumulative impacts go beyond the watershed for cienega ecosystems and vegetation with regional implications.

Since cienega animal communities are greatly influenced by soil and water resources and cienega vegetative communities, see cumulative impacts under Sections 3.1.2, 3.1.3, 3.2.2, and 3.2.3. Habitat-altering activities in and near the planning area include livestock grazing; residential development; mining; wood cutting; off-highway motorized recreational vehicle use; groundwater pumping on private lands, such as vineyards; potential for beaver reintroduction; various vegetation and wetland treatments and fire management projects designed to restore habitat integrity to reference conditions (e.g., seven erosion control and restoration projects completed between 1994 and 2015 on Pima County land in the Cienega Creek Natural Preserve; removal of mesquite in mesquite-invaded grasslands; removal of Johnson grass

and bigleaf periwinkle in wetlands and riparian areas); and new invasive species released by recreation and other activities. Some actions would result in improved ecological function; however, cumulatively over time, many surface disturbance activities in and near the planning area may serve to fragment habitat and reduce habitat quality for native wildlife species, including special status species. The effects of climate change are anticipated to increase the scale and pace of effects on wildlife habitats, especially in high-value riparian and aquatic habitats in the desert landscape, in combination with habitat-altering activities.

### 3.3.3 Impacts from the Proposed Action

#### Direct and Indirect Impacts

Exact locations and methods of vegetation or erosion control activities are not fully defined at the planning-level phase. Thus, a precise quantification of potential impacts is not feasible, and impacts on migratory birds and wildlife are described primarily qualitatively. A quantitative analysis is provided where there is information of where treatments or projects would likely occur under the proposed action. Impacts on migratory birds and wildlife are based primarily on changes to occupied and potential habitat where proposed activities are likely to have adverse, short-term effects; but over the long term, improvements to habitat quality would benefit wildlife associated with such habitats. Inclusion of BMPs (Appendix B) and conservation measures, described below and in the biological assessment (BA), would avoid or reduce potential adverse impacts on migratory birds, wildlife, including special status species. It is assumed that further environmental review, as needed, at the design and project level would evaluate and mitigate site-specific potential impacts on wildlife, special status species, migratory birds, and aquatic species.

Potential impacts on terrestrial wildlife and migratory birds, including special status species, are detailed in Table E-9; potential impacts on aquatic species, including special status species, are described in Table E-10.

#### *Issues 1 and 2: How would heavy equipment, chain saw noise, and associated human activity affect migratory birds, general wildlife and threatened, endangered, and sensitive species health, behavior, and distribution? How would the removal of vegetation, including upland, wetland or riparian, affect habitat (breeding habitat, nesting habitat, hiding cover, and thermal cover) for migratory birds, general wildlife species, and specifically for threatened, endangered, and sensitive species?*

The project is cross-jurisdictional to improve habitat conditions on a landscape scale and to address wildlife movement corridors. The purpose of this project also includes treating existing and future potential soil erosion areas with erosion control structures. Activities related to these efforts could cause short-term, localized impacts on wildlife and their habitats. These could include disturbance and displacement from surface disturbance activities (mechanical and manual treatments), heavy equipment and chain saw noise, prescribed fire, chemical treatments, erosion control projects, and associated human presence. Impacts would be more pronounced during sensitive periods, such as nesting, denning, spawning, or hibernating, where activities could cause reduced reproductive success or potential harm or mortality to wildlife, including special status species and migratory birds. Also, short-term effects would be proportionally greater in limited, high-value areas like cienegas and riparian habitat than in widespread scrub uplands or general grassland communities (see Section 3.2: Vegetation).

Under the proposed action, short-term impacts, such as displacement, to migratory birds, general wildlife species, and threatened, endangered, and sensitive species may occur during the initial vegetation treatments. However, vegetation treatment schedules would be managed by BLM to avoid disturbance during breeding and nesting periods. Long-term impacts would include habitat improvement, which would result in reduction of impacts to migratory birds and wildlife species.

### *Issue 3: What would be the impact from the proposed vegetation management and treatments and erosion control projects on riparian and wetland plant communities, aquatic habitat, aquatic (fish, amphibians and aquatic reptiles) species, including threatened and endangered species, and critical habitats?*

Of the activities described in Tables E-9 and E-10, mechanical, prescribed fire, and herbicide treatments (for both vegetation treatments and erosion control and stream restoration treatments) would have a higher potential to affect aquatic species and habitat, including aquatic special status species and critical habitat. Use of heavy, mechanized equipment could trample and crush smaller wildlife such as amphibians. Fire can be lethal to wildlife that are not able to flee the area and contact with certain herbicides can have deleterious effects on certain species.

Broadscale application of prescribed fire and herbicides has the potential to remove the majority of existing vegetation, which would increase runoff and transport soil, ash, debris, and/or herbicides to surface water, thereby affecting water quality and habitat conditions for aquatic wildlife, such as native fishes. Treatment scale would be adjusted to diminish these potential impacts. Changes in vegetation composition resulting from these treatments could also affect water availability because different plants use different amounts of water, and thus could lead to changes in habitat availability for aquatic species over the long term. In addition to vegetation removal, mechanical treatments would disturb and compact soil, thereby decreasing soil infiltration capacity and increasing erosion and runoff to aquatic habitats. Compaction can be reduced using equipment with low ground pressure tires and tread. Leaving behind vegetation or viable root systems can resolve compaction through loosening of soil as plants regrow following treatment.

An in-depth discussion of chemical treatment effects on wildlife is provided in the Vegetation Treatments using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (BLM 2007, pp. 4-101 to 4-118) and the 2016 Final PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Lands in 17 Western States (BLM 2016a, pp. 4-54 to 4-60).

The use of livestock to control crowding vegetation in restored wetlands and artificial ponds could degrade riparian areas and affect streambank stability around the ponds, which would affect riparian-dependent wildlife, aquatic, and fish species. Changes in streamside vegetation (around restored wetlands and artificial ponds) 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. Habitat alterations may improve habitat for some species but degrade it for others, although practices that promote habitat diversity generally improve wildlife habitat overall (Launchbaugh et al. 2006). Targeted grazing would be implemented as described in Section 2.1.4: Targeted Livestock Grazing in Wetlands, which would reduce impacts by optimizing efficacy and reducing the length and/or frequency of treatments. Over the long term, targeted grazing is expected to improve habitat by reducing cover of invasive species, such as Johnson grass (Simms 2019).

Treatments that take place within aquatic habitats would have the highest potential to result in direct impacts on aquatic species. For example, disruptive activities in aquatic environments (e.g., pulling aquatic vegetation or using an underwater weed eater) would have a moderate to high probability of affecting Huachuca water umbel and fish and amphibian eggs attached to vegetation. The probability would be lower for mobile wildlife such as Mexican gartersnake, Chiricahua leopard frog, Gila chub, desert pupfish, and Gila topminnow. Heavy equipment and human presence would have a moderate to high probability of disturbing Mexican gartersnake and Chiricahua leopard frog. Further, the use of heavy equipment in or near wetland and riparian habitat has the potential to injure or kill other wildlife such as snakes, turtles, and amphibians. Overall, while some individuals would be impacted in the short term, there would not be significant impacts at the local population level.

Treatments in surrounding habitats and uplands would mainly have indirect impacts on aquatic species through effects on habitat described above and in Table E-10. Potential treatment acres for vegetation

treatments have not yet been identified, but initial potential erosion control projects have been designed and areas identified (see Section 2.1.4). Initial erosion control projects would improve approximately 2% of total aquatic habitats in the project area (Table E-11) and no more than 2% of critical habitat for any federally listed species in the project area (Table E-12). Future erosion control projects could be designed and implemented as needed; the areas of future projects are unknown but could feasibly overlap riparian habitats and threatened and endangered species critical habitats. Project mitigation would be devised and ESA compliance with the BO would occur for each treatment during planning and implementation. If a future vegetation treatment is unlikely to conform with the BO, the new project would require modification or additional consultation.

Over time, vegetation, erosion control, and stream restoration treatments would restore the vegetation community and indirectly benefit fish and wildlife by improving habitat conditions and availability. 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, water quality would be improved (from reduced erosion), and 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).

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). Achieving long-term habitat management objectives would increase the extent and condition of riparian areas and wetlands, which are important habitats for many aquatic species, including migratory bird, fish, and amphibian species. Increased riparian vegetation would improve habitat for southwestern native fish species, many of which are less tolerant to increased stream temperature than previously thought (Carveth et al. 2006). Aquatic habitat choked with wetland vegetation would become suitable for an array of Federally listed aquatic species, which would aid in their recovery.

Following BMPs (WR-01 to WR-04, and WL-01 to WL-05) would minimize impacts on aquatic species and their habitats, including special status species and critical habitats. The treatment methods chosen would balance the best method(s) (integrated vegetation management) for invasive vegetation control with those with the fewest effects on a variety of species. For example, manual and mechanical treatments can be combined to lessen effects on special status species, while herbicides could be used in combination with or following other types of treatments. Because vegetation removal activity during breeding bird, fish, amphibian, and reptile periods cannot be avoided, a biological monitor would be on-site to ensure that threatened, endangered, and sensitive species injury or mortality is minimized and the duration of work is kept to a minimum. Injury of listed plants can be reduced but not eliminated through careful application of treatments or limited treatment intensity and/or duration, and by considering local species distribution.

The following project design features and conservation measures are relevant to all wildlife, including special status species, and would avoid or minimize adverse impacts:

- **WL-01** Avoid treating vegetation during time-sensitive periods (e.g., nesting and migration and sensitive life stages) for special status species in areas to be treated, when appropriate (wetland treatments will be done during the growing season when birds and other species are active and breeding). Time vegetation treatments to take place when foraging pollinators are least active, both seasonally and daily.
- **WL-02** Use area buffers around sensitive habitats, such as wetlands, riparian zones, and special status species locations, to minimize adverse effects. The exception to this is when treatments occur in wetland and riparian areas for the benefit of the wetland and related special status species.
- **WL-03** Treatments should be rotated so that various successional stages, heights, and densities are developed over varying years and on different sites across the landscape.

- **WL-04** Treatment design and location will consider wildlife habitat concerns, such as diversity, cover, movement corridors, and connectivity.
- **WL-05** Minimize treatments near fish-bearing water bodies during periods when fish are in life stages most sensitive to the herbicides used and use spot rather than broadcast or aerial treatments.
- **TA-05** Upon completion of the vegetation treatment, all temporary access routes will be evaluated for rehabilitation and closed to further traffic.
- **HT-05** Herbicides utilized will take into account target vegetation, sensitive plant and animal species, as well as sensitive land features, such as water sources and soil characteristics.
- **VG-01** Pre-treatment surveys for threatened, endangered, and sensitive plant species will be conducted via online resources (e.g., IPaC and HDMS), resource specialists, local subject matter experts, and on-site surveys. Design features for threatened and endangered species will be developed and implemented, per the requirements of the Biological Opinion from the USFWS.
- **VG-02** In riparian areas, use appropriate herbicide-free buffer zones for herbicides not labeled for aquatic use, based on risk assessment guidance, with minimum widths of 100 feet for aerial, 25 feet for vehicle, and 10 feet for hand-spray applications (BLM 2007).
- **WR-02** Herbicide treatments will be implemented between weather fronts and at appropriate time of day to avoid high winds that increase the potential for overland flow and to avoid potential stormwater runoff and water turbidity.
- **WR-01** Buffer widths between vegetation treatment areas and water sources will be developed based on treatment type and site-specific criteria to minimize impacts on water sources (e.g., wells, stock tanks, streams, and springs).
- **WR-03** Application of herbicides not designated for aquatic use will be avoided in rapidly permeable soils in areas that have potential for ground-surface water interaction, such as shallow water tables, to prevent groundwater contamination.
- **WR-04** Spray tanks will be rinsed only at approved staging areas; staging areas will be established away from bodies of water.

The proposed project would adhere to the requirements of the BO to avoid or minimize potential effects on listed ESA species in the planning area.

Applicable RMP plan components, design features, BO measures, and standard operating procedures and BMPs appropriate for specific activities under the proposed project would be identified during the design process and adhered to during implementation. Potential practices include site-specific wildlife surveys, seasonal and spatial avoidance buffers for breeding wildlife and when pollinators are least active, buffers around sensitive habitats, and future treatment-specific consultation with the USFWS, as needed. Such site-specific measures would avoid or minimize short-term adverse impacts on migratory birds, special status species, fish, aquatic species, and wildlife habitats.

Over the long term, vegetation management, riparian site restoration, and erosion control projects would move fish and wildlife habitat toward reference conditions and improve habitat suitability for special status species. Proposed project efforts should increase watershed cover by promoting increased perennial grasses and stabilizing vegetation along streams. Project treatments would improve watershed conditions, reduce sedimentation, and reduce the frequency of peak flood flows, which would benefit wildlife, fish, and special status species. These erosion control and stream restoration projects would enhance habitats for riparian-dependent and aquatic species.

## Cumulative Impacts

Cumulative impacts on terrestrial wildlife, including special status species, would be similar to those described under the no action alternative. The cumulative effects of climate change and ongoing surface-disturbing activities in and near the planning area would contribute to long-term changes to wildlife throughout the planning area; however, under the proposed action, vegetation management, riparian site restoration, and erosion control projects would result in increased effectiveness to meet vegetation objectives in the RMP. Efforts to maintain upland areas; reduce undesirable woody species; restore and maintain mesquite bosques, wetlands, and cottonwood willow galleries; and control noxious, invasive

species at a coordinated landscape level, as well as minimize erosion impacts, would improve wildlife habitat and improve resilience for the climate change-related impacts on wildlife and their habitats with greater effectiveness over the long term compared with the no action alternative.

Past, present, and reasonably foreseeable activities in the planning area with the potential to affect aquatic wildlife include other stream restoration/erosion projects; reintroduction of native species, including beavers; groundwater pumping; drought; and climate change.

Water reductions from groundwater pumping for domestic uses, agriculture, and mining are concerns for riparian habitat in the NCA as groundwater is supplied by the Cienega Creek aquifer. Perennial surface flows that remain continuous in a few reaches during a substantial portion of the year are necessary for the persistence of fish species (Stefferud and Stefferud 1998). As such, stream flow has a strong influence on the population dynamics of native fishes. In addition, by lowering the water table, these reduced water levels have led to the loss of some mature trees which, in turn, has accelerated erosion and caused headcutting in some reaches (USFWS 2016). In addition, low stream flows have rendered some habitats in Cienega Creek anoxic (low dissolved oxygen levels) and unsuitable for fish.

Continuing drought and climate change are likely to affect watersheds and subsequently waterbodies. Recent climate change trends in the Southwest include warming, unusually severe drought, and lower flows in the four major drainage basins of the Southwest (Garfin et al. 2013). Future climate change scenarios generally predict these trends to continue during the twenty-first century (Seager et al. 2007), which would likely exacerbate the effects of water reductions from human use.

Erosion control and stream restoration projects have been constructed in Los Pozos Gulch and on Cienega Creek near the agricultural fields and its confluence with Springwater Canyon. In addition, Pima County has implemented seven erosion control and restoration projects completed between 1994 and 2015 in the Cienega Creek Natural Preserve. Short-term effects from vegetation, stream restoration, and erosion treatments on the NCA would accumulate with impacts from other vegetation projects, climate change, and water withdrawals; but overall long-term improvements in the ecosystem health and aquatic 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, wildlife, and their habitats.

Wetlands on a regional scale (Arizona and New Mexico) would benefit from the cumulative beneficial effects to the maintenance or improvement of ecological integrity and function in the Cienega Creek basin and allow for the continued and future recovery of federally listed aquatic and wetland plants and animals. Together with other ongoing and planned restoration efforts in the basin and the region, along with those recovery efforts for listed species across their individual ranges, the proposed action would have a large beneficial cumulative impact over time and at a regional scale.

# 3.4 Visual Resources

- Issue 1: How would the impact from large-scale vegetation treatment techniques affect the viewshed of riparian and upland communities?

## *3.4.1 Affected Environment*

More than 45,000 acres of rolling grasslands and woodlands in southeastern Arizona are protected under the Las Cienegas NCA. The region's oak-studded hills connect several "sky island" mountain ranges and lush riparian corridors. With its perennial flow, Cienega Creek supports diverse plant and animal communities. Unique and rare vegetation communities include five of the rarest habitat types in the southwest United States: cienegas (marshlands), cottonwood-willow riparian forests, sacaton grasslands, mesquite bosques, and semidesert grasslands (BLM 2019b).

It is also rich in historic and archaeological resources. The Empire and Cienega Ranches, along with portions of the adjacent Rose Tree and Vera Earl Ranches, are under public ownership and managed by the BLM under the principles of multiple-use and ecosystem management (BLM 2019b).

Highway 83, which runs along the planning area boundary and crosses the planning area for 2 miles, is a designated scenic route in Arizona's State Highway System. The viewshed or scenery from Highways 82 and 83 and the Empire Ranch Road includes undisturbed panoramas of rolling grasslands with an average elevation of 4,500 feet against the dramatic backdrops of the mountain sky islands of Coronado National Forest, the 9,400-foot summit of Mount Wrightson in the Santa Rita Mountains to the west, and the 7,700-foot summit of Apache Peak in the Whetstone Mountains to the east. To the southeast is the distinctive hump of 6,300-foot Biscuit Mountain in the Mustang Mountains; to the north and south are the gentler vistas of the Empire Mountains and the Canelo Hills (BLM 2002).

Cienega Creek's riparian vegetation and the oak woodlands in other drainages create a dramatic greenbelt that magnifies the overall scenic quality of the rolling grass and oak- and agave-covered hills and offers a sharp contrast to nearby views of desert scrub. Along Cienega Creek, however, is a limited area that farming has visually degraded (BLM 2002).

Some vantage points along the interior roads of the planning area reveal arroyo cutting, abandoned water diversion structures, a 0.25-mile-long abandoned dirt airstrip, heavily trampled livestock watering holes, badlands topography, old dumps, and cut mesquite bosques. These features, while constituting a measurable degree of visual contrast with the surrounding visual setting, do not detract from the planning area's overall scenic quality (BLM 2002).

A 1-mile segment of Empire Gulch near the historic Empire Ranch headquarters consists of a visually spectacular Fremont cottonwood gallery forest. Views from the historic Ranch House, especially the breezeway and bay window, are generally unspoiled except for the Doppler radar tower in the Empire Mountains and the abandoned airstrip, which is occupied 5 to 10 times per year with small (1 to 20 vehicles) to large (20 to 70 vehicles) groups for periods of up to 2 weeks (BLM 2002).

The BLM is responsible for managing the public lands for multiple uses, and for ensuring that the scenic values of public lands are considered when providing for various uses. The BLM visual resource management (VRM) system involves inventorying scenic values and establishing management objectives for those values through the resource management planning process. The approved VRM objectives (Classes I through IV) provide the visual management standards for the design and development of future projects and for rehabilitation of existing projects (BLM 1984).

Within the proposed action area, there are 51,300 acres of VRM Class II, which describes a landscape that is largely unmodified and scenic. The remaining lands are not BLM-administered lands and, therefore, are not designated with a VRM class. The objective of VRM Class II is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but they should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape (BLM 1986).

The remaining non-BLM-administered lands are mostly north and south of the Las Cienegas NCA. Like Cienega Creek, the Babocomari River (south of the Las Cienegas NCA) begins near the community of Elgin, Arizona and drains into the Sonoita Basin and is surrounded by riparian vegetation and grassland. The Babocomari River begins near the community of Elgin, Arizona. Other developments in the proposed action area include Clyne and Sands Ranches (east of the Las Cienegas NCA) and Bar V and Empirita Ranches (north of the Las Cienegas NCA). The areas north of the Las Cienegas NCA are dominated by scrub uplands and contain the highest elevations in the proposed action area in the Coronado National Forest and foothills of the Santa Rita Mountains.

### 3.4.2 Impacts from the No Action Alternative

The proposed action area is the geographic scope of the analysis area for direct and indirect impacts. Designated transportation routes would be locations from which direct and indirect impacts would be viewed.

### Direct and Indirect Impacts

Under this alternative, the BLM would not implement the proposed vegetation treatments or erosion control projects and would not maintain previous vegetation treatment areas. The agency could implement vegetation treatments that are identified under existing NEPA documentation (EA # 420-2006-19). Ongoing impacts on the form, line, color, or texture of the landscape from those vegetation treatments would continue. There would be no new impacts on the form, line, color, or texture of the landscape from temporary roads, temporary equipment and vehicles, or vegetation changes from treatments.

### Cumulative Impacts

The proposed action area is the geographic scope of the analysis area for cumulative impacts. Designated transportation routes would be locations from which cumulative impacts would be viewed.

Past, present, and future actions that have affected and would affect visual resources include vegetation treatments, wildfires, livestock grazing, climate change, and Forest Service vegetation treatments within a 90,000-acre project area (though not all acres would be treated) in the upper part of the watershed. Previously, the BLM completed vegetation treatments on approximately 19,500 acres using prescribed fire, chemical, and mechanical methods in the Las Cienegas NCA. Erosion control and stream restoration projects have been constructed in Los Pozos Gulch and on Cienega Creek near the agricultural fields and its confluence with Springwater Canyon. Past, present, and future actions have affected and would affect visual resources by removing vegetation, altering the composition of vegetation, and changing conditions (such as temperature and precipitation) that support vegetation health and spread.

## *3.4.3 Impacts from the Proposed Action*

### Direct and Indirect Impacts

The types of actions associated with the project, including staging of construction equipment and creation of temporary roads, would be short-term actions occurring for the duration of the treatments. Vegetation would be removed from these areas, exposing the bare soil. The removal of vegetation can change the overall form of vegetation, introduce abrupt vegetation lines and bands of exposed soil, change the composition of colors in the landscape, and change the local vegetation texture. These impacts would depend on a variety of factors, including the type and density of existing vegetation and the amount and location of vegetation removed. The acres of staging areas and miles of temporary roads are unknown.

Denuded staging areas and temporary roads would be remediated after the vegetation treatment. This could include raking tracks, mulching, or reseeding or other techniques proven to be effective for remediation. Also, the BMPs listed in Appendix B, Best Management Practices, would minimize the degree of potential negative impacts, to the extent possible. As long as the BMPs are followed, the extent of impacts would be consistent with the VRM Class II definition. The impacts would gradually diminish over time after successful remediation and desired vegetation matured. To further minimize the degree of potential negative impacts, VRM Class II objectives could be applied to non-BLM-administered lands.

During the proposed action, crews may be working concurrently at various locations. Views of the proposed action area would be cluttered with construction equipment and construction materials. The bold colors and geometric, boxy forms of artificial construction vehicles, materials, and equipment would not resemble the colors and forms of the surrounding terrain and vegetation. They would create various focal points on an open landscape and would not resemble other landscape elements, which is mostly vegetation. These impacts would be temporary and would occur only when construction equipment and construction materials are present.

Prescribed burns are temporary and although they result in vegetation removal, including leaving dark patches on the landscape, the recovery process is quick due to a greater chance of precipitation in the area. Manual treatments would involve selecting certain vegetation to remove. Both actions would not significantly change the visual class definition of what is assigned to the NCA from the current RMP. After all proposed actions and the successful establishment and maturity of vegetation in treated areas,

however, vegetation communities would be established that promote desired future conditions. This would consist of vegetation communities that are maintained within their natural range of variation in plant composition, structure, and function, thereby creating a natural landscape that is appropriate to the region. This would be a long-term beneficial impact on visual resources.

### Cumulative Impacts

The proposed action area is the geographic scope of the analysis area for cumulative impacts. Designated transportation routes would be locations from which cumulative impacts would be viewed. Past, present, and future actions are described above under Section 3.4.2**,** Impacts from the No Action Alternative.

Past, present, and future actions have affected and would affect visual resources by removing vegetation and altering the composition of vegetation. In addition, changing conditions (such as temperature and precipitation) that support vegetation health and spread would also affect visual resources. Because the proposed action would ultimately restore vegetation communities and not degrade landscape conditions, the proposed action would not contribute to cumulative impacts that degrade visual resources and affected areas would remain consistent with the visual class objectives as defined in the current RMP.

# 3.5 Recreation

- Issue 1: How would the proposed action impact special recreation permittees (e.g. bird-dog trial groups, endurance equestrian riders)?
- Issue 2: How would the proposed action impact dispersed recreation users (e.g. hunters, campers, OHV users)?

## *3.5.1 Affected Environment*

There are recreational opportunities in the Las Cienegas NCA. Recreation is concentrated at the historic Empire Ranch and six designated campgrounds, including group campgrounds at Maternity Well, Ag Fields, and the Airstrip. Motorized, unpaved access to these sites is primarily via Empire Ranch Road (LC6900) and Yucca Farm Road from Highways 82 and 83. Table E-13 shows the average annual daily traffic, measured in number of vehicles, for six locations in the NCA.

Total estimated traffic to the NCA between 2019 and 2021, excluding the annual Empire Ranch Cowboy Festival, was 118,054, which equates to 59,027 total vehicles counted (BLM 2021c). Most visitors access recreation opportunities in the NCA via Empire Ranch Road where the average annual daily traffic, excluding the annual Empire Ranch Cowboy Festival, is 89 vehicles. During the festival, daily traffic exceeds 1,100 vehicles. Less than 10% of all vehicles enter the NCA from the south (BLM 2021c).

Examples of recreational opportunities include camping in designated primitive campgrounds, walking on an interpretive trail near Empire Gulch, driving for pleasure, and interpreting historic architecture and cattle ranching at Empire Ranch. The Empire Ranch House, Oak Tree Canyon camp area, and the Airstrip group site are the most frequently visited sites in the NCA for these types of recreational opportunities (BLM 2021d). Other more dispersed recreation also occurs in the NCA. This includes hiking, horseback riding, hunting, mountain biking, nature photography, night sky viewing, OHV riding, and wildlife viewing.

BLM recreation management information system data indicate that camping, horseback riding, viewing cultural sites, walking on dog trails, and OHV riding are the most popular activities with an average of 54,598 participants collectively engaging in these activities between October 2018 and September 2021 (BLM 2021d). These activities typically occur near developed sites accessed via Empire Ranch or Yucca Farm Roads.

In 2019 and 2020, the BLM also issued 19 special recreation permits (SRPs) for group activities in the NCA. In 2021, the BLM issued 24 SRPs for group activities. These included seven SRPs for a series of competitive bird dog trials, which occur annually in late December through early March at the Airstrip and Maternity Well group sites. The BLM also issues commercial and organized group event SRPs for

equestrian rides, hunting outfitters, and all-terrain vehicle tours (BLM 2021d). In November, the annual Empire Ranch Cowboy Festival allows visitors to experience Western heritage demonstrations and ranching exhibits; the BLM issues an SRP for the festival.

Recreation in the NCA is seasonal, with the highest visitation between October and May (BLM 2021c,d) when average high temperatures are between 60 and 80 degrees Fahrenheit. In the summer months, the average high temperature is approximately 90 degrees with high temperatures often exceeding 100 degrees. Monsoonal thunderstorms are also most frequent in July and August (NOAA 2019). These factors discourage or preclude many outdoor recreation activities in the NCA during the summer.

### 3.5.2 Impacts from the No Action Alternative

#### Direct and Indirect Impacts

Under the no action alternative, the BLM would not implement vegetation treatments or erosion control projects, nor would it maintain previous vegetation treatments. There would be no displacement of visitors, SRP activities, or changes to the recreation experiences or settings from treatment projects (except for treatments that would occur under existing NEPA); however, the continued invasion of riparian and upland areas by noxious weeds would contribute to increasing soil erosion and wildfire potential. Eroded soils can reduce the quality of road and trail surfaces, campsites, and undeveloped areas visible to visitors. Wildfire would displace visitors and potentially damage recreation infrastructure. These changes could reduce the commercial viability of some SRP operations. After fire, the setting within and around standing dead vegetation would provide for lower-quality recreation experiences compared with unburned areas. Unstable soils would be more likely to erode. Emergency stabilization and recovery treatments following fire could result in the temporary displacement of visitors and SRP activities in the treatment area.

#### Cumulative Impacts

Combined with past, present, and reasonably foreseeable future actions, the no action alternative would result in the potential for vegetation community departure to accelerate soil erosion and wildfire potential. Where these outcomes occur, there would be a change in the recreation setting and the associated quality of the recreation experience. Impacts would be greatest where erosion and wildfire occur within or in proximity to developed sites, trails, and roads. With increasing vegetation community departure and potential for wildfire that would lead to erosion and burn scars, more frequent emergency stabilization and recovery treatments in or near popular recreation areas would increasingly displace visitors.

### 3.5.3 Impacts from the Proposed Action

#### Direct and Indirect Impacts

##### *Issue 1: How would the proposed action impact special recreation permittees (e.g. bird-dog trial groups, endurance equestrian riders)?*

Prescribed fire, mechanical, manual, and herbicide treatments under the proposed action could result in the temporary displacement of visitors participating in SRP activities. The location and extent of displacement would depend on the treatment location, type, and size. Because many permitted activities are scheduled events and typically occur annually, proposed treatments would likely be planned around those events so as to not temporarily displace those engaged in specially-permitted activities.

Smoke from prescribed fire treatments and noise from mechanical and manual treatments would indirectly diminish the quality of the recreation setting and associated visitor experiences. The magnitude of direct and indirect impacts would decline with increasing distance from the treatments. Smoke from prescribed fire and noise from mechanical or manual treatments would directly and indirectly impact SRP activities where treatments occur at the same time and are located near the specially-permitted event. Treatments that take place at a different time of year would not result in direct or indirect impacts on specially permitted events from smoke or noise.

For some SRP participants, unburned slash burn piles could diminish the quality of the recreation setting and associated experiences. Piles visible from the primary access routes or event location would have the greatest potential to conflict with visitors' desired recreation setting, which would lead to a greater impact than from piles located elsewhere in the project area.

Slow-moving vehicles accessing treatments could increase the travel times for some visitors using the same roads to access specially permitted events. If the treatment and the event occur at the same time, impacts would be temporary. There would be no impact if the treatment and special event occur at different times of the year.

Aircraft used during aerial herbicide treatments could temporarily displace visitors at the Airstrip group site engaged in SRP activities. Aircraft noise would temporarily affect the recreation setting and associated experiences. However, it is unlikely that aircraft activity associated with treatments would coincide with scheduled SRP events at the Airstrip.

The greatest potential for impacts under the proposed action would be from October to May when the greatest number of specially-permitted activities take place. Treatments in November, December, and January near the Empire Ranch or Airstrip group site would have the potential to affect visitors engaged in SRP activities in those locations. However, the SRP events are pre-planned, annual events; treatments would likely be planned so as to not coincide with the events.

Under the proposed action, there would be a long-term reduction in the types of impacts described under the no action alternative.

### *Issue 2: How would the proposed action impact dispersed recreation users (e.g. hunters, campers, OHV users)?*

The types of impacts would be similar to those described for Issue 1, with the exception that treatments would be more likely to displace visitors or affect recreational experiences and settings for dispersed users. This is because dispersed recreation occurs more often and over a larger area compared with specially-permitted activities. Compared with specially-permitted events, the potential for incidents of treatments impacting dispersed recreation activities would be higher; however, the number of people with the potential to be impacted would be less because fewer people engage in dispersed recreation.

## Cumulative Impacts

Combined with past, present, and reasonably foreseeable future actions, the proposed action would result in the temporary displacement of SRP holders and dispersed recreation activities; however, over the longer term, treatments would reduce the potential for the types of cumulative impacts described under the no action alternative. Compared with the no action alternative, treatments implemented under the proposed action would incrementally restore vegetation communities to desired conditions, reducing the potential for erosion and wildfire, which would improve the long-term quality of the recreation setting and the associated visitor experiences.

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# 4 SUPPORTING INFORMATION

## 4.1 Tribes, Individuals, Organizations, or Agencies Consulted

### *4.1.1 Tribal Consultation*

The BLM initiated government-to-government consultation with 10 Native American Tribes who claim cultural affiliation to and/or traditional use of the project planning area. Letters summarizing the proposed action were sent to the Fort Sill Apache Tribe, Hopi Tribe, Mescalero Apache Tribe, Pascua Yaqui Tribe, San Carlos Apache Nation, Tohono O'odham Nation, Tonto Apache Tribe, White Mountain Apache Tribe, Yavapai-Apache Nation, and Zuni Tribe on October 1, 2021.

The Tohono O'odham Nation responded via phone message on October 5, 2021, therein requesting additional information on the proposed plan and expressing interest in receiving copies of future, related cultural and biological resources assessments for review and consultation. The Yavapai-Apache Nation responded via email on October 18, 2021, stating that the Tribe had no concerns or comments, therein deferring to the San Carlos and Mescalero Apache Tribes. The White Mountain Apache Tribe responded via letter dated October 22, 2021, stating that the proposed plan posed no adverse effect to the Tribe's cultural heritage resources and/or traditional cultural properties. The Hopi Tribe responded via letter dated October 23, 2021, requesting hard copies of the proposed plan and draft EA, along with their interest to develop an Assistance Agreement to participate in implementation-level resource studies. To date, no other responses or comments have been received; however, Tribal consultation is considered ongoing and will continue throughout plan implementation.

Currently, there are no known or likely impacts to any culturally significant plants, items, sites, or landscapes. Any new information provided by consulting Tribes could prompt issue(s)-analysis and/or alternatives development. Likewise, the BLM may later apply additional or edited terms and conditions of project implementation or require mitigation to protect or restore culturally significant resource values.

### *4.1.2 U.S. Fish and Wildlife Service Consultation*

The BLM consulted with the US Fish and Wildlife Service as part of the requirements under Section 7(a)(2) of the Endangered Species Act. The BLM received the final Biological Opinion from the US Fish and Wildlife Service on August 17, 2023.

## 4.2 List of Preparers

| Name | Role/Responsibility |
|---|---|
| **BLM Tucson Field Office** | |
| Dave Murray | Project Manager; soil and water resources |
| Amy McGowan | Environmental Planner |
| Theresa Condo | Vegetation |
| Zach Driscoll | GIS |
| Tiffany Verlander | GIS |
| Kristen Duarte | Range |
| Keith Hughes | Terrestrial species and terrestrial special status species |
| Dan Quintana | Vegetation treatment methods; wildland fire |
| Jeff Simms | Aquatic species and aquatic special status species |
| Christina Perez | Aquatic species and aquatic special status species |
| Kim Ryan | Cultural resources and Tribal interests |
| Robert Walter | Recreation; visual resources |
| **EMPSi – Environmental Management and Planning Solutions, Inc.** | |
| Chad Ricklefs, AICP | Project Manager; recreation; travel management |
| Meredith Zaccherio | NEPA Specialist |

| Name | Role/Responsibility |
|---|---|
| Lindsay Chipman | Aquatic species and aquatic special status species |
| Peter Gower, AICP, CEP | Recreation |
| Derek Holmgren | Soil and water resources; visual resources |
| Dan Morta | Vegetation |
| Julie Remp | Terrestrial species and terrestrial special status species |
| Marcia Rickey | GIS |
| Cindy Schad | Word processor |
| Andy Spellmeyer | 508 compliance |
| Randolph Varney | Technical editor |

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# A. RESOURCE MANAGEMENT OBJECTIVES

## A.1 Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management and Record of Decision, 2004

The Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management and Record of Decision (LUPA), approved in 2004, has been reviewed to determine if this proposed action conforms to the land use plan goals and objectives, as required by 43 CFR 1610.5 and the BLM NEPA Handbook (H-1790-1).

The proposed action is consistent with the LUPA Land Use Allocation 1-Wildland Fire Use: Areas suitable for wildland fire use for resource management benefit:

- Areas where wildland fire is desired, and there are few or no constraints for its use. Where conditions are suitable, unplanned and planned wildfire may be used to achieve desired objectives, such as improve vegetation, wildlife habitat or watershed conditions, maintain non-hazardous levels of fuels, reduce the hazardous effects of unplanned wildland fires and meet resource objectives. Where fuel loading is high but conditions are not initially suitable for wildland fire, fuel loads are reduced by mechanical, chemical or biological means to reduce hazardous fuels levels and meet resource objectives (includes WUI areas), (LUPA, pg. 4).

The proposed action is consistent with the LUPA Desired Future Conditions:

- Each vegetation community is maintained within its natural range of variation in plant composition, structure, and function, and fuels loads are maintained below levels that are considered to be hazardous, (LUPA, pg. 4).
- Semidesert Grasslands-The Desired Future Conditions are for perennial grasses to cover its historic range of variability, annual grass cover is reduced, and fire naturally inhibits the invasion of woody plants such as juniper, tarbush, whitethorn, and creosote bush (pg. 6).
- Chihuahuan Desert Scrub-The Desired Future Conditions are for an adequate cover and mix of natural plant species that have good vigor, In terms of fire management and fire ecology, the Desired Future conditions are for fire to control or reduce the exotic annual weeds such as red brome and to limit woody vegetation to non-hazardous levels (pg. 7).
- Riparian-The Desired Future Conditions are that annual weed cover and density is controlled and ladder fuels and downed woody debris are limited or not present. Disturbances such as livestock grazing, mining, and off road vehicle travel, that can potentially reduce natural vegetation cover and vigor, are managed to maintain adequate cover and mix of natural plant species (pg. 7).
- Interior Chaparral-The Desired Future Conditions are that fire naturally maintains shrub cover while reducing annual grass cover, the invasion of woody plants such as juniper and pinyon pine are controlled (pg. 6).
- Plains and Great Basin Grasslands-The Desired Future Conditions are for a predominance of perennial grass cover, reduced cover of annual grasses, and for fire to naturally inhibit the invasion of woody shrubs such as rabbitbrush, snakeweed, and big sage brush (pg. 6).

The proposed action is consistent with the LUPA Management Actions:

- In areas suitable for fire where fuel loading is high, BLM will utilize biological, mechanical or chemical treatments, and some prescribed fire to maintain non-hazardous levels of fuels and meet resource objectives (LUPA, pg. 9).
- For all fire management activities (wildfire suppression, appropriately managed wildfire use, prescribed fire, and mechanical, chemical, and biological vegetation treatments), conservation measures will be implemented as part of the proposed action to provide statewide consistency in

reducing the effects of fire management actions on federally threatened, endangered, proposed, and candidate ("federally protected") species (LUPA, pg.9).

## A.2 Las Cienegas Resource Management Plan and Record of Decision, 2003

The Las Cienegas Resource Management Plan and Record of Decision, approved in 2004, has been reviewed to determine if this proposed action conforms to the land use plan goals and objectives, as required by 43 CFR 1610.5 and the BLM NEPA Handbook (H-1790-1).

- Maintain or achieve properly functioning upland condition and a high similarity index (> 50%, by weight) to the historic climax plant community present on the site on 80% or more of the ecological sites in the Sonoita valley by year 2015. (WS01)
- Maintain or achieve the following ground cover characteristics on 80% or more of the ecological sites in the Sonoita Valley
    - < 40% exposed soil surface in woodland communities
    - < 30% exposed soil surface in grassland communities
    - < 60% exposed soil surface in shrub land communities
- On loamy bottom ecological sites, provide habitat for breeding grasshopper sparrow and wintering Baird's sparrow by maintaining or achieving the following conditions:
    - Average 6-8" grass height
    - > 75% ground cover of live grass and grass litter
    - < 10% shrub canopy on 2/3 of the loamy bottom ecological sites
- On open grasslands and in draws in semi-desert grassland and oak-savannah communities for loamy bottom, loamy hills and limy slope ecological sites, maintain or achieve the following conditions for pronghorn fawning:
    - < 5% total tree cover
    - 10-18" high vegetative cover during April-June
    - > 5 species of grasses and shrubs
    - Scattered trees >12' tall
- Maintain or achieve PFC on 100% of the riparian areas and maintain and achieve PNC for 95% of the riparian areas on BLM lands in the Empire-Cienega planning area. Maintain or achieve properly functioning condition (PFC) and the potential natural vegetative community (PNC) for 80% of the lands in the Sonoita Valley. PNC conditions for vegetation communities in riparian area types are listed below.
    - Cienegas – along Upper Cienega Creek stream channel
        - Ground cover and protective roots > 90% on upper and lower banks.
        - Marsh habitat > 50% of the total aquatic habitat in key cienega riparian segments.
        - Vegetation community on lower banks dominated by rushes, sedges, deer grass, and willows.
        - Upper banks and floodplain dominated by sacaton, yerba mansa, cottonwood, willow, and mesquite.
    - Cienegas – along the historic floodplain of Cienega Creek in valley bottom ponds
        - Ground cover > 90% on banks.
        - Emergent vegetation covering 75% or more of the perimeter of the aquatic vegetation.

        - Vegetation community banks dominated by rushes, sedges, deer grass, and willows.
        - Adjacent vegetation dominated by sacaton, paspalum, grass, and yerba mansa. Dominated means that < 20% in aggregate of the plant community consists of other species (e.g., seep willow, Bermuda grass, knot grass, upland herbaceuous annuals, or cattail).

    - Deciduous Woody Riparian (perennial surface water) – along lower Cienega Creek (below Mattie Canyon)

        - A tree community dominated by Goodding willow on lower banks or in aquatic habitat.
        - Trees on upper banks to include yew willow, Fremont cottonwood, velvet ash, and Arizona black walnut.
        - A mix of all age classes of riparian trees including seedlings, saplings, and adults
        - Lower banks to be dominated by rushes, sedges, seedling riparian trees, and deer grass with bank cover exceeding 90%.
        - Upper banks to be dominated by deer grass, sacaton grass, and riparian, trees of sapling and adult age classes.

    - Deciduous woody riparian (free subsurface water)

        - Maintain a tree community composed of any of the following tree species according to the existing site potential: Goodding willow, yew willow, Arizona black walnut, Fremont cottonwood, sycamore, seep willow, alder, box elder, and velvet ash.
        - Lower banks will be dominated by rushes, sedges, seedling riparian trees, and deer grass.
        - If tamarisk is present, it is only a minor component of the riparian tree community.

- Remove or control non-native vegetation species where monitoring finds that they threaten native species and where control is feasible and will not degrade ecosystem function over the long-term.
- Work with other entities within the watershed to maintain or improve watershed processes and characteristics that affect infiltration, runoff, and sediment transport. Current sub-watersheds of concern include: Gardner Canyon, Springwater Canyon, Mattie Canyon, Fresno Canyon, and Apache Canyon.
- Repair eroding streambanks or terraces at abandoned stream crossings or other disturbed sites along Cienega Creek and its tributaries, where erosion from these banks or terraces is harming riparian or aquatic habitats or function.
- Stabilize erosion and restore the natural function of the drainage in Wood Canyon according to the following management prescriptions:

    - Monitor the rate at which the gully system in lower Wood Canyon is advancing and the mechanism involved in this erosion process.
    - Once the cause of erosion has been determined, develop methods for stabilization.
    - Implement methods of erosion prevention in lower Wood Canyon and other areas where this type of erosion is advancing.

### *A.2.1 Arizona Standards for Rangeland Health*

Arizona Standards for Rangeland Health and Guidelines for Grazing Administration are available in full on the BLM Arizona website (https://www.blm.gov/programs/natural-resources/rangeland-and-grazing/rangeland-health/arizona). The standards and criteria for meeting each standard are presented below.

## Standard 1: Upland Sites

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

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

Ground cover in the form of plants, litter or rock is present in pattern, kind, and amount sufficient to prevent accelerated erosion for the ecological site; or ground cover is increasing as determined by monitoring over an established period of time.

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

**Exceptions and exemptions (where applicable):** None.

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

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

## Standard 2: Riparian-Wetland Sites

Riparian-wetland areas are in properly functioning condition.

**Criteria for meeting Standard 2:** Stream channel morphology and functions are appropriate for proper functioning condition for existing climate, landform, and channel reach characteristics. Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows.

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

The checklist for riparian areas is in Technical Reference 1737-9 "Process for Assessing Proper Functioning Condition." The checklist for wetlands is in Technical Reference 1737- 11 "Process for Assessing Proper Functioning Condition for Lentic Riparian-Wetland Areas." These checklists are reprinted on the pages following the Guidelines for Standard 3.

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

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

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

**Exceptions and exemptions (where applicable):** None.

## Standard 3: Desired Resource Conditions

Productive and diverse upland and riparian-wetland plant communities of native species exist and are maintained.

**Criteria for meeting Standard 3:** Upland and riparian-wetland plant communities meet desired plant community objectives. Plant community objectives are determined with consideration for all multiple uses. Objectives also address native species, and the requirements of the Taylor Grazing Act, Federal Land Policy and Management Act, Endangered Species Act, Clean Water Act, and appropriate laws, regulations, and policies.

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

**Exceptions and exemptions (where applicable):** Ecological sites or stream reaches on which a change in existing vegetation is physically, biologically, or economically impractical.

**Guidelines:** The use and perpetuation of native species will be emphasized. However, when restoring or rehabilitating disturbed or degraded rangelands, non-intrusive, non-native plant species are appropriate for use where native species (a) are not available, (b) are not economically feasible, c) cannot achieve ecological objectives as well as non-native species, and/or (d) cannot compete with already established non-native species.

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

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

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

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

- ephemeral vegetation is present in draws, washes, and under shrubs and has grown to useable levels at the time grazing begins;
- sufficient surface and subsurface soil moisture exists for continued plant growth;
- serviceable waters are capable of providing for proper grazing distribution;
- sufficient annual vegetation will remain on site to satisfy other resource concerns, (i.e., watershed, wildlife, wild horses and burros); and
- monitoring is conducted during grazing to determine if objectives are being met.

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

Management practices to achieve desired plant communities will consider protection and conservation of known cultural resources, including historic and prehistoric sites, and Tribally significant resource values.

# A.3 Additional LCNCA Ecological Objectives developed by Biological Planning Team

## *A.3.1 Updated Perennial Grass and Bare ground Cover*

Updated Perennial Grass Basal Cover and Bare ground objectives for select ecological sites in *MLRA 41-3 (12-16"pz)* by Dan Robinett (2010)[1]. Parenthetic values are indicative of cover levels objectives for areas after severe disturbance such as fire or long-term drought.

| Ecological Site | Basal Cover % | Bare Ground % |
|---|---|---|
| Sandy Loam Upland/Loamy Upland | 8 (4) | 30 (60) |
| Loamy Slopes (Loamy Hills) | 7 (4) | 30 (40) |
| Limy Slopes | 5 (3) | 30 (40) |
| Shallow Hill (Granitic Hills) | 5 (3) | 30 (40) |
| Loamy Swale/Loamy Bottom | 10 (8) | 30 (50) |

## *A.3.2 Loamy bottom Ecological Sites*

Loamy Bottom 12-16" PZ and Loamy Bottom 16-20" PZ Ecological Sites, e.g., KAs 19, 20.

a. In areas with sacaton grasslands that can sustain those into the future (appropriate depth to water, flood regime, etc.),
    i. Maintain or increase sacaton canopy to 25-80% cover
    ii. Maintain or reduce mesquite cover to 0-15% canopy cover (less than 10% in areas with breeding Grasshopper sparrows and wintering Baird sparrows as per LCNCA RMP Ecological objective)
    iii. Reduce size and number of unstable gully erosion and/or sheet erosion areas
b. In areas with loamy bottom forest site, Mesquite Bosque
    i. Maintain or increase overstory canopy cover of native trees (PRVE and others) to 25-65% cover
    ii. Manage for tall-statured trees with densities of 200-500 trees/ha.
        1. Do not cut trees near or on streambanks
        2. Harvest should not reduce canopy cover below 25%
        3. Manage for stable water table at less than 50ft. below ground.
        4. Reduce size and number of unstable gully erosion areas
    iii. In areas intermediate or unknown loamy bottom composition (sacaton flats vs. mesquite bosques), use ID team to choose between managing towards (i), (ii), OR manage as mixed Mesquite-Sacaton state as described in Loamy Bottom Rangeland R041xC312AZ

# A.4 Pima County Ranches Ecological Site Objectives

## *A.4.1 Loamy Upland 12–16" Precipitation Zone (P.Z.)*

**Bar V KA 1 (lT 5):** *Sasabe-Caralampi complex, 1–15% slopes;* may contain clay loam upland **Clyne KAs 1 and 2:** *White House gravelly loam, 1–8% slopes*

Objectives:

- Decrease bare ground to less than 30% at Clyne KA 2.
- Maintain catclaw acacia (*Mimosa biuncifera*), velvet mesquite (*Prosopis velutina*), wait-a-bit (*Mimosa aculeaticarpa*), and whitethorn acacia (*Acacia constricta*) frequency at less than 5% at Clyne KAs 1 and 2.

[1] Robinett, D. 2010. Draft Report on the Revision of BLM, Las Cienegas NCA, Objectives for Perennial Plant Cover on Upland Ecological Sites. Robinett Rangeland Resources LLC. August 2010.

- Reduce canopy composition of velvet mesquite (*Prosopis velutina*) from 18% to less than 10% to move towards a mesquite – native grass state at Bar V KA 1/IT 5
- Manage livestock grazing conservatively if winter precipitation is not adequate for native perennial grass survival before monsoons begin; time the grazing so that Lehmann's lovegrass is grazed immediately at green-up. This will allow native perennial grasses time to start growing. Lehmann's lovegrass is currently at 100% frequency, natives average at 30% frequency.
- Maintain native grass composition at 25% or higher.

**Sands KAs 6 and 7/Clyne KA 3:** *White House-Caralampi complex, 5–25% slopes*

Objectives:

- Maintain velvet mesquite (*Prosopis velutina*) and velvetpod mimosa (*Mimosa dysocarpa*) at less than 5%
- Manage livestock grazing conservatively if winter precipitation is not adequate for native perennial grass survival before monsoons begin; time the grazing so that Lehmann's lovegrass is grazed immediately at green-up at KAs 6 and 7. This will allow native perennial grasses time to start growing. Lehmann's lovegrass occurs with 97% frequency at KAs 6 and 7, but only at 36% at Clyne KA 3 site.
- Monitor recently established yellow bluestem carefully and apply proper grazing practices to encourage native grasses to remain dominant on the site.
- Maintain monitor fluctuations in frequency of Palmer's agave (*Agave palmeri*) and Sotol/desert spoon (*Dasylirion wheeleri*).
- Maintain exceptional diversity among short and mid-grasses, including: curly mesquite (*Hilaria belangeri*), hairy grama (*Bouteloua hirsuta*), cane bluestem (*Bothriochloa barbinodis*), fall withcgrass (*Digitaria cognata*), Hall's panic (*Panicum hallii*), plain's lovegrass (*Eragrostis intermedia*), at least 6 different species of threeawn (*Aristida* spp.), Santa Rita grama (*Bouteloua eludens*), sideoats grama (*Bouteloua curtipendula*), sprucetop grama (*Bouteloua chondrosoides*), tanglehead (*Heteropogon contortus*), wolftail (*Lycurus phleoides*).

### *A.4.2 Sandy Loam Upland 12–16" P.Z.*

**J Six IT 1/KA 1:** Verified to Sandy Loam Upland; *Nolam-Tombstone complex, 8–30% slopes, Baboquivari series*

Objectives:

- Monitor high frequency of Lehmann's lovegrass (*Eragrostis Lehmanniana*); currently at 60%
- Maintain mesquite (*Prosopis velutina*) at 5% or less
- Increase native perennial grasses to limit the invasion of Lehmann's lovegrass

### *A.4.3 Limy Slopes 12–16" P.Z.*

**Bar V IT 2/KA 2, J Six IT 2/KA 2:** *Power Line-Kimrose family complex, 10–35% slopes*

Objectives:

- Reduce canopy composition of whitethorn acacia (*Acacia constricta*) from 12% to less than 10% at Bar V KA 2 and maintain whitethorn acacia (*Acacia constricta*) and mesquite (*Prosopis velutina*) at <5% at J Six IT 2/KA 2 to move towards a native grass, forbs and half-shrub state at both sites.
- Increase native perennial grass composition to greater than 25%; continue to monitor increasing composition of Lehmann's lovegrass (*Eragrostis lehmanniana*).

**J Six IT 5/KA 4:** Limy Slopes 12–16" PZ; MLRA 41-3; *Tombstone very gravelly sandy loam, 15–50% slopes*

Objectives:

- Maintain current levels of perennial native grasses in the community
- Apply livestock grazing ONLY IF winter precipitation is adequate for perennial grass survival before monsoons begin. Drought alone, without grazing pressure, will kill black grama (*Bouteloua eriopoda*) and either Lehmann's Lovegrass (*Eragrostis lehmanniana*) or annual grasses will fill the space.

### *A.4.4 Limy Upland 12–16" P.Z.*

**Bar V KA 3:** *Soil series not currently known*

Objectives:

- Reduce canopy composition of whitethorn acacia (*Acacia constricta*) from 28% to less than 15% and maintain creosote (*Larrea tridentada*) canopy cover at less than 15% to move towards a native grass state.
- Maintain perennial native grass cover composition at 10 – 20% to move towards a native grass state.

### *A.4.5 Granitic Upland 12–16" P.Z.*

**J Six IT 3/KA 3:** Verified to Shallow Upland 12–16" PZ; *Oracle-Romero shallow granite upland 5–35% slopes*

Objectives:

- Maintain current levels of perennial native grasses in the community
- Monitor high frequency of Lehmann's Lovegrass (*Eragrostis lehmanniana*) (currently at 80%)
- Maintain mesquite (Prosopis velutina) and velvetpod mimosa (*Mimosa dysocarpa*) tree cover at 0% to remain in native grass, forb and half-shrub state.

### *A.4.6 Volcanic Hills 12 – 16" P.Z.*

**J Six IT 4:** *Pantak, Deloro-Andrada complex, 5–35% slopes*

Objectives:

- Maintain current levels of perennial native grasses in the community
- Monitor high frequency of Lehmann's Lovegrass (*Eragrostis lehmanniana*) (currently at 58%)
- Maintain mesquite (*Prosopis velutina*) and whitethorn acacia (*Acacia constricta*) at less than 35% canopy

### *A.4.7 Sandy Wash 10–13" P.Z.*

**J Six IT 6:** Sandy Wash 10–13" OR 12–16" PZ, MLRA 41-3; *Comoro, Parent Material granite/alluvium*

Objectives:

- Maintain mesquite (*Prosopis velutina*) tree canopy cover under 25%
- Reduce burroweed (*Isocoma tenuisecta*) and snakeweed (*Gutierrezia* spp.) to less than 20%
- Prevent additional erosion
- Increase mid to tall structured native perennial grasses: bush muhly (*Muhlenbergia porteri*), Arizona cottontop (*Digitaria californica*), black grama (*Bouteloua eriopoda*), plains bristlegrass (*Setaria vulpiseta*), sideoats grama (*Bouteloua curtipendula*), tanglehead (*Heteropogon contortus*), green sprangletop (*Leptochloa dubia*), Big sacaton (Sporobolus wrightii), and cane bluestem (*Bothriochloa barbinodis*).

# B. BEST MANAGEMENT PRACTICES

## B.1 Best Management Practices

### *B.1.1 Best Management Practices*

Each treatment would consider project design features to minimize the degree of potential negative impacts, to the extent possible. These management practices are specific protective measures that will be identified for each treatment during the treatment planning and design process, and the appropriate best management practices will be applied.

### *B.1.2 Air Quality (AQ)*

When appropriate, the following air quality best management practices will be utilized during implementation of the proposed action:

- **AQ-01** For each prescribed fire treatment, a burn plan will be developed, incorporating smoke emissions computer modeling for particulate matter (PM) 2.5 and PM 10, day and night estimated smoke dispersal maps, and a vicinity map; these will be submitted for approval by BLM administrators prior to implementation.
- **AQ-02** All prescribed fire treatments will be registered with Arizona Department of Environmental Quality (ADEQ) on an annual basis. An ADEQ burn permit will be obtained prior to any prescribed fire treatments.
- **AQ-03** Apply dust abatement techniques (e.g., water or soil stabilizers) when appropriate, such as when treatments have the potential of creating fugitive dust from vehicle or mechanical equipment operation in areas of exposed or disturbed soil.
- **AQ-04** Herbicides will be applied in favorable weather conditions to minimize drift (e.g., when winds do not exceed 10 mph or temperatures do not cause volatility). Herbicide applications will not occur during weather calms and in winds less than 2 mph, as these conditions are conducive to temperature inversions that can concentrate droplets and cause drift.

### *B.1.3 Temporary Access (TA)*

Often, vegetation treatment units are not located adjacent to roads; therefore, off-road vehicular travel (e.g., vehicles, utility terrain vehicles, and equipment) not within the footprint of the vegetation treatment unit will be required. Temporary access is defined here as repeated off-road travel over a route to access a treatment. It does not include one-time off-road uses. When appropriate, the following temporary access best management practices will be utilized during implementation of the proposed action:

- **TA-01** Temporary access routes may be utilized to gain entry into or within vegetation treatment units; access is limited to authorized personnel only (BLM, contractor, and grazing permittees).
- **TA-02** Temporary access routes will be discussed with resource staff and approved by the BLM Authorized Officer prior to implementation of the vegetation treatment.
- **TA-03** No new permanent roads will be established; all access routes to vegetation treatment units that develop two tracks may be signed with administrative access only during project implementation. (This may reduce the spread of invasive species.)
- **TA-04** Access across other landownerships (e.g., federal, state, local, and private) will be coordinated with the appropriate stakeholder prior to implementation of vegetation treatments.
- **TA-05** Upon completion of the vegetation treatment, all temporary access routes will be evaluated for rehabilitation and closed to further traffic.

### B.1.4 Biomass Utilization (BM)

When appropriate, the following biomass utilization best management practices will be utilized during implementation of the proposed action:

- **BM-01** Usable biomass generated during vegetation treatments will be made available for use by the public, where in conformance with resource management plans.
- **BM-02** Permits may be issued to the public for biomass generated during vegetation treatments. Maps of the area available for biomass collection will be issued with the permit.
- **BM-03** Stewardship contracts may be utilized for vegetation treatments that have the potential to produce large quantities of usable biomass. Residual biomass not utilized by the stewardship contractor may be made available to the public.
- **BM-04** Biomass generated from vegetation treatments may be utilized for erosion control material during vegetation treatment implementation or rehabilitation.

### B.1.5 Coordination (CO)

When appropriate, the following coordination best management practices will be utilized during implementation of the proposed action:

- **CO-01** Coordination with the interested public is vital. Interested public is inclusive of federal, state, local, and private stakeholders, partners, cooperators, and individuals. When appropriate, coordination with the interested public will occur prior to implementation of vegetation treatments.
- **CO-02** Vegetation treatments will be identified and implemented based on a BLM interdisciplinary team review, in coordination with the interested public, as appropriate.
- **CO-03** Public notification of planned prescribed fire and aerial herbicide treatments will occur as appropriate, prior to implementation (e.g., by newspaper, radio, letter, or posted notices).

## B.2 Materials Management (MM)

When appropriate, the following equipment, materials storage, and maintenance best management practices will be utilized during implementation of the proposed action:

- **MM-01** Equipment will be well maintained and void of any high volume fluid leaks.
- **MM-02** Fueling, equipment maintenance, equipment staging, materials storage, and overnight parking will occur in designated staging areas, near established roads and parking areas, or other designated equipment storage areas.
- **MM-03** Fuel transport and field storage will only occur in Department of Transportation-approved safety fuel containers or transfer tanks.
- **MM-04** Chemical spills (e.g., spills of hydraulic fluid, oil, antifreeze, or herbicide) will be contained and disposed of properly. Hazardous materials (hazmat) protocol will be used for large spills.
- **MM-05** Safety data sheets will be made available at the vegetation treatment job sites.

## B.3 Herbicide Treatments (HT)

When appropriate, the following herbicide treatment best management practices will be utilized during implementation of the proposed action:

- **HT-01** A Pesticide Use Proposal will be developed and approved for all herbicide treatments.
- **HT-02** All herbicide treatments on BLM-managed lands will be supervised by a BLM-certified pesticide applicator.
- **HT-03** All herbicide applications will follow the directions and application rates outlined on the product label, or at BLM-approved application rates, if less than label authorized rates. Apply the least amount of herbicide needed to achieve the desired result.
- **HT-04** Only federally registered and BLM-approved herbicides and adjuvants will be used.
- **HT-05** Herbicides utilized will take into account target vegetation, sensitive plant and animal species, as well as sensitive land features, such as water sources and soil characteristics.

- **HT-06** All herbicide applications will follow the stipulations outlined in the 2007 and 2016 update to the Western Vegetation PEIS (BLM 2007, 2016) and associated Records of Decision. See Appendix D of this EA.
- **HT-07** Tebuthiuron application rates will be less than 0.5 pounds active ingredient / acre.

## B.4 Noxious Weeds (NW)

When appropriate, the following noxious weed best management practice will be utilized during implementation of the proposed action:

- **NW-01** All equipment (e.g., contractor- and BLM-owned) utilized during and for treatments will be cleaned to remove dirt and debris to minimize the potential of transporting noxious weed seeds or plant parts, prior to arriving on-site for treatment implementation.

## B.5 Grazing Management (GM)

When appropriate, the grazing management best management practices listed below will be utilized prior to, during, or following implementation of the proposed action. These best management practices are designed to reduce the impacts of the proposed action on grazing operations, reduce impacts of grazing operations on post-treatment vegetation recovery, ensure BLM coordination with permittee/lessee, and allow for appropriate management of grazing operations.

- **GM-01** Coordination with the affected livestock permittee/lessee within the allotment will be conducted prior to any treatment occurring. Concurrence among all parties with regard to treatments will be documented via a cooperative agreement.
- **GM-02** Following a vegetation treatment, cattle would be excluded from the treatment unit for a minimum of two growing seasons (July-December) or until resource conditions are met as outlined in this EA and the Las Cienegas RMP to allow for perennial grasses to grow and drop seed before cattle enter the unit. Post-treatment monitoring will assist in determining the timing of the reintroduction of deferred livestock. Reintroduction timing will be based on favorable vegetation regrowth (vegetation treatment unit is meeting RMP objectives and/or there is not an extended drought) rather than on a predetermined duration.
- **GM-03** Any livestock grazing deferment (both pre- or post-treatment deferment) for the purpose of the vegetation treatment will be done through a cooperative agreement and will be finalized prior to the treatment.
- **GM-04** Monitoring data will be collected within key areas or in new established areas specific to the proposed treatment. Data will be used to guide the grazing management of the allotment and to document results of the treatment.

## B.6 Recreation (RC)

When appropriate, the following recreation best management practices will be utilized during implementation of the proposed action:

- **RC-01** When possible, treatment implementation will be scheduled outside of peak recreational use periods, while taking into account the optimum management period for the targeted species.
- **RC-02** When areas need to be closed to the public for safety reasons, public notification will occur prior to treatment implementation (e.g. signs, public meetings, or newspaper ads). The closure notice will outline the area closed, the reason for closure, and the duration of closure. The public notification will be coordinated with the BLM Public Affairs Officer.

## B.7 Road Maintenance (RM)

When appropriate, the following road maintenance best management practices will be utilized during implementation of the proposed action:

- **RM-01** Standard road maintenance guidelines established in the BLM Roads Manual 9113 and the BLM Primitive Roads Design Handbook 9115 may be implemented before and after treatments, as needed.
- **RM-02** Road maintenance activities will occur only within the footprint of existing roads.
- **RM-03** All road maintenance activities will be implemented according to the road classification and maintenance standards outlined in the existing land use plan or transportation management plans.
- **RM-04** Road maintenance may be completed before and after treatments to reduce the impacts on the road surface due to extra traffic by heavy equipment and support vehicles.
- **RM-05** Road maintenance may be completed before and after treatment implementation to maintain safe driving conditions for equipment and personnel.
- **RM-06** Road maintenance of roads belonging to other jurisdictions or private land owners will be coordinated with the appropriate stakeholder and approved prior to implementation.

## B.8 Soils (SO)

When appropriate, the following soil best management practices will be utilized during implementation of the proposed action:

- **SO-01** Minimize or exclude herbicide treatments that have high mobility and in areas where herbicide runoff is likely, such as during periods of intense rainfall, saturated and impermeable soils, on steep slopes, and paved surfaces.
- **SO-02** Granular herbicides will not be applied on slopes of more than 15 percent where there is the potential of runoff carrying granules into nontarget areas.
- **SO-03** Equipment (e.g. heavy equipment, vehicles, and utility terrain vehicles) will not be used when soils are seasonally saturated or following heavy precipitation to minimize soil disturbance (e.g., rutting and compaction).
- **SO-04** Soil characteristics and topography will be considered in vegetation treatment development to reduce the potential of soil erosion.
- **SO-05** Vegetation removal in drainages will need to be coordinated with on-site staff. Trees and shrubs will be flagged in such a way to prevent vertical incision and promote channel meandering. To be more specific, trees on point bars and trees in the channel thalweg whose roots are actively holding the bed elevation should be left alone. Trees that are on the outside of meander bends could be flagged for removal.
- **SO-06** Low ground pressure tires and wide tracks can be used on equipment to lower or eliminate soil compaction risk.

## B.9 Vegetation (VG)

When appropriate, the following vegetation best management practices will be utilized during implementation of the proposed action:

- **VG-01** Pre-treatment surveys for threatened, endangered, and sensitive plant species will be conducted via online resources (e.g., IPaC and HDMS). Based on the results of the review of the online resources, an on-site survey may be conducted by a resource specialist, local subject matter expert(s), and/or contracted personnel. Design features for threatened and endangered species will be developed and implemented, per the requirements of the Biological Opinion from the USFWS.
- **VG-02** In riparian areas, use appropriate herbicide-free buffer zones for herbicides not labeled for aquatic use, based on risk assessment guidance, with minimum widths of 100 feet for aerial, 25 feet for vehicle, and 10 feet for hand-spray applications (BLM 2007).
- **VG-03** Weed-free straw and mulch may be utilized during rehabilitation and other activities (e.g., revegetation, soil stabilization, and erosion control).
- **VG-04** Use effective non-chemical methods of vegetation control when and where feasible.

- **VG-05** Reseed or plant (disturbed areas and/or treatment areas), where and when appropriate, with desirable vegetation when the native plant community cannot recover and occupy the site sufficiently.
- **VG-06** When reseeding, native or sterile species for revegetation and restoration projects will be used to compete with invasive species until desired vegetation establishes.
- **VG-07** Refer to herbicide label when planning revegetation to ensure that subsequent vegetation will not be injured following application of the herbicide.

## B.10 Visual Resources (VR)

When appropriate, the following visual resources best management practices will be utilized during implementation of the proposed action:

- **VR-01** In Class I or II visual resource areas, ensure that the change to the characteristic landscape is low and does not attract attention (Class I) or, if seen, does not attract the attention of the casual viewer (Class II).
- **VR-02** Lessen visual impacts where appropriate by 1) designing projects to blend with topographic forms; 2) leaving some low-growing trees or planting some low-growing tree seedlings adjacent to the treatment area to screen short-term effects; and 3) revegetating the site following treatment.

## B.11 Water Resources (WR)

When appropriate, the following water resources best management practices will be utilized during implementation of the proposed action:

- **WR-01** Buffer widths between vegetation treatment areas and water sources will be developed based on treatment type and site-specific criteria to minimize impacts on water sources (e.g., wells, stock tanks, streams, and springs).
- **WR-02** Herbicide treatments will be implemented between weather fronts and at appropriate time of day to avoid high winds that increase the potential for overland flow and to avoid potential stormwater runoff and water turbidity.
- **WR-03** Application of herbicides not designated for aquatic use will be avoided in rapidly permeable soils in areas that have potential for ground-surface water interaction, such as shallow water tables, to prevent groundwater contamination.
- **WR-04** Spray tanks will be rinsed only at approved staging areas; staging areas will be established away from bodies of water.

## B.12 Wildlife (WL)

When appropriate, the following design features will be used to reduce the impacts of treatment on general wildlife (aquatic and terrestrial), threatened and endangered species, and other special status species:

- **WL-01** Avoid treating vegetation during time-sensitive periods (e.g., nesting and migration and sensitive life stages) for special status species in areas to be treated, when appropriate. Time vegetation treatments to take place when foraging pollinators are least active, both seasonally and daily.
- **WL-02** Use area buffers around sensitive habitats, such as wetlands, riparian zones, and special status species locations, to minimize adverse effects.
- **WL-03** Treatments should be rotated so that various successional stages, heights, and densities are developed over varying years and on different sites across the landscape.
- **WL-04** Treatment design and location will consider wildlife habitat concerns, such as diversity, cover, movement corridors, and connectivity.
- **WL-05** Minimize treatments near fish-bearing water bodies during periods when fish are in life stages most sensitive to the herbicides used, and use spot rather than broadcast or aerial treatments.

- **WL-06** Coordinate any prescribed burns proposed in or near prairie dog colonies with the Arizona Game and Fish Department.

## B.13 References

BLM (US Department of the Interior, Bureau of Land Management). 2007. Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement. Reno, Nevada.

_____. 2016. Vegetation Treatments Using Aminopyralid Fluroxypyr and Rimsulfuron on BLM Lands in 17 Western States PEIS. Internet website: https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projectId=70301&dctmId=0b0003e8807ca411.

# C. VEGETATION, EROSION CONTROL, AND STREAM RESTORATION TREATMENT TECHNIQUES AND DESIGNS

This appendix is split into four parts; the first part highlights the different types of vegetation treatments, the second part illustrates in more detail the techniques used in erosion control and stream restoration (from the Watershed Management Group [WMG]), the third part indicates the specific design plans for known treatment units to be analyzed in the EA, and the fourth part highlights areas where foreseeable future additional projects could occur.

## C.1 Part One: Vegetation Treatment Technique Examples

### *C.1.1 Mechanical: Grubbing and Masticator*

**Figure C-1. Left: Mechanical Grubber (Tiller et al. 2012), Right: Masticator at work in the Airstrip (2017)**

### C.1.2 Herbicide Application

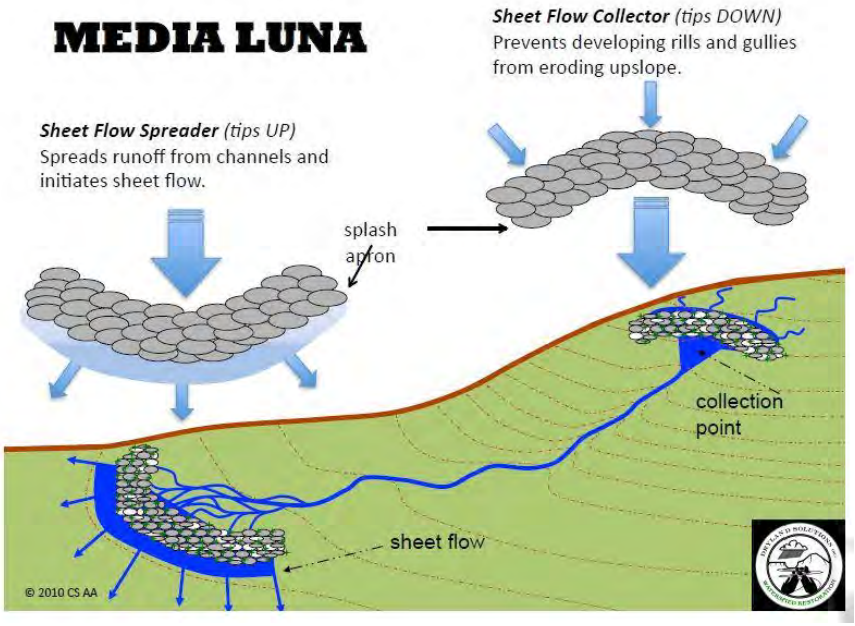
**Figure C-2. Top-Left Image: Truck equipped herbicide tank (Tiller et al. 2012), Top-Right: ATV with herbicide tank (BLM 2015), Bottom-Left: Manual Application (Tiller et al. 2012), Bottom-Right: Fixed wing aerial application (BLM 2018)**

## C.2 Part Two: Erosion Control/Stream Restoration Structures

The following are examples of techniques that would be used in erosion control and stream restoration treatments. A portion of this part of the appendix was provided by the WMG (2018a, 2018b). Restoration structures are rarely constructed exactly as described and this section is merely to provide an understanding of the typical construction of these structures in order to ascertain the typical impacts associated from them. It is common that the techniques illustrated below are merged to fit the topographic and soil context in which the erosion is occurring.

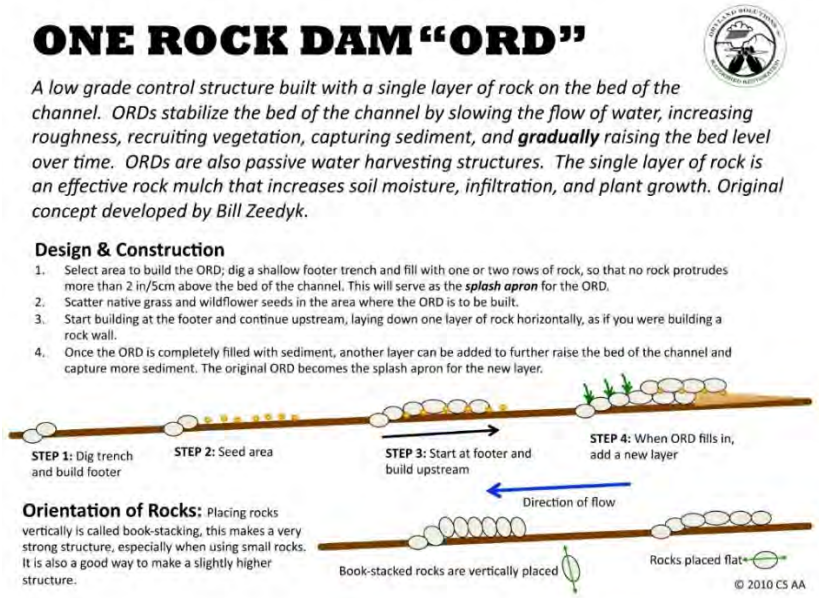
### C.2.1 Media Luna

Media Luna structures are used to manage sheet flow and prevent erosion. These “sheet flow spreaders” are used on relatively flat ground to disperse erosive channelized flow and reestablish sheet flow where it once occurred. They are made of appropriately sized rocks, generally 4 to 10 inches, and are one rock tall with the bottom row acting as a footer, dug in; subsequent rows offset the previous row to lock the structure that will capture sediment and provide germination sites for native plants.



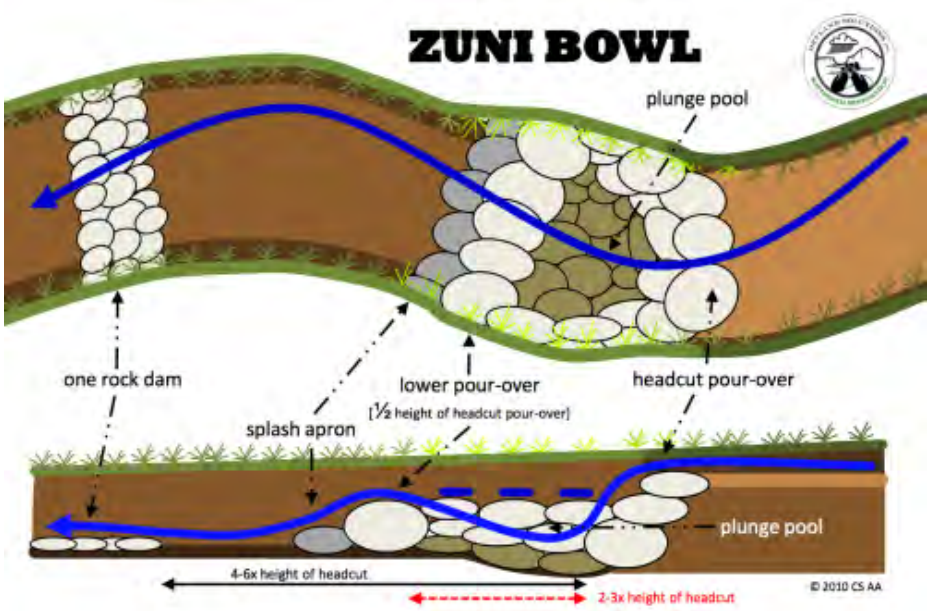

## C.2.2 One Rock Dam

One-rock dams are small grade, control and flow-slowing structures that are only one rock high. The dams should be several rows of rock across, from the up-stream to the downstream edge. Stones are selected, sized, and placed so that the completed structure ends up relatively level from bank to bank and flat from the upstream edge to the downstream edge. This is accomplished by placing larger rocks in the deepest part of the channel as a footer row and then placing smaller ones to either side. Placing greatly oversized rocks in the structure will generate turbulence that could undermine it. Flood flows will pack smaller-sized bedload particles between the rocks, gradually strengthening the structure over time as new vegetation begins to develop at the site.



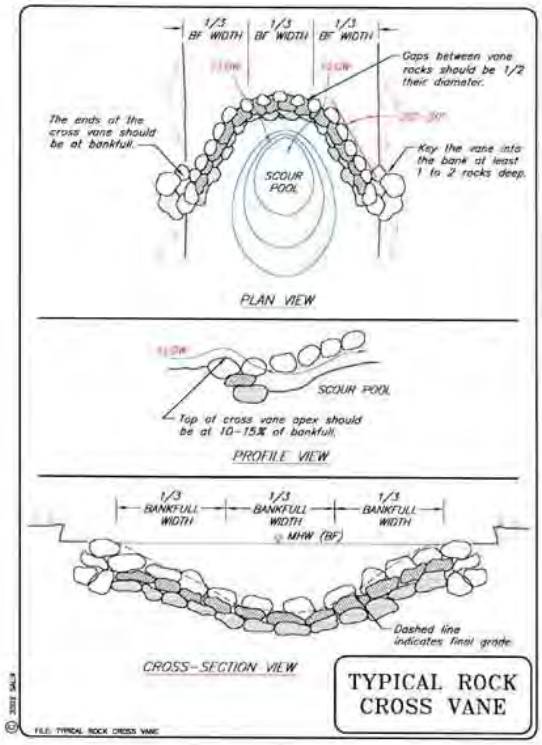

## *C.2.3 Zuni Bowl*

Zuni bowls are a headcut control structure composed of rock-lined step falls and plunge pools that prevent headcuts from continuing to migrate upstream. Zuni bowls stabilize actively eroding headcuts by dissipating the energy of falling water at the headcut pour over and the bed of the channel. The structure converts the single cascade of an eroding headcut into a series of smaller step falls. Zuni bowls also soil moisture on the face of the headcut, encouraging the establishment of protective vegetation.


ZUNI BOWL
plunge pool
one rock dam
splash apron
lower pour-over
[½ height of headcut pour-over]
headcut pour-over
plunge pool
4-6x height of headcut
2-3x height of headcut
© 2010 CS AA

### C.2.4 Cross Vane

A cross vane is a grade control structure that decreases near-bank stress and focuses stream power toward the center of the channel. The structure will establish grade-control, reduce bank erosion, create a stable width-to-depth ratio, and maintain channel and sediment transport capacity. Cross vanes are built with 18- to 24-inch rock and are supported by footers dug into the stream channel and both banks.




### C.2.5 Channel Spanning – Wicker Weir/Brush Dam/Post-Assisted Log Structure (PALS)

These are cross channel structures that act to maintain and increase bed elevations by surface flow and sediment. They are similar to one-rock dams in their placement and design except in the almost exclusive use of wood as the primary construction material. Construction of these structures is by hand with the use

of hydraulic (or gas) post-pounder to anchor posts into the ground (typically 2 to 3 times the height of the structure). Brush dams and post-less log structures do not have posts pounded and are held together with wire or local native materials (small branches and mud), if possible. Diagrams for a wicker weir and PALS from Wheaton et al. (2019) are below.

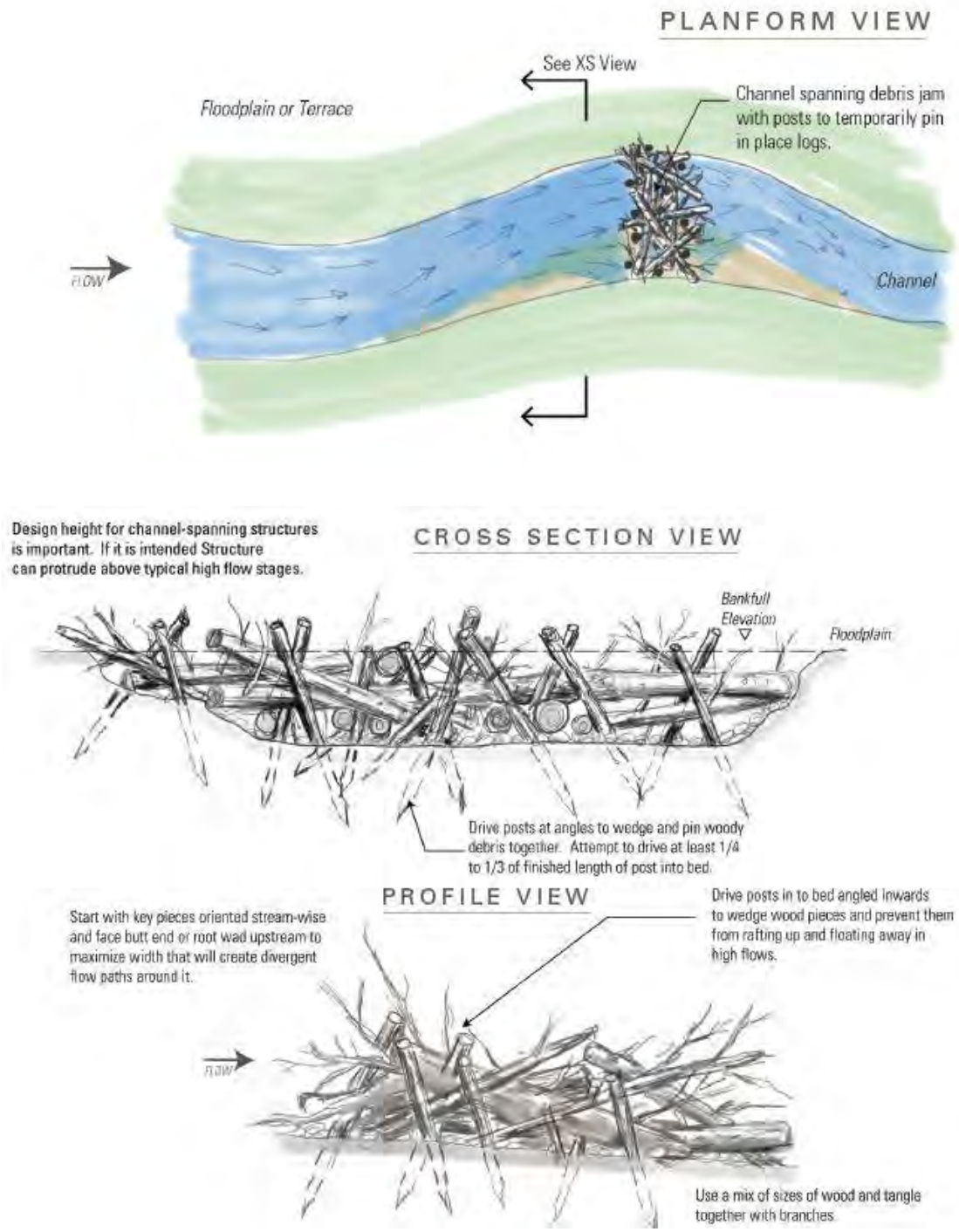



**Figure C-3. Post assisted log structure - Planform, Cross section, and profile view - from Wheaton et al. 2019**

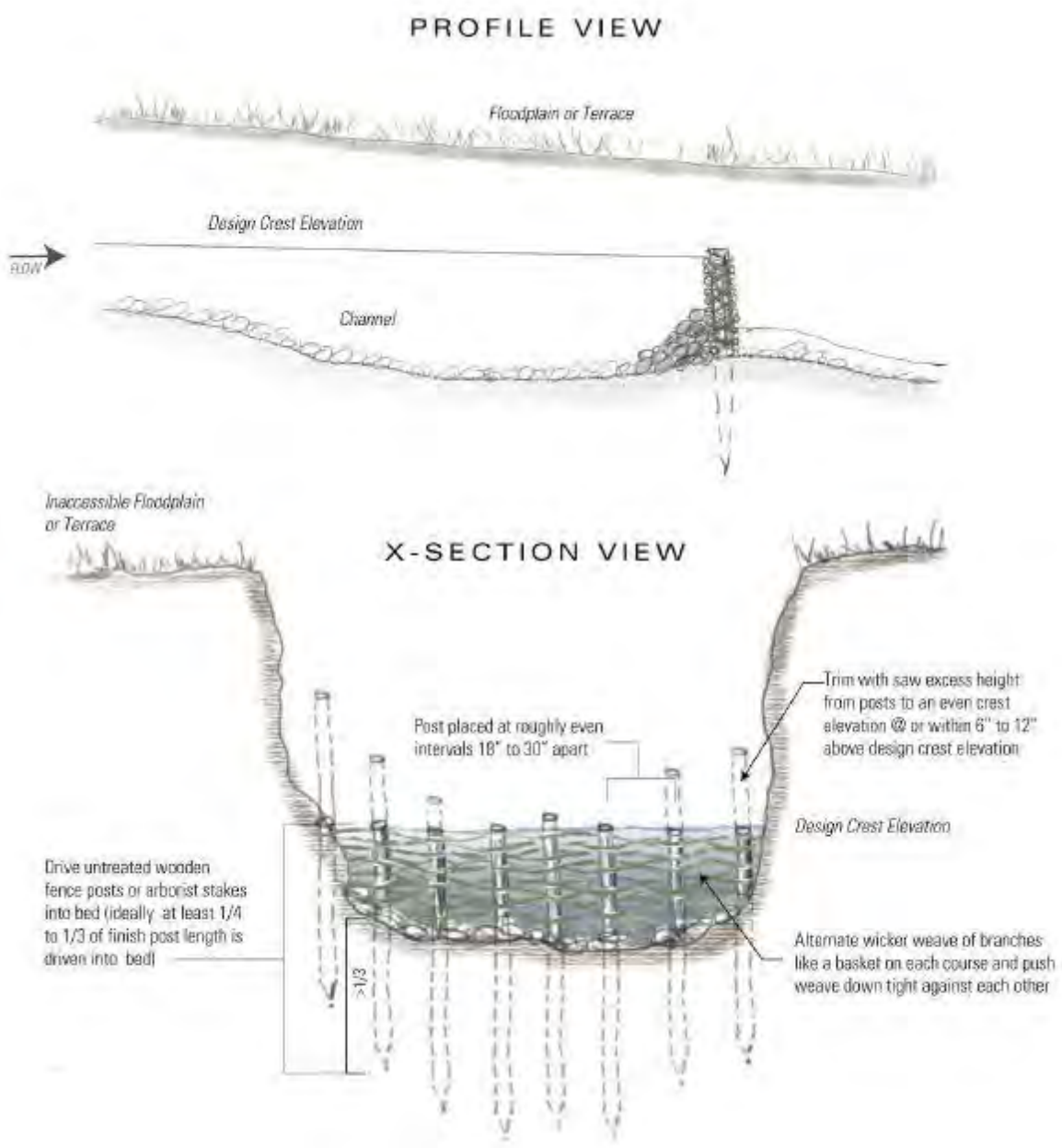



**Figure C-4. Wicker Weir - Profile and Cross-section view - from Wheaton et al. 2019**

### *C.2.6 Bank Attached Structure – Baffle/PALS*

This treatment technique is used to force outside bank erosion and point bar deposition as part of treatment complex to widen and aggrade incised channels. They consist of anchoring one end of a structure to a bank and placing rock or posts out to mid- or two-thirds-channel width. These structures can be composed of rock or wood depending on local availability of materials. As with the previous structure, wood posts would need to be driven into the bed of the channel using a hydraulic (or gas) post pounder. The use of large boulders will require the use of mechanical equipment, this would be only in larger drainages (e.g., Cienega Creek).

### C.2.7 Large Wood Replenishment and Hinge Felling

This treatment is applicable in stream reaches that lack large woody debris which is important for increasing structural complexity, adding nutrients, and trapping sediment. Large wood replenishment consist of physically adding large woody debris to the stream channel in-order to capture additional debris and create natural log jams [see Saldi-Caromile et al (2004)]. Where access is difficult or where sufficient riparian willow populations occur, the treatment would consist of hinge-felling of willows. This consists of cutting the base of near-stream willows such that the tree falls into the main stream channel but is not killed. Re-sprouting from the base of the willow, as well as vertically from the fallen portion in the stream channel, occurs and creates a naturally replenishing structure.

Additional techniques and structure designs that could be used and are similar in impacts are available from the following resources: Heede (1976), Napper (1996), Rosgen (1996), Saldi-Caromile et al. (2004), Zeedyke and Jansens (2006), Zeedyk and Clothier (2009), Wheaton et al. (2019), and the Arizona Department of Transportation Erosion Control Manual.

## C.3 Part Three: Specific Designs

There are 10 designed erosion control projects that are currently being funded through either a Bureau of Reclamation WaterSmart Grant managed by the Cienega Watershed Partnership (CWP) or an Arizona Department of Environmental Quality (ADEQ) Watershed Preservation Grant managed by the WMG. The six projects that are planned in the watershed are the Downstream Pantano Dam #2, Downstream Pantano Dam #3, Horseshoe Bosque, Davidson Canyon Tank, Empirita North, and 49 Wash. The four projects funded through the ADEQ grant are Downstream Pantano Dam #1, Empire Gulch below 900 road crossing, Gardner Canyon and State-Route 83, and Gardner Canyon/South Road sites. The specifics of each treatment are listed below in the same order; each project description includes background information, treatment prescription, and special treatment considerations. An overview of all sites is denoted below.

### C.3.1 Bureau of Reclamation-CWP Sites

#### Downstream of Pantano Dam #2

This unnamed tributary drainage to Cienega Creek has low density residential property at the top of its watershed, and it appears that urban-enhanced runoff may be accelerating erosion. This drainage has multiple eroding, but still shallow, channels across approximately 150 feet and for a length of approximately 400 feet above the creek.

**Treatments—**The project will install 18 to 20 rock media lunas, flow slowing and spreading structures throughout the approximately 1.5-acre site. One eroding channel is deep enough to require a Zuni bowl to arrest the head cut and up to 15 one-rock dams, on 6-foot centers, below. Treatment will require 125 cubic yards (CY) of rock and a crew of eight people for 8 to 10 days.

**Treatment Considerations—**There are two scenarios, both with similar costs: 1) harvest the rock from the immediate area or 2) deliver the rock via Cienega Creek to the floodplain below the drainage. Both will entail transporting rock via wheelbarrows; because of this, the delivered rock is the preferred option as it will minimize ground disturbance in the surrounding area and will minimize the development of travel ways through the vegetation. Both options will entail using a loader to transport materials from a dump site near Colossal Cave Road, down the dry creek bed, to the two drainage's confluences with the creek. WMG will consult with the Lago del Oro Water Company, which has a pipeline at the bottom of the work area. In addition, WMG and Pima County will develop an invasive species control plan for this site.

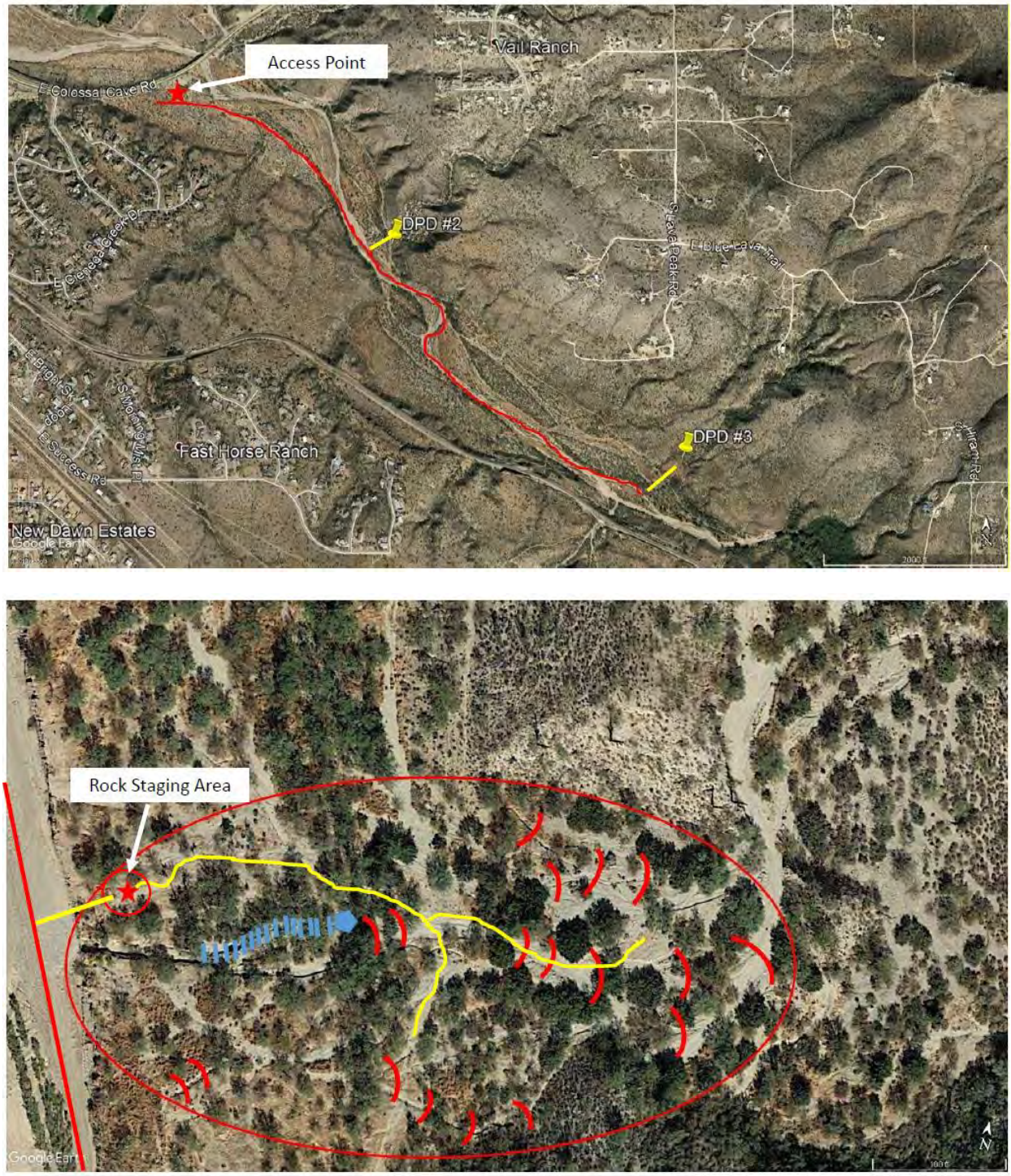



**Figure C-5. Downstream Pantano Dam #2 site:** ***Red oval is Area of Potential Effects, red arcs are Media Lunas, blue lines are one rock dams, and blue pentagon is a Zuni Bowl. The red star is the rock staging area on the first floodplain terrace***

### *C.3.2 Downstream of Pantano Dam #3*

This unnamed tributary drainage to Cienega Creek has low density residential property at the top of its watershed and it appears that urban-enhanced runoff may be accelerating erosion. This drainage has

multiple channels with gully erosion across a width of approximately 200 feet and for a length of approximately 500 feet above the creek.

**Treatments—**One hundred one-rock dams, grade control, flow slowing, and spreading structures will be installed throughout the approximately 3.5-acre site on 15-foot centers. Three Zuni bowls would be installed to arrest headcuts. Treatment will require 125 CY of rock and a crew of eight people for 6 to 8 days. See Part One above for structure descriptions.

**Treatment Considerations—** Rock delivery may be all via wheelbarrow, however if needed access with a loader via yellow line for rock delivery in existing degraded flow channels. WMG will consult with the Lago del Oro Water Company, which has a pipeline at the bottom of the work area. In addition, WMG and Pima County will develop an invasive species control plan for this site.


**Figure C-6. Downstream Pantano Dam Site #3:** ***Red oval is Area of Potential Effects, blue lines are channels for treatment with one rock dams, and blue pentagons are Zuni Bowls. The red star is the rock staging area on the second floodplain terrace. Rock delivery to structure sites will be by wheelbarrow.***

### *C.3.3 Horseshoe Bosque*

This site is bordered by Cienega Creek on the south and the Union Pacific Railroad on the east, north, and west. The presence of the raised rail bed has cut off normal sheet flow in the uplands, cut off one drainage, and caused severe erosion in the other drainage that supported the development of a dense mesquite bosque on the upper terrace of the creek. The active erosion in the drainage has caused severe erosion in the bosque and threatens trees and soil caves that are the sites of numerous bat roosts (cave myotis (*Myotis velifer*), Mexican long-tongued bat (*Choeronycteris mexicana*), Townsend's big-eared bat (*Corynorhinus townsendii*), and canyon bats (*Parastrellus Hesperus*).

In upland areas the construction of the raised rail bed has facilitated the loss of vegetation cover outside of the bosque. In addition, the erosion and downcutting in the bosque has led to large amounts of dead and down mesquite, thereby increasing the fire risk. There have been past efforts to slow and sink water flows and promote vegetation recovery. These efforts have been successful to a certain degree.

**Treatments—**WMG will not be able to import materials for the proposed structures. Pima County managers visited the site to detail the use of on-site materials and to ensure we do not disturb soils or habitat features for sensitive species. Selectively using dead mesquite, brush media lunas will be installed above bosque headcuts and in bare areas, and approximately 15 acres around the media lunas in the bare upland areas will be seeded with a Pima County-approved seed mix.

In addition WMG will selectively harvest all available materials, such as dead brush, leftover railroad construction material, and loose rock, for more structures in the uplands. This will be done to slow and spread water flows and provide more favorable microclimates for seed germination. The dead mesquite and the available materials on-site will be selectively harvested to ensure no adverse effects on soils, the tree canopy, nesting birds, or species habitat features. All materials for structures will be marked with flagging to ensure that the crew harvests appropriate items only, as determined by the land managers. For example only materials that are completely on the surface will be used and no piles of materials will be dismantled.

Treatment will require a crew of eight people, including a certified chainsaw operator, for 1 week. Brush media lunas take the same form as a rock media luna, except that brush is aligned with the flow slope to allow flow but slowing it to drop sediment and seeds and retain soil moisture.

**Treatment Considerations—**Care must be taken to make sure we are directing all water flows away from the bat caves and avoid damage or disturbance to caves during restoration. There is no heavy equipment access because of the railroad. Right-of-Entry paperwork from the Union-Pacific Railroad has been obtained and will be filed when dates are set for implementation. No materials will be imported or staged, all will be harvested locally as discussed with Pima County staff on-site.


**Figure C-7. Top: Access is from Marsh Station Road on an established dirt road, no maintenance needed for access. Bottom: Location of parking and Quarry Access to work sites is by foot.**


**Figure C-8. Horseshoe Bosque treatment areas.**


**Figure C-9. Horseshoe Bosque treatment design**

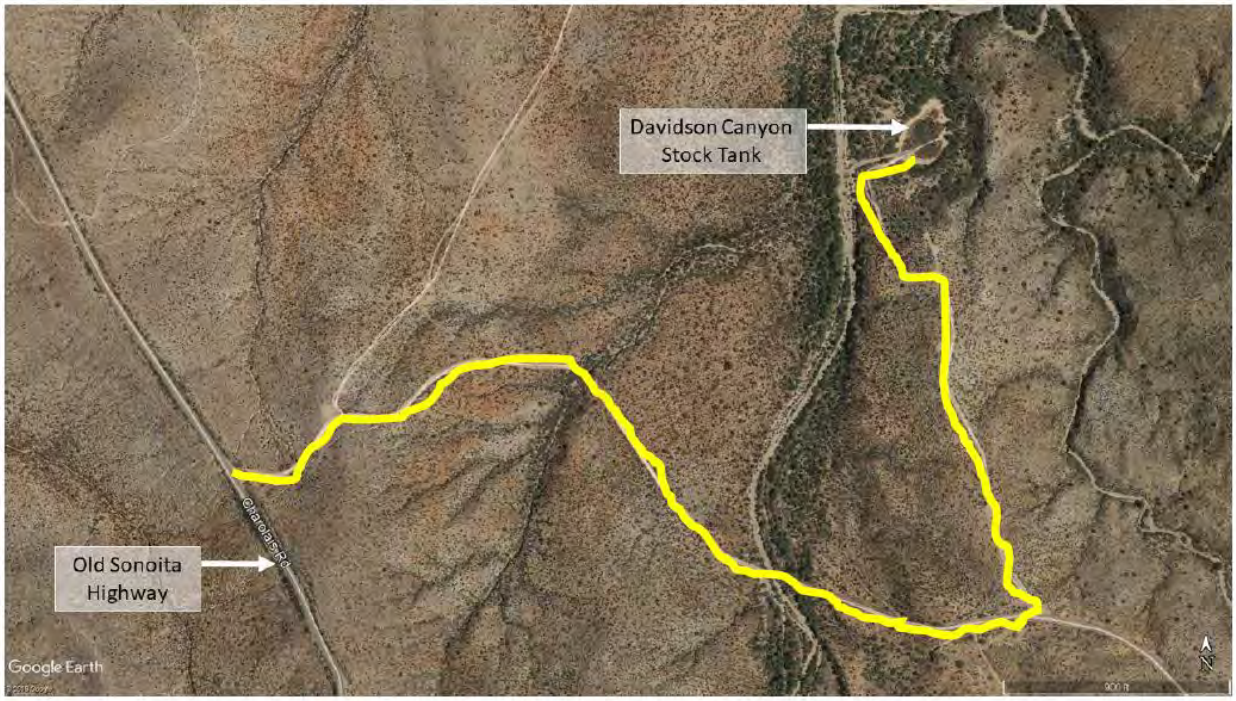

**Figure C-10. Horseshoe Bosque upland treatment design**

### C.3.4 Davidson Canyon Tank

This off-channel stock tank is on the Pima County-owned Bar-V Ranch. This part of the ranch is no longer grazed, and the tank has not been maintained for over 10 years. This has reduced its capacity due to sedimentation and has sent more water over its stabilized spillway. This has eroded the bottom of the spillway, its flow paths, and its outlet to the wash.

**Treatments—**Erosional areas will be repaired by installing one-rock dams, Zuni bowls, and media lunas. These are all grade control structures in different situations: one-rock dams in cuts, Zuni bowls in headcuts, and media lunas in uplands.

**Treatment Considerations—**Access points are from the stock tank and from the wash. Access with a backhoe will only occur from the wash and into the highly eroded headcut adjacent to the wash; all other structures sites will be accessed by wheel barrow.



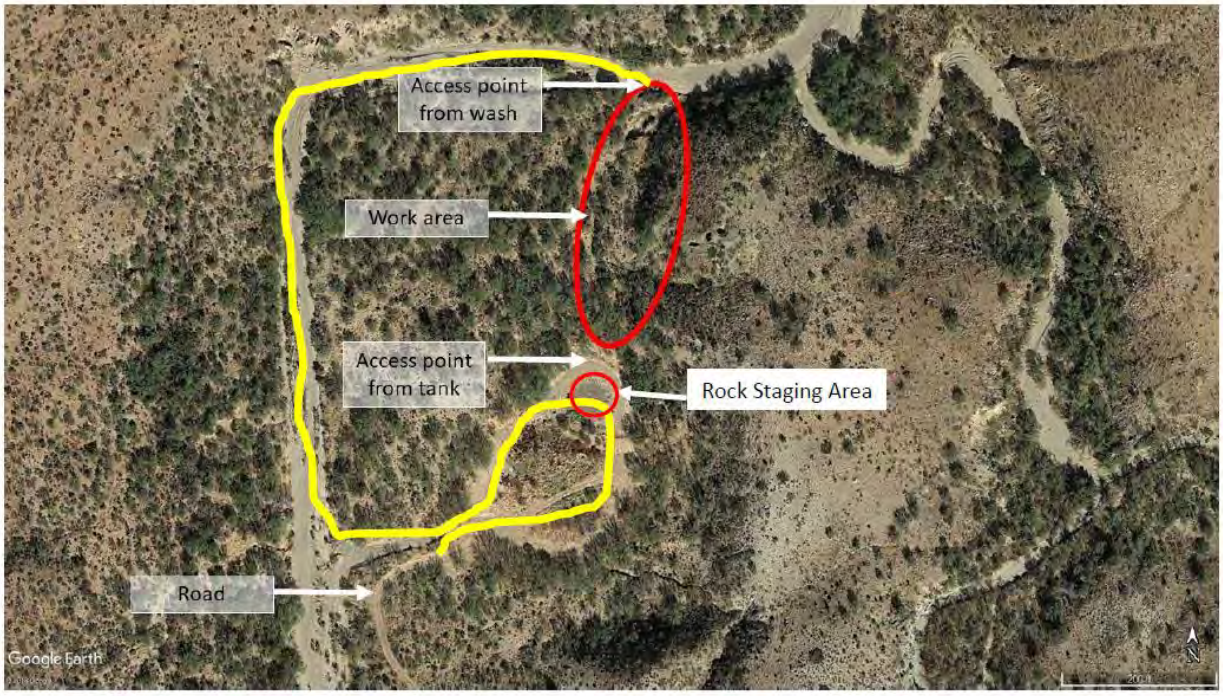



**Figure C-11. Top: Access is from Old Sonoita Highway on an established dirt road, no maintenance needed for access. Bottom: Davidson Stock tank Overview**


**Figure C-12. Davidson stock tank erosion area design (note: orientation is rotated 90 degrees to the west)**

### C.3.5 49 Wash Treatment Site

This site is identified in the 2003 Las Cienegas National Conservation Area Resource Management Plan as having a road that needs to be closed (page 17). Observers suggested that motorized vehicle use in the wash was causing erosion. On a May 27, 2019, site visit Trevor Hare and Dave Murray of the BLM showed that the wash had reclaimed the road, and a large stand of hackberry trees had grown over the entrance. At the same time, they identified a set of headcuts with gullies below the closure area that are active and extensive.

**Treatments—**Repair erosional areas by installing one-rock dams, Zuni bowls, and media lunas using 200 CY of rock.

**Treatment Considerations—**Access is from the designated 49 Wash road, BLM Road 6907A.


**Figure C-13. 49 Wash treatment site; rock staging area denoted by red star**

### C.3.6 ADEQ-WMG Sites

The following sites are funded through an ADEQ Watershed Improvement Grant awarded to WMG on both BLM-administered lands inside the Las Cienegas National Conservation Area and Pima County Lands in the Cienega Creek Preserve.

#### Downstream Pantano Dam #1

This site is the first tributary drainage entering Cienega Creek from the south, just upstream of Colossal Cave Road Bridge. Access to the site is through a Pima County locked gate and a Del Lago Water Company maintained road. Access to rock staging area is on an existing dirt road. In **Figure C-14**, the black line is the Area of Potential Effects, the yellow line represents an approximately 40 foot travel corridor to deliver rock with a loader to wheel barrow staging areas for delivery to structure sites. The 40 foot corridor will allow room to avoid vegetation clearing to the largest extent possible, and identified cultural sites will also be avoided. The entrance and road will be rehabilitated with vertical mulching, spreading of dead and down, and ground litter over the entire length and width of the access route.



**Figure C-14. Downstream Pantano Dam #1: Top photo: Access and Staging Area, Bottom: Area of potential effects in black, access road in yellow.**

This site is characterized as a Loamy Upland ecological site, with Pineleno soil type, in the bottom of a small valley surrounded by Limey Upland with Stagecoach soil type. Both soil types are well drained, deep, alluvial terraces but support different vegetation: the Loamy Uplands support a diverse community

of native and nonnative (buffelgrass) grasses, palo verde, mesquite and hackberry trees with wolfberry, bee bush, salt bush, and bursage; the Limy Uplands support more creosote and ocotillo.

This unnamed tributary drainage to Cienega Creek has high-density, residential development at the top of its watershed, and it appears that urban-enhanced runoff may be accelerating erosion. This drainage has multiple eroding channels across a width of approximately 300 feet and for a length of approximately 1,500 feet above the creek.

**Treatments—**WMG will install approximately 10 rock media lunas, flow slowing, and spreading structures throughout the approximately 10.5-acre site. The eroding channels will require up to 100 one-rock dams, on 15- by 30-foot centers. Treatment will require 150 CY of rock and a crew of three people for 20 days. See Part One above for structure descriptions.

**Treatment Considerations—**The BLM will use a loader to transport materials from a dump site near the arroyo's confluence with the creek. WMG will consult with the Lago del Oro Water Company, which has a pipeline near the work area. In addition WMG and PC will develop an invasive species control plan for this site.

## Empire Gulch below the BLM 6901 Road Crossing

This site is downstream of Empire Spring and the BLM 6901 road crossing, just past the Empire Ranch historic site. Access is via a closed ranch road that parallels the drainage and leads to an earthen stock tank.

This is characterized as a Clayey Swale ecological site, with Guest soil type. This soil type is well drained, mixed alluvium. It supports a more riparian vegetation community, with tobosa, vine mesquite, sacaton, mesquite, cottonwood, and hackberry. The drainage is surrounded by loamy uplands with a mostly native grassland to the north and an encroaching nonnative grassland to the south with Lehman's lovegrass.

This tributary drainage to Cienega Creek has several areas with erosion problems. The site proposed for work is a priority for the BLM. This is because, when BLM personnel visited it in December 2018, its stream flow was approximately one-third of the 1-mile treatment length.

**Treatments—**WMG has identified three large headcuts and a dozen smaller headcuts and will install three Zuni bowls and approximately 80 one-rock dams on 50-foot centers. Treatment will require 150 CY of rock and a crew of three people for 20 days. See Part One above for structure descriptions.

**Treatment Considerations—**CWP will use a loader to transport materials from a dump site near Empire Gulch. The work will be planned for June because the stream flow will have disappeared from the proposed treatment area by then, and the BLM will be able to avoid having impacts on listed species.

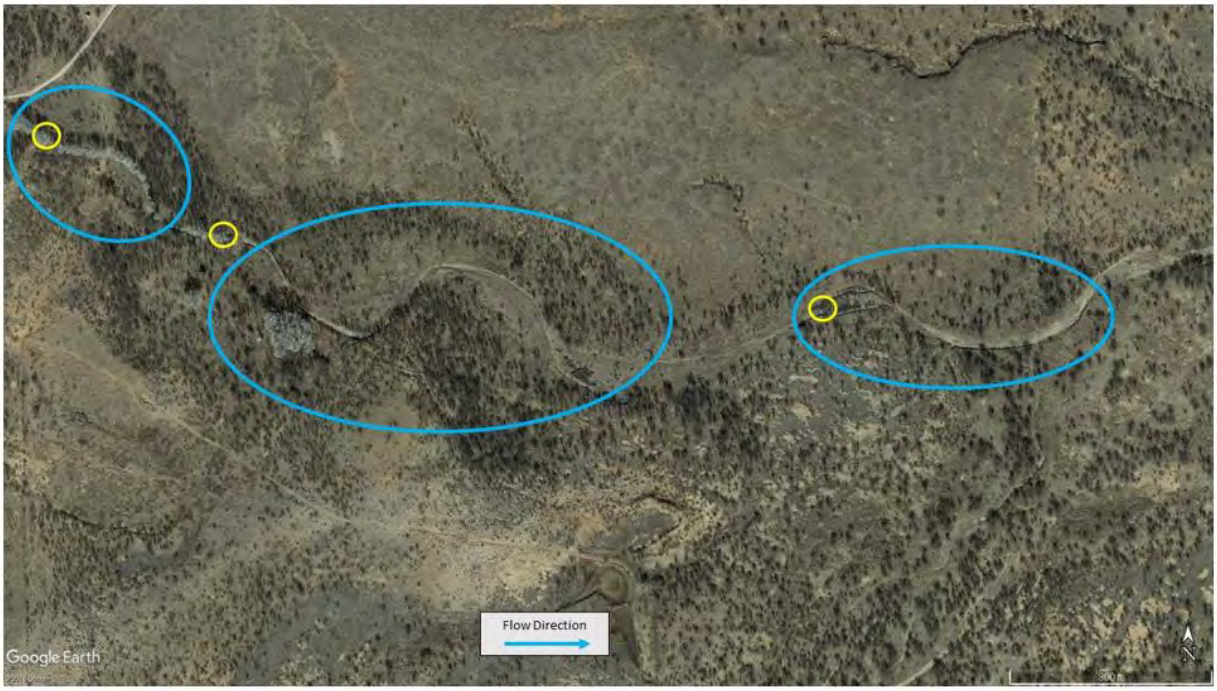



**Figure C-15. Empire Gulch, downstream of BLM 6901 road; large headcuts are demarcated with yellow circles, and blue ovals indicate areas where one-rock-dams will be installed.**

## Gardner Canyon near State Route 83

This site is in Ophir Gulch just upstream of its confluence with Gardner Canyon and upstream of State Route 83 (Sonoita Highway off the road to the Santa Rita Abbey). The project midpoint latitude and longitude are 31.736423/-110.677928. The site is encompassed in T19S, R16E, N½ of the SE¼ of Sec. 35. Access is from the main road, up Ophir Gulch.

This site is characterized as a Sandy Wash ecological site, with Comoro soil type and surrounded by a Loamy Bottom Woodland ecological site with Riverroad soil type. The Comoro soil type is well-drained, coarse alluvium and supports mesquite, desert willow, sacaton, and salt bush. The Riverroad soil type is well-drained fine alluvium that supports a more riparian vegetation community, including sacaton, hackberry, and walnuts.

This tributary drainage to Cienega Creek has several areas with erosion problems. The site proposed for work is a priority for the BLM; it has active lateral erosion to the surrounding sacaton grassland and continued downcutting in the main channel.

**Treatments—**WMG has identified five large headcuts. It will install Zuni bowls and 25 media lunas to halt the lateral erosion and approximately 50 one-rock dams on 50-foot centers in the channel. Treatment will require 150 CY of rock and a crew of three people for 20 days.

**Treatment Considerations—**The BLM will use a loader to transport materials from a dump site near the road to structure locations.

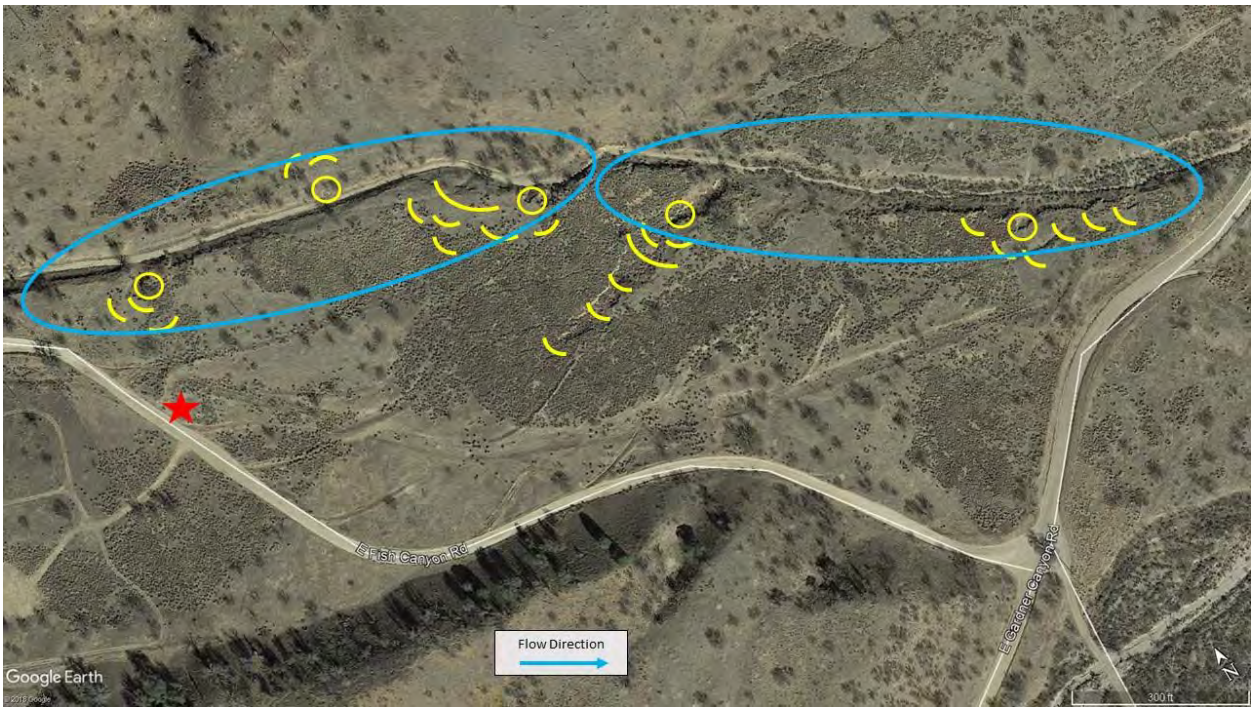



**Figure C-16. Gardner Canyon at SR83 site; the red star indicates the rock staging area, yellow circles are Zuni bowl placements, yellow arcs indicate media lunas, and blue ovals indicate areas where additional channel treatments will be used.**

## Gardner Canyon near South Road Crossing

This site is centered at the South Road (BLM 6900 Road) as it crosses Gardner Canyon. Access is from South Road. This site is characterized as a Sandy Wash ecological site, with Comoro soil type surrounded by a Loamy Bottom Woodland ecological site, with Riverroad soil type. The Comoro soil type is well-drained coarse alluvium and supports mesquite, desert willow, sacaton, and salt bush. There appears to be a shallow groundwater area, because the wash also supports cottonwood and ash. The Riverroad soil type is well-drained fine alluvium that supports an extensive sacaton grassland.

This tributary drainage to Cienega Creek has several areas with erosion problems. The site proposed for work is the road crossing and just upstream and downstream. The road crossing has significantly lowered over the last 5 years, due to high vehicle use. In addition the channel is eroding to match the deeper road crossing and appears to have been straightened at some point, as indicated by a berm on each side of the channel.

**Treatments—**WMG will install a cross vane just below the road crossing to raise the grade of the road and protect it from lowering again. It also will install approximately 50 one-rock dams on 50-foot centers in the channel. Treatment will require 50 CY of rock and a crew of three people for 6 days.

**Treatment Considerations—**The BLM will use a loader to transport materials from a dump site near the road to structure locations.


**Figure C-17. Gardner Canyon At South Road Crossing; the yellow arc indicates cross vane structure, and blue circles indicate areas where one rock dams will be placed.**

## C.4 Part Four: Additional Erosion Control Treatment Areas

The following erosion control areas (**Figure C-18**, below) were delineated through an internal BLM effort, using aerial imagery, and a site prioritization stakeholder engagement and GIS analysis facilitated by the CWP and WMG through a grant funded by the BLM (CWP 2017). These areas do not have site-specific designs, but they would involve similar types of treatments, as described in Parts 1 and 2, above. Furthermore, vegetation treatment techniques that are particularly disturbing to soils may require erosion control implements similar to those described above, which may occur on additional sites in the project area.

## C.5 References

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# D. LIST OF WILDLIFE SPECIES

**Table D-1. List of Wildlife Species with Potential to Occur in the Las Cienegas Landscape Restoration EA Project Area**

**Birds of the Las Cienegas Landscape Restoration EA Project Area**

| FAMILY | Common Name | Species | Occurrence |
|---|---|---|---|
| **PODICIPEDIDAE** | Pied-billed Grebe | *Podilymbus podiceps* | Uncommon |
| **PELICANIDAE** | Brown Pelican | *Pelicanus occidentalis* | Vagrant |
| **ARDEIDAE** | Great Blue Heron | *Ardea herodias* | Uncommon |
| | Great Egret | *Ardea albus* | Uncommon |
| | Snowy Egret | *Egretta thula* | Uncommon migrant |
| | Cattle Egret | *Bubulcus ibis* | Uncommon migrant |
| | Green Heron | *Butorides virescens* | Uncommon migrant ? |
| | Black-crowned Night-Heron | *Nycticorax nycticorax* | Uncommon migrant |
| **THRESKIORNITHIDAE** | White-faced Ibis | *Plegadis chihi* | Uncommon migrant |
| **ANATIDAE** | Greater White-fronted Goose | *Anser albifrons* | Rare migrant |
| | **Mandarin Duck | *Aix galericulata* | Exotic species** |
| | Green-winged Teal | *Anas crecca* | Common migrant and wintering species |
| | Mallard | *Anas platyrhynchos* | Uncommon migrant and wintering species |
| | Mexican Duck | *Anas platyrhynchos diazi* | Breeding? |
| | Blue-winged Teal | *Anas discors* | Uncommon migrant |
| | Cinnamon Teal | *Anas cyanoptera* | Uncommon migrant |
| | American Wigeon | *Anas americana* | Uncommon migrant or wintering species |
| | Gadwall | *Anas strepera* | Uncommon migrant or wintering species |
| | Ring-necked Duck | *Aythya collaris* | Uncommon migrant or winter visitor to ponds |
| | Bufflehead | *Bucephala albeola* | Uncommon migrant |
| | Hooded Merganser | *Lophodytes cucullatus* | Uncommon or rare migrant |
| **CATHARTIDAE** | Turkey Vulture | *Cathartes aura* | Common summer visitor |
| **ACCIPITRIDAE** | Osprey | *Pandion haliaetus* | Uncommon migrant |
| | White-tailed Kite | *Elanus leucurus* | Rare resident species |
| | Bald Eagle | *Haliaeetus leucocephalus* | Rare migrant or winter species |
| | Northern Harrier | *Circus cyaneus* | Common wintering species |
| | Sharp-shinned Hawk | *Accipiter striatus* | Uncommon migrant and wintering species |
| | Cooper's Hawk | *Accipiter cooperii* | Uncommon resident species |

| FAMILY | Common Name | Species | Occurrence |
|---|---|---|---|
| **ACCIPITRIDAE** *(continued)* | Northern Goshawk | *Accipiter gentilis* | Accidental |
| | Harris' Hawk | *Parabuteo uncinctus* | Accidental |
| | Gray Hawk | *Buteo nitidus* | Uncommon summer |
| | Swainson's Hawk | *Buteo swainsoni* | Uncommon summer |
| | Zone-tailed Hawk | *Buteo albonotatus* | Uncommon summer |
| | Red-tailed Hawk | *Buteo jamaicensis* | Common resident species |
| | Ferruginous Hawk | *Buteo regalis* | Rare winter |
| | Golden Eagle | *Aquila chrysaetos* | Uncommon visitor |
| **FALCONIDAE** | American Kestrel | *Falco sparverius* | Common resident species |
| | Merlin | *Falco columbarius* | Uncommon migrant and wintering species |
| | Peregrine Falcon | *Falco peregrinus* | Uncommon migrant |
| | Prairie Falcon | *Falco mexicanus* | Uncommon resident |
| **PHASIANIDAE** | Montezuma Quail | *Cyrtonyx montezumae* | Uncommon resident |
| | Scaled Quail | *Callipepla squamata* | Fairly common resident |
| | Gambel's Quail | *Callipepla gambelii* | Common resident |
| **RALLIDAE** | Virginia Rail | *Rallus limicola* | Uncommon resident species |
| | Sora | *Porzana carolina* | Rare in winter |
| | Common Moorhen | *Gallinula chloropus* | Rare migrant? |
| | American Coot | *Fulica americana* | Uncommon migrant and wintering species |
| **CHARADRIDAE** | Killdeer | *Charadrius vociferus* | Fairly common breeding species |
| **SCOLOPACIDAE** | Solitary Sandpiper | *Tringa solitaria* | Uncommon fall migrant (rare in spring?) |
| | Western Sandpiper | *Calidris mauri* | Uncommon fall migrant |
| | Common Snipe | *Gallinago gallinago* | Uncommon winter resident |
| | Wilson's Phalarope | *Phalaropus tricolor* | Uncommon fall migrant |
| **CUCULIDAE** | Yellow-billed Cuckoo | *Coccyzus americanus* | Uncommon nesting species |
| | Greater Roadrunner | *Geococcyx californianus* | Uncommon resident species |
| **COLUMBIDAE** | Rock Dove | *Columba livia* | Uncommon resident? |
| | White-winged Dove | *Zenaida asiatica* | Common summer resident |
| | Mourning Dove | *Zenaida macroura* | Common resident |
| | Inca Dove | *Columbina inca* | Uncommon resident |
| | Common Ground-Dove | *Columbigallina passerina* | Uncommon irregular resident |
| **TYTONIDAE** | Barn Owl | *Tyto alba* | Uncommon resident |

| FAMILY | Common Name | Species | Occurrence |
|---|---|---|---|
| **STRIDGIDAE** | Western Screech-Owl | *Otus kennicottii* | Uncommon resident species |
| | Flammulated Owl | *Otus flammeolus* | Hypothetical |
| | Great Horned Owl | *Bubo virginianus* | Common resident |
| | Ferruginous Pygmy Owl | *Glaucidium brasilianum* | Hypothetical |
| | Elf Owl | *Micrathene whitneyi* | Uncommon nesting species |
| | Burrowing Owl | *Speotyto cunicularia* | Uncommon nesting species |
| **CAPRIMULGIDAE** | Lesser Nighthawk | *Chordeiles acutipennis* | Uncommon nesting species |
| | Common Nighthawk | *Chordeiles minor* | Uncommon summer visitor |
| | Common Poorwill | *Phalaenoptilus nuttallii* | Uncommon breeding species |
| **APODIDAE** | Vaux's Swift | *Chaetura vauxi* | Uncommon fall migrant |
| | White-throated Swift | *Aeronautes saxatalis* | Uncommon year-round visitor |
| **TROCHILIDAE** | Broad-billed Hummingbird | *Cyanthus latirostris* | Post-breeding visitor |
| | Plain-capped Starthroat | *Heliomaster constantii* | Rare visitor |
| | Black-chinned Hummingbird | *Archilochus alexandri* | Fairly common summer visitor |
| | Anna's Hummingbird | *Calypte anna* | Uncommon migrant and possible breeding species |
| | Costa's Hummingbird | *Calypte costae* | Uncommon migrant |
| | Calliope Hummingbird | *Stellula calliope* | Uncommon migrant |
| | Broad-tailed Hummingbird | *Selasphorus platycercus* | Uncommon migrant |
| | Rufous Hummingbird | *Selasphorus rufus* | Fairly common migrant |
| **TROGONIDAE** | Elegant Trogon | *Trogon elegans* | Accidental |
| **ALCIDINIDAE** | Belted Kingfisher | *Ceryle alcyon* | Uncommon migrant and winter resident |
| | Green Kingfisher | *Chloroceryl americana* | Rare visitor |
| **PICIDAE** | Acorn Woodpecker<br>Gila Woodpecker<br>Red-naped Sapsucker<br>Ladder-backed Woodpecker<br>Hairy Woodpecker<br>Northern Flicker | *Melanerpes formicivorus*<br>*Melanerpes uropygialis*<br>*Sphyrapicus nuchalis*<br>*Picoides scalaris*<br>*Picoides villosus*<br>*Colaptes auratus* | Fairly common resident<br>Common resident<br>Uncommon migrant and winter resident<br>Common resident<br>Accidental<br>Red-shafted form is common resident |

| FAMILY | Common Name | Species | Occurrence |
|---|---|---|---|
| **TYRANNIDAE** | Northern Beardless-Tyrannulet | *Camptostoma imberbe* | Uncommon breeding species |
| | Olive-sided Flycatcher | *Contopus borealis* | Uncommon migrant |
| | Western Wood-Pewee | *Contopus sordidulu* | Uncommon nesting species |
| | Willow Flycatcher | *Empidonax traillii* | Uncommon migrant |
| | Hammond's Flycatcher | *Empidonax hammondii* | Uncommon migrant and winter resident |
| | Dusky Flycatcher | *Empidonax oberholseri* | Uncommon migrant and winter resident |
| | Gray Flycatcher | *Empidonax wrightii* | Uncommon migrant and winter resident |
| | Western Flycatcher | – | – |
| | Pacific-slope Flycatcher | *Empidonax difficilis* | Uncommon migrant |
| | Cordilleran Flycatcher | *Empidonax occidentalis* | Uncommon migrant |
| | Black Phoebe | *Sayornis nigricans* | Common nesting species |
| | Eastern Phoebe | *Sayornis phoebe* | Rare migrant and winter resident |
| | Say's Phoebe | *Sayornis saya* | Common nesting species |
| | Vermilion Flycatcher | *Pyrocephalus rubinus* | Common and conspicuous nesting species |
| | Dusky-capped Flycatcher | *Myiarchus tuberculifer* | Uncommon migrant |
| | Ash-throated Flycatcher | *Myiarchus cinerascen* | Common nesting species |
| | Brown-crested Flycatcher | *Myiarchus tyrannulus* | Uncommon nesting species |
| | Tropical Kingbird | *Tyrannus melancholicus* | Hypothetical |
| | Cassin's Kingbird | *Tyrannus vociferans* | Common nesting species |
| | Western Kingbird | *Tyrannus verticalis* | Common nesting species |
| | Eastern Kingbird | *Tyrannus tyrannus* | Accidental visitor |
| **ALAUDIDAE** | Horned Lark | *Eremophila alpestris* | Common nesting species |
| **HIRUDINIDAE** | Purple Martin | *Progne subis* | Uncommon migrant |
| | Tree Swallow | *Tachycineta bicolor* | Uncommon migrant |
| | Violet-green Swallow | *Tachycineta thalassina* | Common migrant and summer visitor |
| | Northern Rough-winged Swallow | *Stelgidopteryx serripennis* | Common breeding species |
| | Bank Swallow | *Riparia riparia* | Uncommon migrant |
| | Cliff Swallow | *Hirundo pyrrhonota* | Common nesting species |
| | Barn Swallow | *Hirundo rustica* | Common nesting species |

| FAMILY | Common Name | Species | Occurrence |
|---|---|---|---|
| **CORVIDAE** | Steller's Jay | *Cyanocitta stelleri* | Rare winter visitor |
| | Scrub Jay | *Aphelocoma califonica* | Rare visitor |
| | Mexican Jay | *Aphelocoma ultramarina* | Uncommon resident |
| | Chihuahuan Raven | *Corvus cryptoleucus* | Uncommon resident |
| | Common Raven | *Corvus corax* | Uncommon resident |
| **PARIDAE** | Bridled Titmouse | *Parus wollweberi* | Uncommon resident |
| **REMIZIDAE** | Verdin | *Auriparus flaviceps* | Uncommon resident |
| **AEGITHALIDAE** | Bushtit | *Psaltriparus minimus* | Uncommon resident |
| **SITTIDAE** | White-breasted Nuthatch | *Sitta carolinensis* | Uncommon resident |
| **CERTHIIDAE** | Brown Creeper | *Certhia americana* | Uncommon resident |
| **TROGLODYTIDAE** | Cactus Wren | *Campylorhynchus brunneicapillus* | Common resident |
| | Rock Wren | *Salpinctes obsoletus* | Uncommon resident |
| | Canyon Wren | *Catherpes mexicanus* | Uncommon resident |
| | Bewick's Wren | *Thryomanes bewickii* | Common resident |
| | House Wren | *Troglodytes aedon* | Common migrant, uncommon winter resident |
| | Winter Wren | *Troglodytes troglodytes* | Rare in winter |
| | Marsh Wren | *Cistothorus palustris* | Uncommon migrant and winter resident |
| **MUSICAPIDAE** | Blue-gray Gnatcatcher | *Polioptila caerulea* | Uncommon migrant |
| | Black-tailed Gnatcatcher | *Poiloptila melanura* | Uncommon resident |
| | Ruby-crowned Kinglet | *Regulus calendula* | Common winter resident |
| | Western Bluebird | *Sialia mexicana* | Rare or eruptive in winter |
| | Mountain Bluebird | *Sialia currucoides* | Eruptive in winter |
| | Townsend's Solitaire | *Myadestes townsendi* | Eruptive in winter and migration |
| | Swainson's Thrush | *Catharus ustulatus* | Uncommon migrant |
| | Hermit Thrush | *Catharus guttatus* | Uncommon migrant and winter resident |
| | American Robin | *Turdus migratorius* | Uncommon visitor |
| **MIMIDAE** | Northern Mockingbird | *Mimus polyglottos* | Common resident |
| | Sage Thrasher | *Oreoscoptes montanus* | Uncommon winter resident |
| | Curve-billed Thrasher | *Toxostoma curvirostre* | Common resident |
| | Crissal Thrasher | *Toxostoma crissale* | Uncommon resident |
| **MOTACILLIDAE** | American Pipit | *Anthus rubescens* | Uncommon |
| | Sprague's Pipit | *Anthus spragueii* | Uncommon |
| **PTILOGONATIDAE** | Phainopepla | *Phainopepla nitens* | Common permanent resident |

| FAMILY | Common Name | Species | Occurrence |
|---|---|---|---|
| **BOMBYCILLIDAE** | Cedar Waxwing | *Bombycilla cedrorum* | Uncommon usually late winter through early summer |
| **LANIIDAE** | Loggerhead Shrike | *Lanius lodovicianus* | Uncommon resident |
| | Northern Shrike | *Lanius excubitor* | Accidental |
| **STURNIDAE** | European Starling | *Sturnus vulgaris* | Common resident |
| **VIREONIDAE** | Bell's Vireo | *Vireo bellii* | Uncommon summer visitor |
| | Gray Vireo | *Vireo vicinior* | Hypothetical |
| | Solitary Vireo | *Vireo solitarius* | Uncommon migrant |
| | Hutton's Vireo | *Vireo huttoni* | Uncommon visitor |
| | Warbling Vireo | *Vireo gilvus* | Common migrant |
| **EMBERIZIDAE** | Tennessee Warbler | *Vermivora peregrina* | Accidental |
| | Orange-crowned Warbler | *Vermivora celata* | Uncommon migrant |
| | Nashville Warbler | *Vermivora ruficapilla* | Uncommon migrant |
| | Virginia's Warbler | *Vermivora virginiae* | Uncommon migrant |
| | Lucy's Warbler | *Vermivora luciae* | Common summer visitor |
| | Yellow Warbler | *Dendroica petechia* | Common summer visitor |
| | Yellow-rumped Warbler | *Dendroica coronata* | Common winter resident and migrant |
| | Black-throated Gray Warbler | *Dendroica nigrescens* | Uncommon migrant |
| | Townsend's Warbler | *Dendroica townsendi* | Uncommon migrant |
| | Hermit Warbler | *Dendroica occidentalis* | Uncommon migrant |
| | American Redstart | *Setophaga ruticilla* | Rare migrant |
| | Northern Waterthrush | *Seiurus novemboracensis* | Uncommon migrant |
| | Common Yellowthroat | *Geothlypis trichas* | Common summer visitor, uncommon winter resident |
| | MacGillivray's Warbler | *Opornis tolmiei* | Uncommon migrant |
| | Hooded Warbler | *Wilsonia citrina* | Rare migrant |
| | Wilson's Warbler | *Wilsonia pusilla* | Common migrant |
| | Painted Redstart | *Myioborus pictus* | Rare visitor |
| | Yellow-breasted Chat | *Icteria virens* | Common summer visitor |
| | Hepatic Tanager | *Piranga flava* | Rare migrant |
| | Summer Tanager | *Piranga rubra* | Common summer visitor |
| | Western Tanager | *Piranga ludoviciana* | Common migrant |
| | Northern Cardinal | *Cardinalis cardinalis* | Uncommon resident |
| | Pyrrhuloxia | *Cardinalis sinuatus* | Uncommon resident |
| | Rose-breasted Grosbeak | *Pheucticus ludovicianus* | Rare migrant |
| | Black-headed Grosbeak | *Pheucticus melanocephalus* | Common migrant |
| | Blue Grosbeak | *Guiraca caerulea* | Common summer visitor |
| | Lazuli Bunting | *Passerina amoena* | Common migrant |

| FAMILY | Common Name | Species | Occurrence |
|---|---|---|---|
| **EMBERIZIDAE** *(continued)* | Indigo Bunting | *Passerina cyanea* | Uncommon migrant or uncommon summer visitor |
| | Varied Bunting | *Passerina versicolor* | Uncommon summer visitor |
| | Painted Bunting | *Passerina ciris* | Rare migrant |
| | Dickcissel | *Spiza americana* | Rare migrant |
| | Green-tailed Towhee | *Pipilo chlorurus* | Common migrant and winter resident |
| | Spotted Towhee | *Pipilo maculatus* | Uncommon winter resident |
| | Canyon Towhee | *Pipilo fuscus* | Common resident |
| | Abert's Towhee | *Pipilo aberti* | Common resident |
| | Botteri's Sparrow | *Aimophila botterii* | Uncommon summer visitor |
| | Cassin's Sparrow | *Aimophila cassinii* | Uncommon summer visitor/A few in winter |
| | Rufous-winged Sparrow | *Aimophila carpalis* | Irregular resident |
| | Rufous-crowned Sparrow | *Aimophila ruficeps* | Uncommon resident |
| | Chipping Sparrow | *Spizella passerina* | Common winter resident |
| | Brewer's Sparrow | *Spizella breweri* | Common winter resident |
| | Vesper Sparrow | *Pooecetes gramineus* | Common winter resident |
| | Lark Bunting | *Calamospiza melanocorys* | Uncommon winter resident/Eruptive |
| | Lark Sparrow | *Chondestes grammacus* | Uncommon resident |
| | Black-throated Sparrow | *Amphispisa bilineata* | Uncommon resident |
| | Savannah Sparrow | *Passerculus sandwichensis* | Uncommon winter resident |
| | Baird's Sparrow | *Ammodramus bairdii* | Uncommon winter resident |
| | Grasshopper Sparrow | *Ammodramus savannarum* | Uncommon summer visitor and uncommon winter resident |
| | Song Sparrow | *Melospiza melodia* | Uncommon resident |
| | Lincoln's Sparrow | *Melospiza lincolnii* | Common winter resident |
| | Swamp Sparrow | *Melospiza georgiana* | Rare in winter |
| | White-crowned Sparrow | *Zonotrichia leucophrys* | Common winter resident |
| | Dark-eyed Junco | *Junco hyemalis* | Uncommon winter resident |
| | McCown's Longspur | *Calcarius mccownii* | Rare in winter |
| | Chestnut-collared Longspur | *Calcarius ornatus* | Uncommon in winter |
| | Bobolink | *Dolichonyx oryzivorus* | Rare migrant |
| | Red-winged Blackbird | *Agelaius phoeniceus* | Uncommon resident |
| | Eastern Meadowlark | *Sturnella magna* | Common resident |

| FAMILY | Common Name | Species | Occurrence |
|---|---|---|---|
| **EMBERIZIDAE** *(continued)* | Western Meadowlark | *Sturnella neglecta* | Uncommon in winter |
| | Yellow-headed Blackbird | *Xanthocephalus xanthocephalus* | Uncommon summer visitor |
| | Brewer's Blackbird | *Euphagus cyanocephalus* | Uncommon in winter |
| | Great-tailed Grackle | *Quiscalus mexicanus* | Uncommon visitor in spring |
| | Bronzed Cowbird | *Molothrus aeneus* | Uncommon summer visitor |
| | Brown-headed Cowbird | *Molothrus ater* | Common summer visitor |
| | Hooded Oriole | *Icterus cucullatus* | Uncommon summer visitor |
| | Streak-backed Oriole | *Icterus pustulatus* | Accidental |
| | Bullock's Oriole | *Icterus bullockii* | Uncommon summer visitor |
| | Scott's Oriole | *Icterus parisorum* | Uncommon summer visitor |
| **FRINGILLIDAE** | House Finch | *Carpodacus mexicanus* | Common resident |
| | Pine Siskin | *Carduelis pinus* | Uncommon in winter |
| | Lesser Goldfinch | *Carduelis psaltria* | Common resident |
| | Lawrence's Goldfinch | *Carduelis lawrencei* | Eruptive in fall and winter |
| | American Goldfinch | *Carduelis tristis* | Uncommon in winter |
| **PASSERIDAE** | House Sparrow | *Passer domesticus* | Common resident |

**Abundance and Residence Categories**:

**Common**: to be expected in proper habitat. Should be encountered on most visits during proper season.
**Uncommon**: may or may not be encountered. Includes species that are present in low numbers and species that are present in some years but not in others.
**Rare**: includes species that occur some years and in very small numbers.
**Accidental**: includes species that have occurred only once and are not likely to occur again.
**Hypothetical**: includes species for which documentation is lacking or questionable.
**Resident**: occurs year-round.
**Summer**: a neotropical migrant. A species that breeds at the Empire Ranch but is absent during the winter.
**Migrant**: a species encountered during annual passage.
**Winter**: a species that breeds farther north and spends the winter in the planning area.
**Irruptive**: species such as corvids that occur outside their normal range or habitat in response to resource fluctuations.
**Irregular**: a species that uses a site without an established pattern.

**Mammals of the Las Cienegas Landscape Restoration Project Area**

| FAMILY | Common Name | Scientific Name (*Species*) | Source |
|---|---|---|---|
| **SORICIDAE** | Desert Shrew | *Notiosorex crawfordi crawfordi* | 3 |
| **PHYLLOSTOMIDAE** | Lesser Long-nosed Bat | *Leptonycteris curasoae yerbabuenae* | 1, 3 |
| | Mexican Long-tongued Bat | *Choeronycteris mexicana* | – |
| **VESPERTILIONIDAE** | Cave Myotis | *Myotis velifer brevis* | 1,3 |
| | Fringes Myotis | *Myotis thysanodes thysanodes* | 1,3 |
| | California Myotis | *Myotis californicus californicus* | 1,3 |
| | Southwestern Myotis | *Myotis auriculus* | 1 |
| | Western Pipistrelle | *Pipistrellus hesperus* | 3 |
| | Big Brown Bat | *Eptesicus fuscus pallidus* | 1,3 |
| | Red Bat | *Lasiurus borealis* | 1 |
| | Hoary Bat | *Lasiurus cinereus* | 1 |
| | Townsend's Big-eared Bat | *Plecotus townsendii pallescens* | 3 |
| | Pallid Bat | *Antrozous pallidus pallidus* | 1,3 |
| **LEPORIDAE** | Desert Cottontail | *Sylvilagus auduboni arizonae* | 1,3 |
| | Black-tailed Jackrabbit | *Lepus californicus eremicus* | 1,3 |
| | Antelope Jackrabbit | *Lepus alleni* | 1 |
| **SCIURIDAE** | Harris' Antelope Squirrel | *Ammospermophilus harrisii* | 3 |
| | Black-tailed Prairie Dog | *Cynomys ludovicianus* | – |
| | Rock Squirrel | *Spermophilus variegatus* | 1,3 |
| | Spotted Ground Squirrel | *Spermophilus spilosoma* | 4 |
| **GEOMYIDAE** | Botta's Pocket Gopher | *Thomomys bottae proximus* | 3 |
| | Southern Pocket Gopher | *Thomomys umbrinus* | 2 |
| **HETEROMYIDAE** | Silky Pocket Mouse | *Perognathus flavus* | 3 |
| | Bailey's Pocket Mouse | *Perognathus baileyi* | 3 |
| | Hispid Pocket Mouse | *Perognathus hispidus* | 3,4 |
| | Desert Pocket Mouse | *Perognathus penicillatus* | – |
| | Rock Pocket Mouse | *Perognathus intermedius* | 3 |
| | Banner-tailed Kangaroo Rat | *Dipodomys spectabilis* | 1,4 |
| | Merriam's Kangaroo Rat | *Dipodomys merriami* | 3,4 |
| | Ord's Kangaroo Rat | *Dipodomys ordii* | 3 |

| FAMILY | Common Name | Scientific Name (*Species*) | Source |
|---|---|---|---|
| **MURIDAE** | Plains Harvest Mouse | *Reithrodontomys montanus* | 3 |
| | Western Harvest Mouse | *Reithrodontomys megalotis* | 3 |
| | Fulvous Harvest Mouse | *Reithrodontomys fulvescens* | 2,3 |
| | Cactus Mouse | *Peromyscus eremicus* | 3 |
| | Deer Mouse | *Peromyscus maniculatus* | 1,3 |
| | Brush Mouse | *Peromyscus boylii* | 3 |
| | White-footed Mouse | *Peromyscus leucopus* | 1 |
| | Northern Pygmy Mouse | *Baiomys taylori* | 1,2,3 |
| | Northern Grasshopper | *Onychomys leucogaster* | 3 |
| | Southern Grasshopper | *Onychomys torridus* | 3 |
| | Hispid Cotton Rat | *Sigmodon hispidus* | 3 |
| | Arizona Cotton | *Sigmodon arizonae* | 1,4 |
| | Fulvous Cotton | *Sigmodon fulviventer* | 3 |
| | Yellow-nosed Cotton Rat | *Sigmodon ochrognathus* | 2,3 |
| | Least Cotton Rat | *Sigmodon minimus* | 5 |
| | White-throated Wood Rat | *Neotoma albigula* | 1,3 |
| **ERETHRIZONTIDAE** | Porcupine | *Erethizon dorsatum* | 1 |
| **CANIDAE** | Coyote | *Canis latrans* | 1,3 |
| | Gray Fox | *Urocyon cinereoargenteus* | 1,3 |
| **PROCYONIDAE** | Ringtail | *Bassariscus astutus* | 1,3 |
| | Raccoon | *Procyon lotor* | 1,3 |
| | Coati | *Nasua nasua* | 1,3 |
| **MUSTELIDAE** | Badger | *Taxidea Taxus* | 1 |
| | Striped Skunk | *Mephitis mephitis* | 1,3 |
| | Hooded Skunk | *Mephitis macroura* | 1 |
| **FELIDAE** | Mountain Lion | *Felis concolor* | 1 |
| | Bobcat | *Felis rufus* | 1,3 |
| **TAYASSUIDAE** | Collared Peccary (javelina) | *Tayassu tajacu* | 1,3 |
| **CERVIDAE** | Mule Deer | *Odocoileus hemionus* | 1,3 |
| | White-tailed Deer | *Odocoileus virginianus* | 1,3 |
| **ANTILOCAPRIDAE** | Chihuahuan Pronghorn | *Antilocapra americana mexicana* | 1,3 |

Source:

1. BLM, Tucson Office Files (1988–89)
2. Arizona Game and Fish Department Nongame Heritage Database
3. Rosemont Inventory (1975–76): Davis, R., and Callahan, J.R., editors (ca. 1977). An Environmental Inventory of the Rosemont Area in Southern Arizona, Vol 1: The Present Environment. Unpublished contract report to Anamax Mining Corp.
4. Anderson, J. E. 1982. “Hunting area preferences of raptors in rangelands.” Unpublished Master’s thesis, University of Arizona, Tucson.
5. Bock, J. H., C. E. Bock, and J. R. McNight. 1976. “A study of the effects of grassland fires at the research ranch in southeastern Arizona.” *Journal of the Arizona Academy of Science* 2: 49–57.

**Fish, Amphibians, and Reptiles of the Las Cienegas Landscape Restoration Project Area**

| FAMILY | Common Name | Scientific Name *(Species)* | Source |
|---|---|---|---|
| **CYPRINIDAE** | Gila Chub | *Gila intermedia* | 1,2 |
| | Longfin Dace | *Agosia chrysogaster* | 1,2 |
| | Goldfish (Babocomari) | *Carassius auratus* | 5 |
| **ICTALURIDAE** | Yellow Bullhead (Babocomari) | *Ameiurus natalis* | – |
| **POECILIIDAE** | Gila Topminnow | *Poeciliopsis occidentalis occidentalis* | 1,2 |
| | Mosquitofish (Babocomari) | – | 1 |
| **CENTRARCHIDAE** | Largemouth Bass (Babocomari) | *Micropterus salmoides* | 4,5 |
| | Green Sunfish (Babocomari) | *Lepomis cyanellus* | 5 |
| | Bluegill (Babocomari) | *Lepomis macrochirus* | 5 |
| **PELOBATIDAE** | Couch's Spadefoot | *Scaphiopus couchii* | 1,3 |
| | Southern Spadefoot | *Scaphiopus multiplicatus* | 1 |
| **BUFONIDAE** | Sonoran Desert Toad | *Bufo alvarius* | 3 |
| | Great Plain's Toad | *Bufo cognatus* | 3 |
| | Red-spotted Toad | *Bufo punctatus* | 3 |
| **RANIDAE** | Bullfrog | *Rana catesbeiana* | 1 |
| | Lowland Leopard Frog | *Rana yavapaiensis* | 1 |
| | Chiricahua Leopard Frog | *Rana chiricahuensis* | 1 |
| **KINOSTERNIDAE** | Sonoran Mud Turtle | *Kinosternon sonoriense* | 1 |
| **EMYDIDAE** | Desert Box Turtle | *Terrapene ornata luteola* | 1 |
| **IGUANIDAE** | Common Collared Lizard | *Crotaphytus collaris* | 1,3 |
| | Lesser Earless Lizard | *Holbrookia maculata* | 1,3 |
| | Greater Earless Lizard | *Holbrookia texana* | 3 |
| | Clark's Spiny Lizard | *Sceloporus clarkii* | 1,3 |
| | Tree Lizard | *Urosaurus ornatus* | 1,3 |
| | Short-horned Lizard | *Phrynosoma douglassi* | 3 |
| | Regal horned Lizard | *Phrynosoma solare* | 1,3 |
| **SCINCIDAE** | Great Plains Skink | *Eumeces obsoletus* | 1 |
| **TEIIDAE** | Desert Grassland Whiptail | *Cnemidophorus uniparens* | 1,3 |
| | Giant Spotted Whiptail | *Cnemidophorus burti* | 3 |
| | Arizona Desert Whiptail | *Cnemidophorus tigris* | 3 |
| | Sonoran Spotted Whiptail | *Cnemidophorus sonorae* | 3 |
| **ANGUIDAE** | Madrean Alligator Lizard | *Gerrhonotus kingii* | 1,3 |
| **HELODERMATIDAE** | Gila Monster | *Heloderma suspectum* | 1,3 |

| FAMILY | Common Name | Scientific Name *(Species)* | Source |
|---|---|---|---|
| **COLUBRIDAE** | Ringneck Snake | *Diadophis punctatus* | 1,3 |
| | Big Bend Patch-nosed Snake | *Salvadora hexalepis deserticola* | 1,3 |
| | Sonoran Whipsnake | *Masticophis bilineatus* | 3 |
| | Coachwhip | *Masticophis flagellum* | 3 |
| | Gopher Snake | *Pituophis melanoleucus* | 3 |
| | Green Rat Snake | *Elaphe triaspis* | 2 |
| | Common Kingsnake | *Lampropeltis getulus* | 1 |
| | Checkered Garter Snake | *Thamnophis marcianus* | 1 |
| | Mexican Garter Snake | *Thamnophis eques* | 1 |
| | Black-necked Garter Snake | *Thamnophis cyrtopsis* | 1,3 |
| | Chihuahuan Hook-nosed Snake | *Gyalopion canum* | 2,3 |
| | Night Snake | *Hypsiglena torquata* | 3 |
| | Lyre Snake | *Trimorphodon biscutatus* | 3 |
| | Southwestern Black-headed Snake | *Tantilla hobartsmithi* | 3 |
| **VIPERIDAE** | Western Diamondback Rattlesnake | *Crotalus atrox* | 1 |
| | Mojave Rattlesnake | *Crotalus scutulatus* | 1,3 |
| | Rock Rattlesnake | *Crotalus lepidus* | 2 |
| | Black-tailed Rattlesnake | *Crotalus molossus* | 3 |

Sources:

1. BLM, Field Office Files
2. Arizona Game and Fish Heritage Database
3. Davis, R., and J. R. Callahan, editors. n.d. An Environmental Inventory of the Rosemont Area in Southern Arizona, Vol 1: The Present Environment. Unpublished contract report to Anamax Mining Corp.
4. Sheldon, D. L., and D. A. Hendrickson. 1988. Report of the October Fish Count. Arizona Game and Fish Department, Nongame Branch, Phoenix, Arizona.
5. Minckley, W. L. 1985. Native Fishes and Natural Aquatic Habitats in U.S. Fish and Wildlife Service Region 2 West of Continental Divide. Report to the U.S. Fish and Wildlife Service, Albuquerque, New Mexico, Department of Zoology, Arizona State University, Tempe.

**Table D-2. Federally Protected Species and Critical Habitat in the Project Area**

| Common Name | Scientific Name | Federal Status | Critical Habitat |
|---|---|---|---|
| Jaguar | *Panthera onca* | Endangered | Final |
| Ocelot | *Leopardus (=Felis) pardalis* | Endangered | No |
| California Least Tern | *Sterna antillarum browni* | Endangered | No |
| Mexican spotted owl | *Strix occidentalis lucida* | Threatened | No |
| Northern Aplomado Falcon | *Falco femoralis septentrionalis* | Experimental Population | No |
| Southwestern willow flycatcher | *Empidonax traillii extimus* | Endangered | Final |
| Yellow-billed cuckoo | *Coccyzus americanus* | Threatened | Proposed |
| Northern Mexican garter snake | *Thamnophis eques megalops* | Threatened | Proposed |
| Sonoyta Mud Turtle | *Kinosternon sonoriense longifemorale* | Endangered | Proposed |
| Chiricahua leopard frog | *Rana chiricahuensis* | Threatened | Final |
| Sonora Tiger Salamander | *Ambystoma tigrinum stebbinsi* | Endangered | No |
| Desert pupfish | *Cyprinodon macularius* | Endangered | No |
| Gila topminnow | *Poeciliopsis occidentalis occidentalis* | Endangered | No |
| Gila chub | *Gila intermedia* | Endangered | Final |
| Huachuca water umbel | *Lilaeopsis schaffneriana ssp. recurva* | Endangered | No |
| Pima pineapple cactus | *Coryphantha scheeri var. robustispina* | Endangered | No |
| Wright's Marsh Thistle | *Cirsium wrightii* | Endangered | No |
| Canelo Hills Ladies-tresses | *Spiranthes delitescens* | Endangered | No |

Source: USFWS 2019

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# E. FIGURES AND TABLES

The figures and tables that appear below are

| Rangeland | | | | | | | | Forestland | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| State | Sacaton Grassland (HCPC) | Sacaton Grassland | *Sacaton-Mesquite | Exotics | Eroded Sacaton | Annuals | Eroded Mesquite | Mesquite Bosque-native annuals (HCPC) | Mesquite Bosque - exotic annuals | Mesquite Thornscrub | Mesquite Scrubland |
| Original state | A | B | C | D | E | F | G | H | I | J | K |
| Refined sub-state | | B1,B2,B3 | C1,C2 | | E1,E2 | | [not observed] | | | | |
| | Canopy cover (%) | | | | | | | Canopy cover (%) | | | |
| Sacaton | 25-80 | 25-65 | 5-40 | | 20-50 | trace | | | | | |
| Mesquite | | 1-15 | 5-20 | 0-15 | | | 20-80 | 25-65; large | 20-80; large | 5-20; shrubby | 5-20; shrubby |
| Other shrubs, succulents | | | yes | | | 0-10 | 0-10 | 0-5 | | 5-15 | 5-15 |
| Exotics (johnsongrass, bermuda) | | | | yes | | | | | | | |
| Annuals | 0-20 | | | | | yes | | | yes; dominate | yes; fluctuate | yes; fluctuate |
| Gully erosion | | | | | severe | | severe | yes | yes | yes | yes |
| Flooding | | | | | reduced | reduced | no flooding | no flooding | no flooding | no flooding | no flooding |
| Water table (ft) | <20 | <20 | <20 | <20 | >20 | >20 | 25-50 | 25-50 | 25-50 | 25-50 | |
| Causal Mechanisms | | | lack of fire | plowing, cultivation, burning low SM | gully erosion | plowing, cultivation, burning low SM | | | | clearing, cultivation | lowered water table |

**Figure 18-1.** Combined Loamy Bottom Ecological Sites (rangeland and forestland), 12-16 inch precipitation zone, in tabular format for quick field reference. Letters represent original models' states; numbers represent revised model's sub-state distinctions. An asterisk (*) denotes naming convention differs from Mesquite-Sacaton state described in Loamy Bottom rangeland S&T model. *(Source: Tiller et al. 2012b)*

**Table E-1. Ecological Sites**

| Vegetation Community | Ecological Site | Acres |
|---|---|---|
| **Deciduous Riparian** | Clay Loam Upland 12-16" p.z. | 14 |
| | Clayey Swale 12-16" p.z. | 186 |
| | Limestone Hills 12-16" p.z. | 44 |
| | Limy Slopes 10-13" p.z. | 4 |
| | Limy Slopes 12-16" p.z. | 1 |
| | Limy Slopes 16-20" p.z. | 1 |
| | Limy Upland 12-16" p.z. | 4 |
| | Loamy Bottom 12-16" p.z. | 172 |
| | Loamy Bottom, Woodland 12-16" p.z. | 357 |
| | Loamy Slopes 12-16" p.z. | 11 |
| | Loamy Swale 12-16" p.z. | 50 |
| | Loamy Upland 10-13" p.z. | 0 |
| | Loamy Upland 12-16" p.z. | 34 |
| | Loamy Upland 16-20" p.z. | 3 |
| | Sandy Wash 10-13" p.z. | 384 |
| | Sandy Wash 12-16" p.z. | 1 |
| | Volcanic Hills 12-16" p.z. Clayey | 12 |
| | Volcanic Hills 12-16" p.z. Loamy | 21 |
| | Not Classified | 156 |
| **Deciduous Riparian Total** | | **1,457** |
| **Desert Grassland Uplands** | Basalt Hills 12-16" p.z. | 74 |
| | Clay Loam Upland 12-16" p.z. | 37,760 |
| | Clayey Swale 10-13" p.z. | 837 |
| | Clayey Swale 12-16" p.z. | 3,580 |
| | Clayey Upland 12-16" p.z. | 138 |
| | Loamy Slopes 12-16" p.z. | 3,604 |
| | Loamy Swale 10-13" p.z. | 10 |
| | Loamy Swale 12-16" p.z. | 1,223 |
| | Loamy Upland 10-13" p.z. | 688 |
| | Loamy Upland 12-16" p.z. | 53,821 |
| | Loamy Upland 16-20" p.z. | 379 |
| | Sandy Loam 12-16" p.z. Deep | 824 |
| | Sandy Loam Upland 12-16" p.z. | 1,588 |
| | Sandy Loam Upland 16-20" p.z. | 367 |
| **Desert Grassland Uplands Total** | | **104,894** |
| **Loamy Bottoms** | Limestone Hills 12-16" p.z. | 2 |
| | Limy Slopes 10-13" p.z. | 28 |
| | Limy Slopes 12-16" p.z. | 2 |
| | Limy Upland 10-13" p.z. | 0 |
| | Loamy Bottom 12-16" p.z. | 5,000 |
| | Loamy Bottom, Woodland 12-16" p.z. | 8,144 |
| | Loamy Upland 10-13" p.z. | 3 |
| | Loamy Upland 12-16" p.z. | 2 |
| | Sandy Loam 12-16" p.z. Deep | 11 |
| | Sandy Wash 10-13" p.z. | 1,985 |
| | Sandy Wash 12-16" p.z. | 1,204 |
| | Volcanic Hills 12-16" p.z. Clayey | 10 |
| | Volcanic Hills 12-16" p.z. Loamy | 5 |
| **Loamy Bottoms Total** | | **16,397** |
| **Scrub Uplands** | Granitic Hills 12-16" p.z. | 2,686 |
| | Granitic Hills 16-20" p.z. | 1,093 |
| | Granitic Upland 12-16" p.z. | 2,680 |

| Vegetation Community | Ecological Site | Acres |
|---|---|---|
| | Limestone Hills 10-13" p.z. | 2 |
| | Limestone Hills 12-16" p.z. | 11,852 |
| | Limestone Hills 16-20 p.z. | 3,531 |
| | Limy Slopes 10-13" p.z. | 2,272 |
| | Limy Slopes 12-16" p.z. | 29,383 |
| | Limy Slopes 16-20" p.z. | 1,808 |
| | Limy Upland 10-13" p.z. | 126 |
| | Limy Upland 10-13" p.z. Deep | 23 |
| | Limy Upland 12-16" p.z. | 4,372 |
| | Volcanic Hills 12-16" p.z. Clayey | 21,990 |
| | Volcanic Hills 12-16" p.z. Loamy | 11,848 |
| **Scrub Uplands Total** | | **93,667** |
| **Not Classified** | Schist Hills 10-13" p.z. | 70 |
| | Not Classified | 247 |
| **Not Classified Total** | | **317** |
| **Grand Total** | | **216,732** |

Source: BLM GIS 2019

**Table E-2. Acres of Vegetation Types Affected by Erosion Control and Stream Restoration.**

| Vegetation Type | Acres |
|---|---|
| Riparian | 36 |
| Desert Grassland Uplands | 409 |
| Loamy Bottoms | 399 |
| Scrub Uplands | 20 |
| **Total Acres** | **864** |

Source: BLM GIS 2019

**Table E-3. Soil Order and Suborders by Vegetation Type**

| Vegetation Type | Acres | Percentage of Project Area |
|---|---|---|
| **Desert Grassland Uplands** | | |
| *Alfisols* | – | – |
| Ustalfs | 749 | 0.4 |
| *Aridisols* | – | – |
| Argids | 63,584 | 30.5 |
| Calcids | 2,010 | 1.0 |
| *Entisols* | – | – |
| Fluvents | 179 | 0.1 |
| *Mollisols* | – | – |
| Ustolls | 33,036 | 15.8 |
| **Drainages, Lowlands, Other** | | |
| *Aridisols* | – | – |
| Argids | 138 | 0.1 |
| Calcids | 1,709 | 0.8 |
| *Entisols* | – | – |
| Fluvents | 20,346 | 9.7 |

| Vegetation Type | Acres | Percentage of Project Area |
|---|---|---|
| *Mollisols* | – | – |
| Ustolls | 2,817 | 1.3 |
| **Scrub Uplands** | | |
| *Aridisols* | – | – |
| Argids | 23,814 | 11.4 |
| Calcids | 51,399 | 24.6 |
| *Entisols* | – | – |
| Orthents | 5,291 | 2.5 |
| *Mollisols* | – | – |
| Ustolls | 3,682 | 1.8 |
| **Grand Total** | **208,753** | **100** |

Source: BLM GIS 2019

**Table E-4. Erosion Hazard Rating for Soil Series by Vegetation Type**

| Vegetation Community | Erosion Hazard Rating | Acres |
|---|---|---|
| Deciduous Riparian | Slight | 1,349 |
| | Moderate | 65 |
| | Severe | 43 |
| | Total | 1457 |
| Desert Grassland Uplands | Slight | 99,919 |
| | Moderate | 4904 |
| | Severe | 0 |
| | Not Rated | 71 |
| | Total | 104894 |
| Loamy Bottoms | Slight | 16349 |
| | Moderate | 45 |
| | Severe | 2 |
| | Total | 16397 |
| Scrub Uplands | Slight | 7,075 |
| | Moderate | 68,062 |
| | Severe | 18,530 |
| | Total | 93,667 |

Source: BLM GIS 2019

**Table E-5. Project Area Watersheds**

| Watershed Name | Total Acres | Acres in Project Area |
|---|---|---|
| Agua Verde Creek-Pantano Wash | 120,507 | 1,263 |
| Babocomari River | 200,246 | 74,234 |
| Cienega Creek | 265,084 | 137,112 |
| Clifford Wash-San Pedro River | 257,681 | 150 |
| Julian Wash-Santa Cruz River | 223,924 | 320 |

| Watershed Name | Total Acres | Acres in Project Area |
|---|---|---|
| **Grand Total** | **1,067,442** | **213,080** |

Source: BLM GIS 2019

**Table E-6. Erosion and Runoff Conditions for Ecological Sites**

| Ecological Site | Description of Erosion and Runoff Conditions from ESD |
|---|---|
| Basalt Hills 12-16" p.z. | These are shallow soils. Plant-soil moisture relationships are fair. |
| Clay Loam Upland 12-16" p.z. | Soil compaction, due to heavy livestock traffic, and loss of herbaceous cover can result in sheet, rill, and gully erosion. Hydrologic relationships can change to greatly increase the ratio of runoff to infiltration. Heavy soil textures at the surface can reduce the infiltration of high-intensity, summer rainfall. The site is very sensitive to loss of perennial grass cover, and runoff greatly increases under these circumstances. These soils can compact easily when moist and further reduce the effectiveness of warm-season moisture in penetrating the soil. |
| Clayey Swale 10-13" p.z. | This site can be extremely susceptible to gully erosion when grass cover has been removed. Lack of plant cover, soil compaction, and concentration of surface water flow can lead to rilling and gully formation. When dry, these soils produce little runoff due to cracks and depressions that hold water. When wet they produce good amounts of runoff due to heavy soil textures and swelling to seal cracks and holes. |
| Clayey Swale 12-16" p.z. | Due to severe soil cracking and churning (producing rough and porous surfaces), this site can have very high infiltration rates when dry. Vertic soil properties eliminate most surface compaction each year as long as stocking rates are moderate and heavy stocking is not persistent during times of the year when soils are moist. |
| Clayey Upland 12-16" p.z. | Due to severe soil cracking and churning (producing rough and porous surfaces), this site can have very high infiltration rates when soils are dry. It produces runoff only when soils are moist. Vertic soil properties eliminate soil compaction by livestock traffic each year as long as stocking rates are moderate and heavy stocking is not persistent during times of the year when soils are moist. |
| Granitic Hills 12-16" p.z. | The erosion hazard can be slight due to gravel, cobble, and rock covers. This site can have rough surfaces due to a high cover of gravels, cobbles, and stones, which act to hold water on the site. When the soils are dry, it produces little runoff. It produces significant runoff only when heavy rain falls on snow or moist soils. |
| Granitic Hills 16-20" p.z. | The soil erosion hazard can be slight due to a very high density of shrubs and gravel, cobble, and rock covers. This site can have very rough surfaces due to a high cover of gravels, cobbles, and stones, which act to hold water on the site. It produces little runoff from rainfall due to the high canopy cover of shrubs. It produces significant runoff only when heavy rain falls on snow or moist soils. |
| Granitic Upland 12-16" p.z. | Gravel size and cover may be inadequate on moderate slopes in preventing water erosion. This site can be a fair to good producer of runoff due to moderate slopes and shallow to very shallow soils. Very gravelly soil surfaces help to hold water on the site. |
| Limestone Hills 10-13" p.z. | Information unavailable |
| Limestone Hills 12-16" p.z. | Well-developed gravel and cobble covers can protect the soil from erosion. Coarse-textured soils and porous bedrock make this site an important site for capture of water and recharge of southeastern Arizona stream systems. |
| Limestone Hills 16-20 p.z. | The gravel and cobbles can protect soil surface from erosion while rock outcrop areas act as micro-watersheds providing runoff water to soil areas. This site is a poor producer of runoff due to the porous nature of the limestone parent material. |

| Ecological Site | Description of Erosion and Runoff Conditions from ESD |
|---|---|
| Limy Slopes 10-13" p.z. | Well-developed gravel covers can help protect the soil from erosion. This site has deep, coarse-textured soils and even with moderate to steep slopes, it is not a good producer of runoff. |
| Limy Slopes 12-16" p.z. | The long, steep slopes on this site can make it vulnerable to concentrated flow erosion from heavy rains during any time when vegetation cover is removed. Deep, coarse-textured soils produce little runoff except in exceptionally wet seasons. |
| Limy Slopes 16-20" p.z. | These soils can be very coarse textured and can be poor producers of runoff. |
| Limy Upland 10-13" p.z. | Well-developed gravel covers can help protect the soil from erosion. This site can have coarse-textured soils and moderate to gentle slopes, making it a poor producer of runoff. |
| Limy Upland 10-13" p.z. Deep | Well-developed gravel covers can help protect the soil from erosion. Soil surface resistance to erosion can be good under shrub canopies to moderate in interspaces due to crusts formed by raindrop impact. This site can have deep, coarse-textured soils and moderate to gentle slopes, making it a poor producer of runoff. |
| Limy Upland 12-16" p.z. | These soils are coarse textured, but may have lime cemented layers at shallow depths, which limit infiltration. |
| Loamy Bottom 12-16" p.z. | The site can be very susceptible to gully, channel, and bank erosion, especially when the tall grass cover is depleted due to repeated burning and overgrazing or when structures such as dikes and roads are placed on the floodplain. With severe erosion, the effectiveness of flooding is reduced, water tables are lowered, the grass cover is thinned, and woody plants, especially mesquite, will increase to dominate the plant community. Sacaton floodplains are extremely important in the hydrologic regime of southeastern Arizona stream systems. Intact sacaton floodplains retain floodwaters for 3 to 4 weeks after major flooding events. Channeled or gullied bottomlands often pass the same flood in 2 or 3 days. Water tables in healthy sacaton bottoms range from 5 to 20 feet alongside major streams and creeks and their larger tributaries. In other sacaton bottoms, clay lenses at moderate depths perch and hold water in the root zone of sacaton after flood events. |
| Loamy Bottom, Woodland 12-16" p.z. | The site can be very susceptible to channel and streambank erosion. Drainageways are deeply entrenched, and if streamside vegetation is disturbed, bank cutting becomes a serious problem. This site occurs on high stream terraces that no longer flood. Only in exceptional flood events (1983 and 1993) will this site flood and contribute to water and sediment retention in the stream system. |
| Loamy Slopes 12-16" p.z. | Steep slopes and loamy textured soils can make this site a producer of runoff. |
| Loamy Swale 10-13" p.z. | When the grass cover is depleted, the site can be extremely susceptible to gully erosion. Medium to heavy textured soils and flat slopes can make this site a fair producer of runoff. The site receives extra water in the form of run-in from adjacent uplands and watershed areas. |
| Loamy Swale 12-16" p.z. | The site can be very susceptible to gully erosion. These small floodplains receive and hold floodwater from adjacent upland areas for short periods of time (1–2 days). They are important in the hydrology of major streams by trapping sediment eroding from uplands and retaining floodwaters for slower release to the larger stream system. Gullied swales pass large flood events in less than 1 day. |
| Loamy Upland 10-13" p.z. | This site has thin, coarse-textured soil surfaces over clayey subsoils and low-gradient slopes. It can be a fair producer of runoff. |
| Loamy Upland 12-16" p.z. | Thin, coarse-textured soil surfaces can capture some of the intense summer rainfall on the site. Natural rates of runoff are as high as 30 percent for this site. Very shallow argillic (clayey) horizons keep soil moisture high in the soil profile and available to shallow rooted plants. |
| Loamy Upland 16-20" p.z. | Thin, coarse-textured soil surfaces help catch and hold intense summer rainfall and let it slowly infiltrate the clayey subsurface soil. The site can be very sensitive to loss |

| Ecological Site | Description of Erosion and Runoff Conditions from ESD |
|---|---|
| | of the coarse-textured surface (A) horizon. As the surface is reduced in thickness, the ratio of runoff to infiltration increases. Natural rates of runoff on this site are as high as 30 percent. With loss of the A horizon, runoff can increase to over 70 percent of annual rainfall. |
| Sandy Loam 12-16" p.z. Deep | Even with low plant cover, these soils can produce very little runoff and can have very low erosion rates. Some soils can be sandy textured but have enough coarse fragments that they are not subject to wind erosion. Hydrologic relationships can be very good. Coarse-textured soils, high plant and litter cover, and low bulk densities can result in little runoff in most years. |
| Sandy Loam Upland 12-16" p.z. | Thick, coarse-textured surfaces act to catch intense summer rainfall. Shallow, clayey horizons can prevent deep moisture penetration and can allow shallow rooted plants to use most of the moisture. |
| Sandy Loam Upland 16-20" p.z. | Due to thick, coarse-textured soil surfaces, this site can be a poor producer of runoff. |
| Sandy Wash 10-13" p.z. | When the grass cover has been depleted, erosion can begin and sandy channels can form, which remove floodwater rapidly and tend to dry the site. With deep sandy soils and flat slopes, this site can be a poor producer of runoff. Depending on the size of the watershed contributing runoff to the site, it can produce streamflow for short times, in the summer rainy season, to fill ponds. |
| Sandy Wash 12-16" p.z. | The site can be very susceptible to gully, channel, and bank erosion, especially where it has deteriorated to shrubby conditions and where depleted watershed areas are contributing larger-than-normal amounts of runoff. These sandy floodplains are extremely important for groundwater recharge in upland basins. Deep, very coarse-textured soils allow water to percolate to great depths after runoff from large storms. |
| Schist Hills 10-13" p.z. | Gravel and channel covers are continuous but lack the size necessary to prevent erosion on steep slopes if the plant cover has been depleted. This site can be a fair producer of runoff due to steep slopes and shallow soils. Very gravelly and cobbly soil surfaces tend to hold water on the site. |
| Volcanic Hills 12-16" p.z. Clayey | Well-developed covers of gravels, stones, and cobbles protect the soil from erosion. Steep slopes and heavy textured soils make this site a good producer of runoff. |
| Volcanic Hills 12-16" p.z. Loamy | Well-developed gravel, stone, and cobble covers protect the soil from erosion. With steep slopes and loamy soils, this site can be a good producer of runoff. |

Source: BLM GIS 2019, NRCS 2019
Note: *Granitic upland 10- to 13-inch p.z. was used as a surrogate

**Table E-7. Riparian, Xeroriparian, Wetland and Aquatic Habitat in the Planning Area**

| Aquatic Habitat Type | Acres/Perennial Miles (Intermittent and Ephemeral) in the Planning Area |
|---|---|
| Riparian (Acres) | 1,457 |
| Wetland/Cienega | 38 |
| Lakes/ponds (Acres) | 98 |
| **Total (Acres)** | **1,885** |
| Streams (Miles) | – |
| Intermittent | 312 |
| Perennial | 20 |

| Aquatic Habitat Type | Acres/Perennial Miles (Intermittent and Ephemeral) in the Planning Area |
|---|---|
| Ephemeral | 1267 |
| **Total (Miles)** | **1,599** |

Note: For the Las Cienegas, the mean aquatic habitat length is 6.4 miles (perennial flow from wet-dry)
Source: BLM GIS 2019

**Table E-8. Critical Habitat in the Planning Area**

| Critical Habitat | Designation | Acres in the Planning Area |
|---|---|---|
| Northern Mexican gartersnake | Proposed | 57,412 |
| Jaguar | Designated | 55,601 |
| Chiricahua leopard frog | Designated | 3 |
| Southwestern willow flycatcher | Designated | 1,977 |
| Yellow-billed cuckoo | Proposed | 7,162 |
| Gila chub | Designated | 1,870 |

Source: BLM GIS 2019

**Table E-9. Description of Impacts on Terrestrial Wildlife, Including Special Status Species, from Proposed Project Treatments or Activities**

| Treatment Methods or Project Type | Direct and Indirect Impacts | Description of Impacts |
|---|---|---|
| Mechanical vegetation treatments<br>• Mastication<br>• Grubbing<br>• Thinning | Loss, degradation, or modification of wildlife habitat (nesting, roosting, foraging, breeding, and aquatic). Displacement, disturbance, injury, or mortality of individual wildlife species from noise, human activity, light effects, vehicle strikes, collapse of burrows, or trampling. Short-term impacts on habitat can include removal of vegetation material, increased sediment, erosion, and water quality changes; long-term impacts on habitat can include enhanced habitat quality; improved stream, soil, and native vegetation stability; and a reduction of nonnative, invasive species. | Breeding/migratory birds: Short-term, localized disturbances are anticipated to be low. BMP WL-01 and the BLM design feature to survey for ground-nesting birds would avoid impacts to nesting birds. However, wetland treatments will be conducted during the growing season when birds and other species are active and breeding.<br><br>Terrestrial special status species: Short-term, localized disturbances are anticipated to be low. BMPs WL-02, VG-01, and fire management designs would protect special status species.<br><br>Overall, long-term, beneficial wildlife habitat improvements are anticipated. |
| Manual vegetation treatments<br>• Hand tools | Similar to mechanical treatment impacts but lesser in intensity and scale. Loss, degradation, or modification of wildlife habitat (nesting, roosting, foraging, breeding, and aquatic). Manual treatments can more easily avoid key wildlife features, such as burrows, rare plants, and nests. | Similar to mechanical treatments, but short-term impacts on birds and terrestrial species status species are anticipated to be very low. Overall, long-term, beneficial effects may occur but at a smaller scale and pace than would occur with other treatment methods. |

| Treatment Methods or Project Type | Direct and Indirect Impacts | Description of Impacts |
|---|---|---|
| Chemical vegetation treatments<br>• Cut-stump<br>• Basal bark<br>• Foliar<br>• Broadcast aerial<br>• Broadcast ground | Loss, degradation, or modification of wildlife habitat. Displacement and disturbance, including aerial broadcast, of individual species. Injury, mortality, or reduced reproductive success due to inadvertent poisoning or changes in water quality. | BMPs and design features for chemical treatments would minimize adverse impacts. Chemical treatment plans would identify and address adverse impacts at the site-specific level.<br><br>Breeding/migratory birds: Short-term, localized impacts are anticipated to be low.<br><br>Terrestrial special status species: Short-term, localized impacts are anticipated to be low.<br><br>Overall, long-term, beneficial wildlife habitat improvements are anticipated. |
| Prescribed fire treatments<br>• Broadcast burn<br>• Slash pile burn | Loss, degradation, or modification of wildlife habitat (nesting, roosting, foraging, and breeding). Displacement and disturbance of individual wildlife species. Injury, mortality, or reduced reproductive success due to fire or smoke.<br><br>Short-term habitat impacts: changes to water quality, increased flood intensity, vegetation loss, erosion, slumping, and increased surface water runoff.<br><br>Long-term habitat impacts: increased resistance and resilience to wildfire, and changes to nonnative species composition. | Conservation measures will be implemented as part of fire management activities to provide statewide consistency in reducing the effects of fire management actions on federally protected species. Prescribed fire plans would identify and address adverse impacts at the site-specific level.<br><br>Breeding/migratory birds: Short-term and localized disturbance are anticipated to be low. Pretreatment nesting surveys would minimize impacts.<br><br>Terrestrial special status species: Short-term and localized impacts are anticipated to be low. BMPs and design features for prescribed fire would avoid or minimize adverse impacts.<br><br>Overall, a reduction in undesirable woody shrub species would improve upland wildlife habitat over the long term. |

| Treatment Methods or Project Type | Direct and Indirect Impacts | Description of Impacts |
|---|---|---|
| Erosion control and stream restoration projects<br>• Upland mechanical treatments (heavy equipment use on large head cuts and erosion features)<br>• Upland manual treatments (placing materials by hand to reduce erosion)<br>• Stream restoration (placing in-channel features)<br>• Prescribed fire in wetlands<br>• Livestock to treat invasive species | Loss, degradation, modification, or restoration of wildlife and riparian habitat (nesting, roosting, foraging, movement, and breeding). Livestock degradation to wetland and riparian habitats through soil compaction and spread of invasive plants. Displacement and disturbance of individual wildlife species.<br><br>Short-term impacts on habitat can include removal of vegetation material, increased sediment, erosion, and water quality changes; long-term impacts on habitat can include enhanced habitat quality; improved stream, soil, and native vegetation stability; reduced erosion; an increase in wetland and aquatic habitats; and a reduction of nonnative, invasive species. | Potential erosion control treatments are better defined than other treatment activities (**Figure 3**). However, it is possible that projects could occur outside of potential locations. Erosion control and stream restoration projects would identify and address adverse impacts at the site-specific level.<br><br>Breeding/migratory birds: Short-term and localized disturbance are anticipated to be low. Nesting surveys and erosion control treatment techniques and designs would minimize direct and indirect impacts.<br><br>Terrestrial special status species: Short-term, localized impacts are anticipated to be low. Potential erosion control projects overlap with the following USFWS critical habitat:<br>• Yellow-billed cuckoo (143 acres)<br>• Southwestern willow flycatcher (36 acres)<br><br>Approximately 2 percent of yellow-billed cuckoo proposed critical habitat and 2 percent of southwestern willow flycatcher designated critical habitat in the planning area occur in potential erosion control projects. BMPs to protect riparian habitats, ESA consultation, and special status species and nesting bird surveys would avoid or reduce impacts on riparian-dependent wildlife, including the yellow-billed cuckoo and southwestern willow flycatcher, and their habitats.<br><br>Livestock grazing would be short in duration, intensively monitored, and ceased upon reaching vegetation removal objective. Targeted grazing would be part of an integrated treatment with a hand or chemical treatment component.<br><br>Overall, erosion control projects would improve and provide resilience for riparian and wetland habitats, which are essential for many wildlife species in the arid landscape, over the long term. |

**Table E-10. Description of Impacts on Aquatic, Wetland, and Riparian Species, Including Special Status Species, from Proposed Project Treatments or Activities**

| Treatment Methods or Project Type | Direct and Indirect Impacts | Description of Impacts |
|---|---|---|
| Erosion control and stream restoration projects<br>• Upland mechanical treatments<br>• Upland manual treatments<br>• Installing cross veins and weirs using mechanical equipment<br>• Requiring temporary access roads | General effects on all aquatic species/habitats:<br><br>Short-term habitat impacts: increased sediment yield, increased flood intensity, water chemistry changes, vegetation loss, erosion, slumping, and increased water runoff<br><br>Long-term habitat impacts: enhanced riparian development, increased channel stability, improved watershed conditions, reduced sedimentation, a lower frequency of peak flood flows, and increased groundwater recharge<br><br>Short-term impacts on individuals or populations: injury, mortality, disturbance (e.g., noise), and displacement<br><br>Long-term impacts on individuals or populations: increased survival, reproductive success, and viability (resulting from improved habitat) | Potential erosion control projects would affect approximately 1 percent of northern Mexican gartersnake proposed critical habitat, 1 percent of Gila chub designated critical habitat, 2 percent of yellow-billed cuckoo proposed critical habitat, and 2 percent of southwestern willow flycatcher designated critical habitat in the planning area. Although locations of potential erosion control projects do not overlap designated Chiricahua leopard frog critical habitat, it is possible that projects could occur there in the future (e.g., if habitat improvements are determined necessary in the future). In that case, proper mitigation and USFWS consultation would be implemented on a site-specific basis. All erosion control and stream restoration projects would identify and address adverse impacts at the site-specific level.<br><br>Potential erosion control projects would affect approximately 2 percent of total aquatic habitats in the project area (**Table 7**). The probability and intensity of impacts would depend on the species and specific type of treatment. Mechanical treatments would generally be more disruptive and have more intense short-term impacts, but they may be more successful in achieving long-term vegetation management objectives. Less-mobile aquatic species and life stages (e.g., eggs) would generally be more susceptible to short-term impacts, such as injury or mortality.<br><br>Impacts on aquatic species and their habitats, including the federally listed species and critical habitats, would be avoided or minimized by BMPs (WL-01 to WL-05), ESA consultation, and special status species surveys. Overall, long-term, beneficial aquatic wildlife and special status species habitat improvements are anticipated (see discussion below for specific habitat changes). |

| Treatment Methods or Project Type | Direct and Indirect Impacts | Description of Impacts |
|---|---|---|
| Riparian and wetland mechanical vegetation treatments<br>• Activity in water and wetland habitat<br>• Noise associated with gas-powered or battery-powered weed eater<br>• Removal of vegetation<br>• Cutting blades – risk to wildlife | Fish and amphibians (Chiricahua leopard frog, Gila chub, desert pupfish, and Gila topminnow):<br>• Breeding behavioral patterns temporarily altered<br>• Injury or mortality possible to adults<br>• Egg mortality from wading in water and cutting plants below the waterline<br>• Impaired water quality (turbidity)<br>• Short-term displacement from normal activity<br>• Gain in open water (beneficial)<br>• Change in aquatic plant cover<br>• Alterations to Designated critical habitat – Gila chub and Chiricahua leopard frog<br><br>Reptiles (northern Mexican gartersnake):<br>• Breeding behavioral patterns temporarily altered<br>• Take possible, especially to neonates<br>• Impaired water quality (increased turbidity and reduced sight feeding)<br>• Short-term displacement from normal activity<br>• Gain in foraging opportunities on species that use open water (beneficial)<br>• Change in bank and aquatic plant cover<br>• Activity in or near flood plains (benches) may result in take during winter when snakes are bromating.<br>• Burning slash may result in take if close to foraging or wintering locations.<br>• Proposed critical habitat: mild short-term effects<br><br>Aquatic plants (Huachuca water umbel):<br>• Removing invasive plants will lead to injury of stems from trampling or cutting. May stimulate regrowth if damage is moderate.<br>• Decreased surface area of suitable habit converted to thickets of cattail and bulrush<br>• Vegetation community and structure altered (beneficial)<br>• No designated critical habitat<br><br>Riparian birds (yellow-billed cuckoo and southwestern willow flycatcher):<br>• Activity during work may have short- or medium-term effects on species.<br>• May change plant community of proposed critical habitat | The area of aquatic habitat affected is unknown because potential treatment acres have not yet been identified.<br><br>Mechanical treatments would generally be more disruptive and of higher intensity due to the nature of treatments, which would involve one or more of the following: activity in water and wetland habitat, noise associated with a gas- or battery-powered weed eater, vegetation removal, and cutting blades.<br><br>Power cutters (weed eaters) built for cutting under water increase hazard of injury or mortality. However, aquatic wildlife are not likely remain in close proximity to vibrating and noisy equipment, which will drastically or lessen potential for injury. Consequently, the effects are similar to cutting vegetation by hand.<br><br>Plants and less-mobile aquatic species and life stages (e.g., eggs) would be more susceptible to short-term impacts, such as injury or mortality.<br><br>Impacts on aquatic species and their habitats would be minimized by BMPs (WL-01 to WL-05). Treatments may be more successful in achieving long-term vegetation management objectives. Overall, long-term, beneficial aquatic wildlife and special status species habitat improvements are anticipated. |

| Treatment Methods or Project Type | Direct and Indirect Impacts | Description of Impacts |
|---|---|---|
| Riparian and wetland manual vegetation treatments<br>• Hand tools<br>• Removal of selected vegetation | Similar to mechanical treatments but will take longer.<br><br>Huachuca water umbel and other sensitive aquatic plants will be removed with plants that are removed by the roots and trampling will occur on banks and in water. | The area of aquatic habitat affected is unknown because potential treatment acres have not yet been identified.<br><br>Short-term impacts on aquatic species and special status species are anticipated to be low due to the nature of treatments (small scale and low intensity), but cutting and pulling plants on banks would cause some disturbance. Manual vegetation treatment methods can be extremely species selective and well suited to areas of sensitive habitat.<br><br>Impacts on aquatic species and their habitats would be minimized by BMPs (WL-01 to WL-05). Overall, long-term beneficial effects may occur but at a smaller scale and pace than would occur with other treatment methods. |
| Riparian and wetland herbicide treatments<br>• Spot (cut-stump, basal bark, and foliar)<br>• Broadcast (aerial and ground) | Potential toxicity to threatened and endangered plants and animals.<br><br>Non-target vegetation adversely affected.<br><br>Vegetation composition and structure alterations. | The area of aquatic habitat affected is unknown because potential treatment acres have not yet been identified.<br><br>Herbicide treatments would be used as part of integrated vegetation treatment in conjunction with hand, mechanical, fire, and targeted grazing.<br><br>Effects of aquatic species would occur if herbicide is used on Johnson grass or bulrush in wetlands or on stream banks. Herbicides that are registered for use near aquatic habitats would be chosen. BMPs and design features for chemical treatments would minimize adverse impacts (WR-02 to WR-04, WL-01 to WL-05). Overall, long-term, beneficial aquatic wildlife and special status species habitat improvements are anticipated. |

| Treatment Methods or Project Type | Direct and Indirect Impacts | Description of Impacts |
|---|---|---|
| Riparian and wetland prescribed fire treatments<br>• Broadcast burn<br>• Slash pile burn | Fish and amphibians (Chiricahua leopard frog, Gila chub, desert pupfish, and Gila topminnow):<br>• Breeding behavioral patterns temporarily altered<br>• Take possible to adult Chiricahua leopard frog and fish<br>• Impaired water quality<br>• Short-term displacement from normal activity<br>• Gain in open water (beneficial)<br>• Change in bank and aquatic plant cover<br>• Slower rate of sedimentation of habitat (increased longevity of habitat [beneficial])<br>• Effects on designated critical habitat for Gila chub and Chiricahua leopard frog<br><br>Reptiles (northern Mexican gartersnake):<br>• Breeding behavioral patterns temporarily altered<br>• Take possible<br>• Short-term displacement from normal activity<br>• Gain in foraging opportunities on species that use open water (beneficial)<br>• Slower rate of sedimentation of habitat (increased longevity of habitat [beneficial])<br>• Change in bank and aquatic cover<br>• Proposed critical habitat: mild short-term effects<br><br>Aquatic plants (Huachuca water umbel):<br>• Removing invasive plants will lead to injury of stems from trampling or cutting. May stimulate regrowth if damage is moderate.<br>• Low-growing plant could be scorched by heat.<br>• Vegetation community and structure altered (beneficial)<br>• No designated critical habitat<br><br>Riparian birds (yellow-billed cuckoo and southwestern willow flycatcher):<br>• Activity during work may have short- or medium-term effects, including displacement, on species.<br>• Fire and smoke may cause species to abandon nests. | The area of aquatic habitat affected is unknown because potential treatment acres have not yet been identified.<br><br>Conservation measures will be implemented as part of fire management activities to provide statewide consistency in reducing the effects of fire management actions on federally protected species. Prescribed fire plans would identify and address adverse impacts at the site-specific level.<br><br>Impacts on aquatic species and their habitats would be minimized by BMPs (WL-01 to WL-05). Overall, a reduction in undesirable woody shrub species would increase habitat resistance and resilience to wildfire. |

| Treatment Methods or Project Type | Direct and Indirect Impacts | Description of Impacts |
|---|---|---|
| Riparian and wetland targeted grazing<br>• Treat riparian invasive species | Similar to mechanical treatments except fecal matter and urine may be added to open water and surrounding areas. Effects would be longer lasting (days to weeks). | Targeted grazing would be used only when appropriate as part of integrated vegetation treatment in conjunction with hand, mechanical, chemical, and fire.<br><br>The area of aquatic habitat affected is unknown because potential treatment acres have not yet been identified.<br><br>Plants and less-mobile aquatic species and life stages (e.g., eggs) would be more susceptible to short-term impacts, such as injury or mortality from trampling.<br><br>Impacts on aquatic species and their habitats would be minimized by BMPs (WL-01 to WL-05). Overall, long-term, beneficial aquatic wildlife and special status species habitat improvements are anticipated. |

**Table E-11. Potential Erosion Treatments Within Aquatic, Wetland, and Riparian Habitats in the Planning Area**

| Aquatic Habitat Type | Acres/Miles in the Planning Area | Potential Treatment Acres/Miles | Percent |
|---|---|---|---|
| Riparian (Acres) | | | |
| *Total Riparian* | *1,749* | *36* | *2* |
| Wetland/Cienega | 38 | 0 | 0 |
| Lakes/ponds (Acres) | 98 | 0 | 0 |
| **Total (Acres)** | **1,885** | **34** | **2** |
| Streams (Miles) | | | |
| Intermittent | 312 | 2.27 | 0.72 |
| Perennial | 20 | 0.56 | 2.8 |
| Ephemeral | 1267 | 6.54 | 0.52 |
| **Total (Miles)** | **1,599** | **9.37** | **0.59** |

**Source:** BLM GIS 2019

**Table E-12. Potential Erosion Treatments Within Critical Habitats in the Planning Area**

| Critical Habitat | Acres in the Planning Area | Potential Treatment Acres | Percent |
|---|---|---|---|
| Northern Mexican gartersnake (Proposed) | 57,412 | 467 | 1 |
| Jaguar (Designated) | 55,601 | 0 | 0 |
| Chiricahua leopard frog (Designated) | 3 | 0 | 0 |
| Southwestern willow flycatcher (Designated) | 1,977 | 36 | 2 |
| Yellow-billed cuckoo (Proposed) | 7,162 | 143 | 2 |
| Gila chub (Designated) | 1,870 | 17 | 1 |

**Source: BLM GIS 2019**

**Table E-13. Vehicle Trips**

| Location | Average Annual Daily Traffic | Estimated Annual Traffic[1] |
|---|---|---|
| **Empire Ranch Road** | 89 | 32,486 |
| **Airstrip** | 63 | 22,899 |

| Location | Average Annual Daily Traffic | Estimated Annual Traffic[1] |
|---|---|---|
| **Curly Horse** | 5 | 1,865 |
| **Headquarters Bypass** | 55 | 19,899 |
| **Headquarters Entrance** | 53 | 19,212 |
| **South Road** | 28 | 10,171 |
| **Estimated Annual Total Traffic** | – | **106,532** |

Source: BLM 2019c

[1]Projected annual traffic is based on the average annual daily traffic, excluding the annual cowboy festival, which added approximately 1,000 vehicles to the traffic.

# F. PROGRAMMATIC AGREEMENT AMONG THE BLM, SOUTHWESTERN REGION THREE USFS, USFWS, INTERIOR REGION EIGHT, ARIZONA SHPO, AND ACHP REGARDING THE EFFECTS OF VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA

# PROGRAMMATIC AGREEMENT

# AMONG

# THE BUREAU OF LAND MANAGEMENT,

# SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,

# U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,

# ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND

# ADVISORY COUNCIL ON HISTORIC PRESERVATION

# REGARDING THE EFFECTS OF

# VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA

## RECITALS

**WHEREAS,** the regulations that implement Section 106 of the National Historic Preservation Act (NHPA), found at 54 United States Code (U.S.C.) §§ 300101 to 307108, as amended (hereafter referred to as Section 106), allow an agency official to develop alternate procedures to implement Section 106 through the use of programmatic agreements (36 Code of Federal Regulations (C.F.R.) § 800.14(b)) for when effects on historic properties are similar and repetitive or regional in scope, and where routine management activities are undertaken at federal installations, facilities, or other land management units. The purpose of this Programmatic Agreement (Agreement) is to develop alternate procedures for routine vegetation and range management activities on federal, state, tribal, municipal, county, and private lands throughout Arizona; and

**WHEREAS,** decisions to fund, authorize, permit or license land management activities constitute undertakings as defined in 36 C.F.R. § 800.16(y) that may have the potential to affect historic properties and are therefore subject to review pursuant to 36 C.F.R. Part 800, the regulations implementing Section 106; and

**WHEREAS,** historic properties (defined in 36 C.F.R. § 800.16 (l)(1)) are prehistoric and historic sites, buildings, structures, districts, and/or objects that are listed in or eligible for listing in the National Register of Historic Places (NRHP, National Register) including artifacts, records, and material remains that are related to and located within such properties. The term also includes properties of traditional, religious, and cultural importance to a tribe and that meet the National Register criteria; and

**WHEREAS,** this Agreement may be used by a single agency or multiple agencies collaborating on a single undertaking to satisfy their Section 106 responsibilities; and

**WHEREAS,** when multiple federal agencies are involved, the lead federal agency shall be determined on a case-by-case basis for each individual undertaking conducted under this Agreement (see Stipulation IV, Designating the Lead Federal Agency and Its Responsibilities). In cases where there is one federal agency involved, that agency is the lead federal agency; and

**WHEREAS,** participating federal agencies recognize that the lead federal agency for an undertaking is responsible for compliance with Section 106 (see Stipulation IV, Designating the Lead Federal Agency and Its Responsibilities); and

**WHEREAS,** this Agreement does not supersede other agreements, or other established agency standards, without approval by the relevant parties to those agreements. The federal agency must notify the State Historic Preservation Officer (SHPO) as to which agreement is being used; and

**WHEREAS,** the area of potential effects (APE) shall be defined for each individual undertaking by the lead federal agency pursuant to Stipulations IV (Designating the Lead Federal Agency and Its Responsibilities) and VII (Defining the Area of Potential Effects) of this Agreement; and

**WHEREAS,** the Bureau of Land Management (BLM) is the lead federal agency only in the development and administration of this Agreement and BLM is a signatory to this Agreement but is not responsible for the implementation of Section 106 unless identified as the lead federal agency for a specific undertaking; and

**WHEREAS,** the BLM has consulted with the SHPO regarding the development of this Agreement, and the SHPO is authorized to enter this Agreement pursuant to Sections 101 and 106 of the NHPA, as amended and pursuant to 36 C.F.R. § 800.2(c)(1)(i) and 800.6(b)(1)(i) in order to fulfill its role of advising and assisting federal agencies in carrying out their responsibilities; therefore, SHPO is a signatory to this Agreement; and

**WHEREAS,** the BLM has coordinated the development of this Agreement with the Southwest Region Three U.S. Forest Service (USFS). The USFS participation in this Agreement shall apply to administrative units located in Arizona, and the USFS is a signatory to this Agreement; and

**WHEREAS,** the BLM has coordinated the development of this Agreement with the U.S. Fish and Wildlife Service (USFWS), Interior Region 8 (Arizona). The USFWS participation in this Agreement shall apply to administrative units located in Arizona, and the USFWS is a signatory to this Agreement; and

**WHEREAS,** the BLM has coordinated development of this Agreement with other federal land managing agencies, including the Bureau of Reclamation (Reclamation), Department of Defense (DOD), and the National Park Service (NPS); Reclamation is an invited signatory to this Agreement; and

**WHEREAS,** the BLM has coordinated development of this Agreement with state agencies including the Arizona State Land Department (ASLD), Arizona Game and Fish Department (AGFD), Arizona Department of Transportation (ADOT), Arizona Department of Forestry and Fire Management (ADFFM), Arizona Farm Bureau (AZFB), and Arizona State Parks and Trails (ASPT); The ADFFM, ADOT, AGFD, ASLD, AZFB are invited signatories to this Agreement, and ASPT has requested to be a concurring party; and

**WHEREAS,** the BLM has coordinated with agencies that may fund vegetation and range management activities (activities) under this Agreement, including the Arizona Association of Conservation Districts (AACD), Bureau of Indian Affairs (BIA), and the Natural Resources Conservation Service (NRCS). AACD, BIA, NRCS, are invited signatories to this Agreement; and

**WHEREAS,** the BLM has consulted on the development of this Agreement with all Arizona counties, several municipalities, and certified local governments, and Pima County has requested to be an invited signatory. The City of Phoenix Archaeology Office, the City of Phoenix Historic Preservation Office, Mohave County, and the Town of Marana, have requested to be concurring parties to this Agreement; and

**WHEREAS,** the BLM has consulted, and shall continue to consult, with the federally recognized Tribes that may attach religious or cultural significance to historic properties affected by an undertaking, including Ak-Chin Indian Community, Chemehuevi Indian Tribe of the Chemehuevi Reservation, Cocopah Tribe of Arizona, Colorado River Indian Tribes, Fort McDowell Yavapai Nation, Fort Mojave Indian Tribe, Fort Sill Apache Tribe of Oklahoma, Gila River Indian Community, Havasupai Tribe of the Havasupai Reservation, Hopi Tribe of Arizona, Hualapai Indian Tribe of the Hualapai Indian Reservation, Kaibab Band of Paiute Indians of the Kaibab Indian Reservation, Las Vegas Tribe of Paiute Indians of the Las Vegas Indian Colony, Mescalero Apache Tribe of the Mescalero Reservation, Moapa Band of Paiute Indians of the Moapa River Indian Reservation, Navajo Nation, Paiute Indian Tribe of Utah, Pascua Yaqui Tribe of Arizona, Pueblo of Acoma, Pueblo of Jemez, Pueblo of Zuni, Quechan Tribe of the Fort Yuma Indian Reservation, Salt River Pima-Maricopa Indian Community of the Salt River Reservation, San Carlos Apache Tribe of the San Carlos Reservation, San Juan Southern Paiute Tribe of Arizona, Tohono O'odham Nation of Arizona, Tonto Apache Tribe of Arizona, Ute Mountain Ute Tribe, White Mountain Apache Tribe, Yavapai-Apache Nation of the Camp Verde Indian Reservation, and the Yavapai-Prescott Indian Tribe, (collectively, Tribes); and

**WHEREAS,** for projects affecting historic properties on tribal lands of the Colorado River Indian Tribes, Gila River Indian Community, Hopi Tribe, Hualapai Indian Tribe, Navajo Nation, Pascua Yaqui Tribe, Pueblo of Zuni, San Carlos Apache Tribe, Salt River Pima-Maricopa Indian Community, Tohono O'odham Nation, and/or White Mountain Apache Tribe, consultation shall occur with the Tribal Historic Preservation Officer (THPO), as appropriate; and

**WHEREAS,** the BLM has invited Tribes to be concurring parties to this Agreement. If this Agreement is used to review undertakings occurring on, or affecting historic properties on,

tribal lands, the appropriate THPO must become a Signatory to this Agreement before the undertaking may proceed pursuant to Stipulation XVI (Additional Signatories); and

**WHEREAS,** nothing in this Agreement shall affect any individual agency's decision-making responsibilities under applicable tribal, state, and federal law, and the federal agency for individual undertakings shall follow consultation protocols to ensure relevant land managing agency's responsibilities (including, but not limited to determinations of eligibility) are considered; and

**WHEREAS,** for undertakings involving federal and tribal lands, federal and tribal land managers shall follow the Native American Graves Protection and Repatriation Act (NAGPRA), 43 C.F.R. § 10, regarding the discovery and treatment of human remains. For undertakings involving state and private lands, the agencies shall follow the procedures found in Arizona Revised Statutes (A.R.S.) § 41-844 for state land and A.R.S. § 41-865 for private land; and

**WHEREAS,** the BLM has invited the Advisory Council on Historic Preservation (ACHP) to participate in this Agreement, and ACHP has agreed to participate and is a signatory to this Agreement; and

**WHEREAS,** for purposes of this Agreement, signatories, and invited signatories to this Agreement, collectively, shall be identified as Signatories; and

**WHEREAS,** all time periods in this Agreement are calendar days unless otherwise specified; and

**WHEREAS,** no provision of this Agreement shall be construed by any of the Signatories to this Agreement as abridging or debilitating any sovereign powers or rights of the Tribes; or interfering with the government-to-government relationship between the United States and Tribes; and

**WHEREAS,** the Parties to this Agreement share a common desire to develop a programmatic approach for implementing Section 106 of the NHPA that takes into account the effects of federal undertakings on historic properties, addresses meaningful tribal consultation, as well as public participation, minimizes redundancy, and reduces the need for case-by-case review of routine administrative, conservation, and land management activities when historic properties will not be affected or when standard protocols and treatments can be applied; and

**WHEREAS,** additional parties may participate in this Agreement after its execution, pursuant to Stipulation XVI (Additional Signatories); and

**WHEREAS,** the (lead) federal agency for each undertaking implemented under this Agreement shall ensure that public involvement reflects the nature and complexity of the undertaking and its effect on historic properties in accordance with 36 C.F.R. § 800.2(d); and

**WHEREAS,** for the purposes of this Agreement, "Consulting Parties" collectively refers to the Signatories, concurring parties, and all Tribes regardless of their decision to sign this Agreement; and

**NOW, THEREFORE,** the BLM, USFS, USFWS, SHPO, and ACHP agree that undertakings conducted under this Agreement shall be implemented in accordance with the following Stipulations in order to take into account the effects of the undertaking on historic properties.

## STIPULATIONS

The BLM, USFS, and USFWS agree that the following Stipulations shall be carried out for undertakings conducted under this Agreement.

### I. DEFINITIONS

All definitions in this Agreement follow 36 C.F.R. § 800.16 and/or as otherwise defined in Appendix A.

### II. PROFESSIONAL QUALIFICATIONS

A. All actions conducted under this Agreement that involve the identification, evaluation, analysis, recording, treatment, monitoring or disposition of historic properties, or that involve the reporting or documentation of such actions in the form of reports, forms, or other records, shall meet professional standards under regulations (Section 112 of the NHPA; 36 C.F.R. § 800.2 (a)(1)) set forth in the Secretary of the Interior's (SOI) Professional Qualification Standards (48 Federal Register 44738-44739) or Office of Personnel Management (OPM) 0193 series Archaeologist, grade GS-9 or higher. Undertakings occurring on state, county, or private land shall meet the requirements of the Arizona Antiquities Act (AAA) permit. Undertakings occurring on tribal land shall be conducted in accordance with each individual Tribe's permitting policy.

B. The participating agencies acknowledge that Tribes "possess special expertise in assessing the eligibility of historic properties that may possess religious and cultural significance to them" (36 C.F.R. 800.4 (c)(1)). Participating agencies acknowledge and respect traditional knowledge and traditional education systems on their own terms and recognize that inclusion of individuals with this knowledge is a vital component for the identification, evaluation, analysis, recording, treatment, or monitoring of historic properties.

C. Others providing archeological assistance may assist in cultural resources investigations as dictated by relevant land management agency policy. The lead federal agency pursuant to Stipulation IV (Designating the Lead Federal Agency and Its Responsibilities) must conform to the policy of the appropriate land managing agency. Additionally, all work must be done under the direct supervision of a SOI-qualified archaeologist or OPM 0193 series Archaeologist, grade GS-9 or higher. See Appendix A (Definitions) for the definition of direct supervision.

## III. COORDINATION AMONG ALL CONSULTING PARTIES

A. Unless otherwise requested, electronic mail shall serve as the official correspondence method for all communications regarding this Agreement and the undertakings covered by this Agreement. If a Consulting Party wishes to opt out of electronic communication, they may submit notification of their communication preference to the federal agency for the undertaking.

B. Agreed upon agency communication protocols are provided in Appendix I.

## IV. DESIGNATING THE LEAD FEDERAL AGENCY AND ITS RESPONSIBILITIES

For undertakings conducted under this Agreement, the protocol for designating the lead federal agency provided in Appendix B (Designating the Lead Federal Agency) shall be followed. This Stipulation applies to undertakings that involve more than one federal agency, as follows:

A. When an undertaking subject to review under Section 106 of the NHPA is carried out by more than one federal agency, the Section 106 regulations allow for some or all those agencies to designate one lead federal agency [36 C.F.R. § 800.2(a)(2)].

B. In consultation with other involved agencies, the lead federal agency shall have the following responsibilities:

1. Determine the scope of the undertaking and identify Consulting Parties;

2. Determine whether the undertaking meets the criteria for exempted or screened undertakings in accordance with Appendices D (Exempted Undertakings) and E (Screened Undertakings) of this Agreement;

3. Coordinate with relevant agencies on the level of effort for inventories, description of the undertaking, definition of the APE, and all determinations of NRHP eligibility and Findings of Effect related to Section 106 review. Communication may occur informally through electronic mail and telephone calls and shall be documented to the project file;

4. Coordinate with participating agencies to ensure appropriate government-to-government consultation with Tribes is conducted, beginning as early in project planning as possible; and

5. Maintain records for consultation and the annual report (see Stipulation XV, Annual Report and Meeting).

## V. CONSULTATION PROCESS

Throughout the duration of this Agreement, the federal agency for each undertaking shall seek, discuss, and consider the views of Consulting Parties, and shall, where feasible, seek agreement with them when making decisions under the Stipulations of this Agreement (36 C.F.R. § 800.16(f)).

A. The federal agency shall submit documentation relating to undertakings under this Agreement to Consulting Parties following the provisions of this Agreement. Unless otherwise agreed, or specified within a Stipulation to this Agreement, those parties shall have 30 days from receipt of the request to review the submitted documentation and provide response, comment, or request additional time.

B. If the Consulting Parties have not responded to the submitted documentation within 30 days of receipt, the federal agency shall make at least one attempt to follow up with them, via electronic mail and/or telephone, to verify a Consulting Party does not have any input with regard to the issue under consideration. If, after this effort, there has been no response from a Consulting Party, the federal agency shall proceed to the next step in the relevant process under this Agreement.

C. If a Consulting Party requires additional time for consultation, a request for extension shall be made in writing within the original review period specified for the consultation. The federal agency shall attempt to accommodate such requests, provided they do not adversely affect other scheduled planning efforts.

D. The federal agency shall consider all comments submitted during the review period and shall consult with the appropriate Consulting Parties to resolve disagreements. If comments cannot be incorporated into the document, the federal agency shall provide a written response outlining the decision.

1. If comments received from a Consulting Party require only minor editorial corrections, such as addressing spelling, grammatical, formatting, and punctuation errors, the federal agency shall execute the changes and complete the consultation.

2. If substantive changes are required, the federal agency shall provide draft copies of the revised documents to the Consulting Parties with a request for second review and comment. Consulting Parties shall have 14 days to provide comments on the revised draft.

3. Following the completion of consultation with appropriate Consulting Parties, the federal agency shall provide copies of the final document to the Consulting Parties, along with copies of comments received during consultation and a summary of the federal agency’s responses to those comments.

## VI. CONSULTATION WITH TRIBES

A. Each federal agency acknowledges its government-to-government responsibilities to the Tribes for Section 106 review and implementation of the Agreement and commits to accord tribal officials the appropriate respect and dignity as leaders of sovereign nations.

B. Each federal agency will engage the Tribes in meetings and discussions regarding the undertaking at the earliest stages possible.

C. The objective of consultation is for the federal agency to seek, discuss, and consider the views of Tribes, and where feasible, seeking agreement with them regarding matters arising in the Section 106 process. In consultation with tribes, the federal agency will identify any potential historic properties, properties with cultural or religious significance to tribes (including landscape-level resource concerns). Also identify tribal concerns associated with the undertaking in order to avoid, minimize or mitigate effects on historic properties.

D. The timeline for consultation will follow Stipulation V (Consultation Process).

## VII. DEFINING THE AREA OF POTENTIAL EFFECTS

A. The federal agency, in consultation with SHPO/THPO and Tribes, shall define the APE based on the potential of the undertaking to alter, directly, indirectly, or cumulatively, any of the characteristics of a historic property that make the property eligible for, or qualify the property for inclusion in, the National Register.

B. If the APE is located within or adjacent to Traditional Cultural Properties (TCP), National Historic Landmarks, National Historic Trails, or other classes of historic properties, for which integrity of setting, location, feeling, and/or association contribute to NRHP eligibility, then those properties shall be taken into consideration when defining the APE.

## VIII. IDENTIFICATION AND EVALUATION OF HISTORIC PROPERTIES

A. Guidelines for Identification and Documentation of Historic Properties

1. Each land managing agency's site recording criteria shall be followed. The criteria utilized shall be explicitly stated in the inventory report.

2. For private land, Arizona State Museum (ASM) site recording criteria and SHPO guidance for identifying and documenting historical in-use structures shall be followed.

3. Documentation shall follow agency and SHPO reporting standards (e.g., Inventory Standards & Accounting form, Survey Report Summary Form for negative surveys, technical reports), as appropriate.

4. Phased identification and evaluation of historic properties may be completed under this Agreement pursuant to Stipulation IX (Phased Identification and Evaluation).

B. Guidelines for Determining Appropriate Level of Inventory

1. Depending on the scope of the undertaking, the land managing agency may consider the need for 100% (Class III) or sample (Class II) inventory (see Appendix A, Definitions and Appendix H, Survey Strategies, Part B).

2. When a federal agency proposes to perform 100% survey of the APE, no consultation with the SHPO regarding the level of inventory or extent of survey shall be required.

3. Based upon existing inventory information (i.e., Class I inventory), the federal agency may determine that further inventory shall not be necessary for all or a portion of the APE if a 100% inventory has previously been performed and if the fieldwork/documentation are consistent with current professional standards (see SHPO Guidance Point No. 5: *SHPO Position on Relying on Old Archaeological Survey Data*).

4. When less than 100% inventory is proposed (excluding conditions listed in Appendix H, Vegetation Management Protocol, Part D.2 for previously disturbed areas), the federal agency shall coordinate the alternative inventory strategy with the SHPO/THPO, Tribes, the appropriate land managing agency(ies), and other applicable entities.

5. Alternative inventory strategies should be considered. They include, but are not limited to, remote sensing such as aerial photography (including alternate light source, drone, and satellite imagery), predictive modeling, and geophysical survey technologies (magnetometry, electrical resistivity, ground-penetrating radar, and LIDAR).

C. Determinations of Eligibility

1. Prehistoric and historic sites, buildings, structures, districts, and objects (property types as defined in National Register Bulletin 15) and TCPs (as defined by National Register Bulletin 38) shall be evaluated for National Register eligibility. The federal agency shall ensure that cultural resources and TCPs within the APE are evaluated for eligibility for inclusion in the National Register by applying the National Register criteria (36 C.F.R. § 63) in consultation with the SHPO/THPO, and any tribe that attaches religious and/or cultural significance to the properties.

   a. Unevaluated properties will be treated as eligible for the purposes of Section 106;

2. Participating agencies, the SHPO/THPO, and Tribes agree that certain classes of properties may be determined eligible for the National Register in accordance with Appendix C (Eligible Properties) without additional consultation.

3. If a class of property is not listed in Appendix C (Eligible Properties) then the federal agency shall coordinate with the other land managing agency(ies) to obtain agreement on the Determinations of Eligibility prior to consultation with SHPO/THPO, Tribes, and other Consulting Parties.

4. If the federal agency, SHPO/THPO, and Tribes cannot agree on the eligibility of a property, a formal determination of eligibility shall be obtained from the Keeper of the National Register, whose decision shall be final.

## IX. PHASED IDENTIFICATION AND EVALUATION

A. Phased identification of historic properties may be used when a large-scale project is to be implemented over time and it is not reasonably possible to complete the Section 106 compliance for all aspects of the undertaking prior to reaching a National Environmental Policy Act (NEPA) decision, project authorization, issuance of a license or permit, or obligation of federal financial assistance. In a phased approach, the federal agency, in coordination with Consulting Parties, may seek final project authorization prior to completion of the identification of historic properties and evaluation of significance in the entire project area, if all the following requirements are met:

1. Justification has been provided to the SHPO in an initial Section 106 consultation report as to why completion of the identification and evaluation of properties within the entire APE is not feasible. The report should also clearly state the process and time frames for completing that work and that the identification and protection requirements of this protocol shall be completed prior to the authorization of on-the-ground work in each phase of the project.

2. The initial consultation shall also address the expected nature and distribution of properties in the entire project area and anticipated effects shall be discussed and considered in the initial project-wide Section 106 compliance report.

3. Each subsequent phase of the project shall have a completed Section 106 compliance report that includes concurrence on the Determinations of Eligibility and project effects from SHPO/THPO prior to the authorization of on-the-ground work.

4. The protection measures in Appendices G (Rangeland Management Protocol, Part D) and H (Vegetation Management Protocol, Part E) shall be enough to protect historic properties in the entire project area and can be implemented with no prior consultation with the SHPO/THPO.

5. Protection measures that are not listed in Appendices G (Rangeland Management Protocol) and H (Vegetation Management Protocol) should be consulted on with SHPO/THPO prior to implementation.

B. If the federal agency subsequently determines that adverse effects on historic properties in any phase of the project cannot be avoided, they shall consult with the SHPO/THPO, Tribes, and other Consulting Parties in accordance with this Agreement or 36 C.F.R § 800.6 and shall amend its decision, if necessary, to disclose the effects.

## X. ASSESSMENT OF EFFECTS

A qualified archaeologist (as defined in Appendix A) shall make recommendations of effects for the federal agency's consideration. In making its finding of effect, as follows, the federal agency, in coordination with the appropriate land manager, shall consider the direct, indirect, and cumulative effects of the undertaking (e.g., physical, visual, auditory, atmospheric effects), to historic properties. If the federal agency finds there are historic properties that may be affected by the undertaking, the federal agency shall make one of the following Findings of Effect:

A. No Historic Properties Affected
For all undertakings not exempted under Appendix D (Exempted Undertakings) or screened under Appendix E (Screened Undertakings), if the federal agency determines that either there are no historic properties within the APE, or that historic properties are present but will not be affected by the undertaking, the federal agency shall issue a finding of "no historic properties affected" pursuant to 36 C.F.R. § 800.4(d)(1). The federal agency shall document the finding to the project file and for the annual report, pursuant to Stipulation XV (Annual Report and Meeting).

B. No Adverse Effect
The federal agency shall consult with SHPO/THPO, and tribes pursuant to 36 C.F.R. § 800.5(c) for any undertaking where the activity may affect historic properties, but the effects would not alter a characteristic that would qualify the property for listing in the NRHP. The federal agency shall consult with Consulting Parties and shall request that any comments be submitted within 10 business days of receipt of agency consultation letter or notification.

C. No Adverse Effect with Protection/Mitigation Measures (Conditional No Adverse Effect)
For those undertakings where historic properties may be affected, but where those effects can be avoided or lessened, the federal agency shall apply the criteria of adverse effect in accordance with 36 C.F.R. § 800.5 and take protective measures to ensure that historic properties are not adversely affected by applying the protective measures listed in Appendices G (Range Management Protocol) and H (Vegetation Management Protocol). The federal agency shall consult with

Consulting Parties and shall request that any comments be submitted within 10 business days of receipt of agency consultation letter or notification.

D. Adverse Effect
If the federal agency applies the criteria of adverse effect in 36 C.F.R. § 800.5 and determines that the effects of the undertaking to historic properties cannot be avoided or minimized by applying the protection measures listed in Appendices G (Rangeland Management Protocol) and H (Vegetation Management Protocol), it shall issue a finding of adverse effect and consult further to resolve the adverse effect pursuant to Stipulation X (Resolution of Adverse Effects) Part E, below.

E. Resolution of Adverse Effects

1. Standard Measures for Resolving Adverse Effects
   a. Adverse effects on certain types of historic properties may be resolved by following the process in Appendix F (Standard Measures for Resolving Adverse Effects) as an alternative to preparing a Memorandum of Agreement (MOA) or project-specific Programmatic Agreement (PA). For undertakings that require resolution of adverse effects that cannot be resolved using the standard measures, the federal agency shall notify the ACHP of the finding of adverse effect and invite them to participate in a MOA or project-specific PA.

   b. The federal agency shall propose the applicable standard measures for resolving adverse effects, as provided in Appendix F, and request comments from the SHPO/THPO and other appropriate Consulting Parties to the undertaking, if applicable. The federal agency shall provide the SHPO/THPO and the Consulting Parties with information on the undertaking, each historic property and its significance, the anticipated adverse effect to the property, and a justification for resolving adverse effects, as proposed, under Appendix F to this Agreement.

   c. Where the federal agency, SHPO/THPO, and other Consulting Parties, if appropriate, agree in writing that resolving adverse effects under Appendix F is warranted, and any Consulting Party with a role in authorizing the undertaking concurs in writing, the Section 106 process is completed and the federal agency shall ensure that a Historic Property Treatment Plan (HPTP) for resolving the adverse effects is prepared in accordance with Appendix F.

   d. The Consulting Parties shall have 30 days to provide comments.

   e. Any Consulting Party to the undertaking may object to the federal agency's decision regarding the proposal to resolve the adverse effects of the undertaking through standard measures pursuant to Appendix F. The federal agency, in consultation with the SHPO/THPO and other

applicable Consulting Parties, shall consider the objection. Should the federal agency determine that resolving the adverse effects of the undertaking under Appendix F is not warranted, the federal agency shall then prepare a MOA or project-specific PA pursuant to this Stipulation X.E.2(a) below.

f. The federal agency shall provide draft copies of the HPTP to the SHPO/THPO, tribes, and other Consulting Parties if applicable, to the undertaking for review and comment. The Consulting Parties shall have 30 days to provide comments.

g. After treatment measures to resolve adverse effects outlined in the HPTP have been implemented, the federal agency shall ensure that a preliminary report of findings is completed and shall submit the report to all Consulting Parties to the undertaking for review and comment. The specific requirements for the preliminary report of findings, as well as the review process and time frames, shall be stipulated in the HPTP. The federal agency shall not authorize the start of construction until consultation on the preliminary report of findings has been approved by the SHPO/THPO and other Consulting Parties to the undertaking or no objections have been received.

h. The federal agency may authorize the start of construction if, upon review of a preliminary report of findings, either the SHPO/THPO and other Consulting Parties to the undertaking agree that the HPTP was adequately implemented or no objections have been received.

i. The federal agency shall ensure that a draft report is prepared and submitted to the SHPO/THPO and other Consulting Parties to the undertaking for review and comment within a timeframe specified in the HPTP. All comments shall be considered prior to finalizing the draft report, and a final report shall be distributed to the SHPO/THPO and all other Consulting Parties.

2. MOA or Project-Specific PA
   a. When the federal agency determines resolution of an adverse effect under Appendix F is not warranted, or is not agreed to, the federal agency shall, in consultation with the SHPO/THPO and other applicable Consulting Parties, prepare an MOA in accordance with 36 C.F.R. § 800.6 or a project-specific PA in accordance with 36 C.F.R. § 800.14(b). The federal agency shall invite ACHP to participate. The process for preparing and reviewing the MOA or project-specific PA shall be negotiated among the Consulting Parties to the undertaking.

   b. The MOA or project-specific PA shall be executed upon its filing with the ACHP.

## XI. POST-REVIEW DISCOVERIES

The federal agency shall follow the procedures in 36 C.F.R. § 800.13(a)(1) for post-review discoveries if potential historic properties are discovered or if unanticipated effects on known historic properties are found after the agency has completed Section 106 consultation for the undertaking.

A. Cultural Resources

1. If a post-review discovery is made during implementation of an undertaking conducted under this Agreement, all activities within a 50-foot radius of the discovery shall cease, and the federal agency shall take steps to protect the discovery and promptly report the discovery to the SHPO/THPO, Tribes, and appropriate land managing agencies, municipalities, or private land owner.

2. The federal agency, in coordination with the appropriate land managing agency, shall identify actions to resolve adverse effects, notify the SHPO/THPO, any Tribes that might attach religious and cultural significance to the affected property, if appropriate, within 48 hours of the discovery. The notification shall describe the assessment of National Register eligibility of the property and, if necessary, propose treatment to resolve adverse effects to the Register-eligible property. The SHPO/THPO, Tribe(s), if appropriate, shall respond within 48 hours of the notification. The agency official shall consider their recommendations regarding National Register eligibility and proposed treatment, then carry out appropriate treatment. The federal agency shall provide the SHPO/THPO, land managing agency, and Tribes a report of the actions when they are completed.

3. If there is no agreement among the parties, the protocol in Stipulation XXI (Dispute Resolution) will be followed.

B. Human Remains

1. If human remains and associated cultural items are encountered on federal or tribal lands, the land manager shall follow the regulations at 43 C.F.R. § 10. A NAGPRA Plan of Action shall be implemented.

2. If human remains, funerary objects, sacred ceremonial objects, or objects of national or tribal patrimony are discovered on state, county, municipal, or private lands, either through archaeological excavation or during construction, and a Burial Agreement is in place, the federal agency shall require the person in charge to immediately cease all activity within a 100-foot radius of the discovery, take steps to protect the discovery, and immediately notify the SHPO/THPO, Tribes, appropriate land owner(s),

and the Director of the ASM. The requirements of A.R.S. § 41-844 for discoveries on state land and A.R.S. § 41-865 for discoveries on private land shall also be followed.

## XII. PERMITTING REQUIREMENTS

Archaeological investigations shall be conducted in accordance with a permit issued by the land management agencies, or the ASM for projects on state, county, and municipal land.

## XIII. CURATION

Any collections of archaeological materials and associated records that result from activities undertaken as part of this Agreement shall be curated in accordance with federal laws and regulations, including 36 C.F.R. § 79, or with the ASM curation policy for collections from state, county, municipal, and private lands.

## XIV. EMERGENCY ACTIONS

A. Emergency actions are those actions deemed necessary by a participating agency as an immediate and direct response to an emergency, which is a disaster or emergency declared by the President, tribal government, or the governor of the state, or other immediate threats to life or property. Emergency actions under this Agreement are only those implemented within 30 days from the initiation of the emergency and shall follow 36 C.F.R. § 800.12(b)(2).

   Local emergencies (i.e., those emergencies outside the definition of 36 C.F.R. § 800.12) may be identified by any local government (state agency, county, or municipality) or Tribe and reviewed by the relevant land manager in consultation with the SHPO/THPO and Tribes on a case-by-case basis. Emergency action includes immediate rescue and salvage operations as well as wildland fire suppression activities conducted to preserve life or property and implemented within 30 days from the initiation of the emergency.

## XV. ANNUAL REPORT AND MEETING

A. Participating agencies shall annually compile a report of the undertakings for which they are the designated federal agency. Information in the report shall include, but is not limited to, a list of agencies involved in each undertaking, a summary of actions taken (including all findings and determinations), a list of all exempted and screened undertakings, and inadvertent effects or post-review discoveries.

B. Participating agencies shall submit the report to all Consulting Parties to this Agreement no later than January 31 for each year the Agreement is in effect. The Consulting Parties shall have 30 days to review and provide comments regarding the effectiveness or appropriate implementation of this Agreement. Any Consulting Party can request a meeting with relevant participating agencies to address concerns. All communications shall be via electronic mail unless otherwise requested.

## XVI. ADDITIONAL SIGNATORIES

A. Any Consulting Party can request to become an invited signatory after execution of this Agreement. The process for becoming an invited signatory is to send a request in writing to the BLM Arizona State Office to join this Agreement. The BLM will then prepare a signature page and send it to the party for their signature. The party shall then return the signed signature page to the BLM, and the BLM shall incorporate it into the Agreement. The BLM will file any additional signature pages with the ACHP and provide a copy of the signature page to the Consulting Parties.

B. For undertakings occurring on, or affecting historic properties on, tribal lands, the THPO or tribe's designated representative must become a signatory to this Agreement before that undertaking may proceed. If such an undertaking is proposed, the BLM will prepare a signature page and send it to the THPO/tribal representative for their signature. The THPO/tribal representative shall then return the signed signature page to the BLM, and the BLM shall incorporate it into the Agreement. The BLM will file any additional signature pages with the ACHP and provide a copy of the signature page to the Consulting Parties. The addition of tribal signatories under this process shall not require formal amendment to this Agreement.

## XVII. AMENDMENTS

Any signatory or invited signatory to this Agreement may request that it be amended. The signatory or invited signatory that requests the change shall seek input from the Consulting Parties for a period of 30 days. Any amendment to this Agreement must be signed by the SHPO and all other Signatories. The party that proposed the amendment shall provide electronic copies of the amendment to all Consulting Parties.

## XVIII. ADDITIONAL PROTOCOLS, SCREENED UNDERTAKINGS, OR EXEMPTIONS

Consulting Parties may propose additional protocols, screened undertakings, or exemptions by notifying the signatories, in writing, of the details of the new proposal. The Signatories to this Agreement shall respond within 30 days with their response to the proposal. If agreement is reached on the new proposal, the party that proposed the new protocol, screened undertaking, or exemption shall distribute it to all Consulting Parties, and the BLM will add it as an attachment to this Agreement without formal amendment.

## XIX. WITHDRAWAL FROM THE AGREEMENT

A. Any Consulting Party to this Agreement may withdraw from the Agreement after first providing a 30-day written notice explaining the reasons for withdrawal and providing signatories an opportunity to consult regarding amendment of this Agreement to prevent withdrawal.

B. Withdrawal from this Agreement by a federal or state land managing agency or THPO/tribe on tribal lands shall require the federal agency to comply with 36 C.F.R. Part 800 with respect to all undertakings on or affecting lands within that party's jurisdiction, in lieu of this Agreement. Withdrawal from this Agreement by a federal or state land managing agency or a participating Tribe does not terminate the Agreement.

## XX. TERMINATION

A. If any signatory or invited signatory determines that it wants to terminate this Agreement, they shall provide a 30-day written notification to the Signatories to explain the reasons for proposing termination and shall consult to seek an amendment to the Agreement in lieu of termination.

B. Should such consultation result in an amendment to this Agreement avoiding termination, the signatories and invited signatories shall proceed to amend the Agreement pursuant to Stipulation XVII (Amendments) and carry out its provisions as amended.

C. Termination of the Agreement by a signatory or invited signatory shall only apply to the lands under their respective jurisdiction. Upon termination of this Agreement in its entirety, all consultation shall comply with 36 C.F.R. Part 800, subpart B or other relevant agreements with respect to individual undertakings that would otherwise be reviewed under this Agreement.

D. Should the BLM, USFS, USFWS, SHPO, or ACHP terminate this Agreement, either individually or collectively, the Agreement shall be terminated in its entirety. Upon termination of this Agreement in its entirety, all consultation shall comply with 36 C.F.R. Part 800, subpart B or other relevant agreements with respect to individual undertakings that would otherwise be reviewed under this Agreement.

## XXI. DISPUTE RESOLUTION

Should any Consulting Party to this Agreement object at any time to any actions proposed or the way the terms of this Agreement are implemented, the federal agency shall consult with the party that raised the objection, and the SHPO/THPO to resolve the objection. If within 30 days the federal agency determines that such objection cannot be resolved, the federal agency shall:

A. Forward all documentation relevant to the dispute, including the federal agency's proposed resolution, to the ACHP. The ACHP shall provide the federal agency with its advice on their solution to the objection within 30 days of receiving adequate documentation. Prior to reaching a final decision on the dispute, the federal agency shall prepare a written response that considers any timely advice or comments regarding the dispute from the ACHP, SHPO/THPO, and other Consulting Parties, and provide them with a copy of this written response. The federal agency shall then proceed according to its final decision.

B. If the ACHP does not provide its advice regarding the dispute within the 30-day period, the federal agency may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, the federal agency shall prepare a written response that considers any timely comments regarding the dispute from the SHPO and other Consulting Parties to this Agreement and provide them and the ACHP with a copy of such written response.

C. The federal agency's responsibility to carry out all other actions subject to the terms of this Agreement that are not the subject of the dispute remain unchanged.

## XXII. CONFIDENTIALITY

Pursuant to this Stipulation, all Consulting Parties agree to appropriately safeguard and control the distribution of any confidential information they may receive as a result of their participation in this Agreement. Such safeguarded information, including private property information, is exempt from disclosure under the Freedom of Information Act (FOIA) (5 U.S.C. § 552 as amended by Public Law No. 104-231, 110 Stat. 3048) and Section 1619 of the Farm Bill, codified as 7 U.S.C. 8791(b)(2)(A), and 25 U.S.C. 32A - §, Prohibition on Disclosure.

Information concerning the nature and location of any historic property (historic or prehistoric) or archaeological resource may be considered sensitive and protected from release under the provisions of the FOIA (5 U.S.C. § 552, as amended by Public Law No. 104-231, 110 Stat. 3048; and specifically 54 U.S.C. 307103(a)), Section 9 of the Archaeological Resources Protection Act (16 U.S.C. § 470hh), Section 304 of the NHPA (54 U.S.C. § 307103), and A.R.S. 39-125.

## XXIII. DURATION

This Agreement shall remain in effect for a period of 10 years after the date it takes effect, unless terminated prior to that time pursuant to Stipulation XX (Termination). At least one year prior to the expiration date, BLM shall inform the Signatories and shall consult to determine if the Agreement should be allowed to expire or whether it should be extended. This Agreement may be extended for an additional term, the length of which is to be agreed to by the Signatories. The extension shall be codified through an amendment to this Agreement pursuant to Stipulation XVII (Amendments). Where there is no agreement by all the Signatories, the Agreement shall not be extended and shall be terminated.

## XXIV. ANTI-DEFICIENCY ACT

The federal government's obligations under this Agreement are subject to the availability of appropriated funds, and the Stipulations of this Agreement are subject to the provisions of the Anti-Deficiency Act (31 U.S.C. § 1341). The federal government shall make reasonable and good faith efforts to secure the necessary funds to implement this Agreement in its entirety.

## XXV. COUNTERPART SIGNATURES

This Agreement may be executed in counterparts, each separately and together constituting one and the same document. Execution and delivery of this Agreement by facsimile or electronic mail shall be sufficient for all purposes and shall be binding on any party to this Agreement.

**Execution of this Agreement by the BLM, USFS, USFWS, SHPO, and the ACHP, and the implementation of its terms are evidence that they have taken into account the effects of the undertaking on historic properties and has afforded the ACHP an opportunity to comment.**

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**BUREAU OF LAND MANAGEMENT**

RAYMOND SUAZO Digitally signed by RAYMOND SUAZO
Date: 2020.09.11 08:51:22 -07'00'

Raymond Suazo Date
Arizona State Director

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE**

JAMES MELONAS Digitally signed by JAMES MELONAS Date: 2020.09.18 10:43:27 -06'00' 9/18/20

Sandy Watts — Date
Acting Regional Forester

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT (ARIZONA)**

_____

Amy Lueders Date
Regional Director

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER**

14 Sep 2020

Kathryn Leonard — Date
State Historic Preservation Officer

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**9/30/2020**

Aimee Jorjani — Date
Chairwoman

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**ARIZONA ASSOCIATION OF CONSERVATION DISTRICTS**

_____

Frank Kentz Date
President

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**ARIZONA DEPARTMENT OF FORESTRY AND FIRE MANAGEMENT**

_____

David Tenney Date
Director

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**ARIZONA DEPARTMENT OF TRANSPORTATION**

_____

John S. Halikowski Date
Director

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**ARIZONA GAME AND FISH DEPARTMENT**

_____

Ty E. Gray Date
Director

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**ARIZONA STATE LAND DEPARTMENT**

_____

Lisa A. Atkins Date
Commissioner

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**BUREAU OF INDIAN AFFAIRS**

_____

Darryl Lacounte Date
Director

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**BUREAU OF RECLAMATION**

_____

Terry Fulp Date
Regional Director, Lower Colorado Basin

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**NATURAL RESOURCES CONSERVATION SERVICE**

_____

Keisha Tatem Date
State Conservationist

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**ARIZONA FARM BUREAU**

_____

Stefanie Smallhouse Date
State President

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**PIMA COUNTY**

_____

Chuck Huckelberry Date
County Administrator

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**AK-CHIN INDIAN COMMUNITY**

_____

Robert H. Miguel, Jr. Date
Chairman

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**ARIZONA STATE PARKS AND TRAILS**

_____

Robert Broscheid Date
Executive Director

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**CHEMEHUEVI INDIAN TRIBE OF THE CHEMEHUEVI RESERVATION**

_____

Charles F. Wood Date
Chairman

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**AMONG**

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**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

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**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**CITY OF PHOENIX ARCHAEOLOGY OFFICE**

_____

Name Date
Title

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**AMONG**

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**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

**ARIZONA STATE HISTORIC PRESERVATION OFFICER, AND**

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

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**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**CITY OF PHOENIX HISTORIC PRESERVATION OFFICE**

_____

Name Date
Title

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**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**COCOPAH TRIBE OF ARIZONA**

_____

Sherry Cordova Date
Chairwoman

**PROGRAMMATIC AGREEMENT**

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**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

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**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**COLORADO RIVER INDIAN TRIBES**

_____

Dennis Patch Date
Chairman

**PROGRAMMATIC AGREEMENT**

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**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

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**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**FORT MCDOWELL YAVAPAI NATION**

_____

Bernadine Burnette Date
President

**PROGRAMMATIC AGREEMENT**

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**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**FORT MOJAVE INDIAN TRIBE**

_____

Timothy Williams Date
Chairman

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**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**FORT SILL APACHE TRIBE OF OKLAHOMA**

_____

Lori Gooday-Ware Date
Chairperson

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**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**GILA RIVER INDIAN COMMUNITY**

_____

Stephen Roe Lewis Date
Governor

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**HAVASUPAI TRIBE OF THE HAVASUPAI RESERVATION**

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Muriel Uqualla-Coochwytewa Date
Chairwoman

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**HOPI TRIBE OF ARIZONA**

_____

Timothy Nuvangyaoma Date
Chairman

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**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**HUALAPAI INDIAN TRIBE OF THE HUALAPAI INDIAN RESERVATION**

_____

Dr. Damon R. Clarke Date
Chairman

**PROGRAMMATIC AGREEMENT**

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**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**KAIBAB BAND OF PAIUTE INDIANS OF THE KAIBAB INDIAN RESERVATION**

_____

Ona Segundo Date
Chairwoman

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**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

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**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**LAS VEGAS TRIBE OF PAIUTE INDIANS OF THE LAS VEGAS INDIAN COLONY**

_____

Curtis Anderson Date
Chairperson

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**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**MESCALERO APACHE TRIBE OF THE MESCALERO RESERVATION**

_____

Arthur "Butch" Blazer Date
President

**PROGRAMMATIC AGREEMENT**

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**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

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**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**MOAPA BAND OF PAIUTE INDIANS OF THE MOAPA RIVER INDIAN RESERVATION**

_____

Vickie Simmons Date
Chairwoman

**PROGRAMMATIC AGREEMENT**

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**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

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**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**MOHAVE COUNTY**

_____

Name Date
Title

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**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

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**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**NAVAJO NATION**

_____

Jonathan Nez Date
President

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**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**PAIUTE INDIAN TRIBE OF UTAH**

_____

Tamra Borchardt-Slayton Date
Chairwoman

**PROGRAMMATIC AGREEMENT**

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**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**PASCUA YAQUI TRIBE OF ARIZONA**

_____

Robert Valencia Date
Chairman

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**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**PUEBLO OF ACOMA**

_____

Brian D. Vallo Date
Governor

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**PUEBLO OF JEMEZ**

_____

David M. Toledo Date
Governor

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**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**PUEBLO OF ZUNI**

_____

Val R. Panteah, Sr. Date
Governor

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**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**QUECHAN TRIBE OF THE FORT YUMA INDIAN RESERVATION**

_____

Jordan D. Joaquin Date
President

**PROGRAMMATIC AGREEMENT**

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**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY OF THE SALT RIVER RESERVATION**

_____

Martin Havier Date
President

**PROGRAMMATIC AGREEMENT**

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**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

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**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**SAN CARLOS APACHE TRIBE OF THE SAN CARLOS RESERVATION**

_____

Terry Rambler Date
Chairman

**PROGRAMMATIC AGREEMENT**

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**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**SAN JUAN SOUTHERN PAIUTE TRIBE OF ARIZONA**

_____

Carlene Yellowhair Date
Chairperson

**PROGRAMMATIC AGREEMENT**

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**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**TOHONO O'ODHAM NATION OF ARIZONA**

_____

Ned Norris Jr. Date
Chairman

**PROGRAMMATIC AGREEMENT**

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**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**TONTO APACHE TRIBE OF ARIZONA**

_____

Jeri DeCola Date
Chairwoman

**PROGRAMMATIC AGREEMENT**

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**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**TOWN OF MARANA**

_____

Jamsheed Mehta Date
Town Manager

**PROGRAMMATIC AGREEMENT**

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**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**UTE MOUNTAIN UTE TRIBE**

_____

Harold Cuthair Date
Chairman

**PROGRAMMATIC AGREEMENT**

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**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

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**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**WHITE MOUNTAIN APACHE TRIBE**

_____

Gwendena Lee-Gatewood Date
Chairwoman

**PROGRAMMATIC AGREEMENT**

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**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**YAVAPAI-APACHE NATION OF THE CAMP VERDE INDIAN RESERVATION**

_____

Jon Huey Date
Chairman

**PROGRAMMATIC AGREEMENT**

**AMONG**

**THE BUREAU OF LAND MANAGEMENT,**

**SOUTHWESTERN REGION THREE U.S. FOREST SERVICE,**

**U.S. FISH AND WILDLIFE SERVICE, INTERIOR REGION EIGHT,**

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**REGARDING THE EFFECTS OF**

**VEGETATION AND RANGE MANAGEMENT ACTIVITIES IN ARIZONA**

**YAVAPAI-PRESCOTT INDIAN TRIBE**

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Robert Ogo Date
Acting President

# APPENDICES

## APPENDIX A: DEFINITIONS

Appendix A includes the definitions that pertain to this Agreement. New definitions can be added without amending the Agreement.

**Activities:** as used in this Agreement, activities include but are not limited to, the management of vegetation communities, wildlife habitat, watershed management, runoff and erosion control, grazing, and infrastructure improvements associated with range, habitat, and fuel-management projects.

**Adverse Effect:** applies when an undertaking may alter, directly, indirectly, or cumulatively, any of the characteristics that qualify a historic property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association (see criteria of adverse effect at 36 C.F.R. § 800.5).

**Advisory Council on Historic Preservation (ACHP):** an independent federal agency established pursuant to Section 201 of the NHPA. Under Section 106 of the NHPA, the ACHP must be afforded an opportunity to comment on federal, federally assisted, or federally licensed undertakings that may affect historic properties.

**Archaeological Site:** generally, any material remains of past human life or activities in history or prehistory, which are of archaeological interest including, but not be limited to: pottery, basketry, bottles, weapons, projectiles, tools, structures or portions of structures, pit houses, rock paintings, rock carvings, intaglios, graves, human skeletal materials, or any portion or piece of any of the foregoing items that are of human design, manufacture, possession, or use. Specific archaeological site definitions shall follow appropriate land managing agency or ASM and SHPO guidelines.

**Area of Potential Effects (APE):** the geographic area(s) within which an undertaking may cause changes in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking (36 C.F.R. § 800.16(d)). The APE must include all areas of direct, indirect, and reasonably foreseeable cumulative effects including, but not limited to, staging areas, temporary construction easements, access roads, and utility corridors.

**Association**: an aspect of integrity and the direct link between an important historic event or person and a historic property. A property retains association if it is the place where the event or activity occurred and is sufficiently intact to convey that relationship to an observer. Association requires the presence of physical features that convey a property's historic character (National Register Bulletin 15).

**AZSITE:** Arizona's online cultural resources database.

**Character-Defining Feature:** a prominent or distinctive aspect, quality, or characteristic of a cultural landscape that contributes significantly to its physical character. Land use patterns, vegetation, furnishings, decorative details, and materials may be such features (NPS 1996).

**Class I Inventory:** includes background research consisting of archival research, a literature review, and site files check that is sufficient to identify past survey coverage and generate expectations about the types and frequencies of cultural resources that might be expected during field survey. This research should include a 1-mile buffer zone surrounding the survey area for block survey parcels (half-mile in highly urbanized areas), and a half-mile buffer either side of a linear survey corridor (measured from the center line).

**Class II "Sample" Inventory:** includes background research and a sample field survey. The sampling strategy must be agreed to by the federal agency in consultation with the SHPO/THPO, Tribes, and land manager prior to fieldwork and discussed in the report. In survey methodology, sampling is the examination of a subset (a statistical sample) of the entire APE to estimate characteristics of the larger area.

**Class III Inventory:** includes background research and an intensive field survey (generally 100%) meeting current agency and/or ASM standards.

**Concurring Parties:** interested parties who may be asked to sign a MOA or PA but do not have the rights to amend or terminate the MOA or PA.

**Conservation District:** an NRCS client who has entered into a working relationship or cooperative agreement with a conservation district.

**Consultation:** the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the section 106 process (36 C.F.R. § 800.16(f)).

**Consulting Parties:** parties with consultative roles in the Section 106 process, including the ACHP (if participating); SHPO, THPO(s); Tribes; land managing agencies; local governments; applicants for federal assistance, permits, licenses or other approvals; and any party with a legal or demonstrated interest to the undertaking, such as private land owners or lessees, or concern with the undertaking's effect on historic properties (36 C.F.R. § 800.2(c)). For the purposes of this Agreement, Consulting Parties collectively refers to the signatories, invited signatories, concurring parties, and all Tribes regardless of their decision to sign this Agreement.

**Coordination:** communication (electronic mail and/or phone calls) among Consulting Parties to increase cooperation among the parties and increase the effectiveness of defining their responsibilities when formal consultation is not necessary.

**Cultural or Ethnographic Landscape:** a geographic area that contains a variety of cultural and natural resources that culturally affiliated groups define as possessing cultural value. The cultural/ethnographic landscape has prominent or distinctive aspects, qualities, or characteristics that contribute significantly to its physical character. Small plant communities, animals, subsistence, and ceremonial grounds are often components of the cultural/ethnographic landscape.

**Cultural Resources:** prehistoric and historic districts, sites, buildings, structures, objects, cultural landscapes, sacred sites, and TCPs. Within the broad range of cultural resources are those that have recognized significance, which are called historic properties, as defined below.

**Cultural Resources Inventory:** the study of an area to identify the cultural resources that are, or may be, present. This term is inclusive of Class I, Class II, and Class III Inventories, as defined above.

**Design**: an aspect of integrity, design is the combination of elements that create the form, plan, space, structure, and style of a property. It results from conscious decisions made during the original conception and planning of a property (or its significant alteration) and applies to activities as diverse as community planning, engineering, architecture, and landscape architecture. Design includes such elements as organization of space, proportion, scale, technology, ornamentation, and materials (National Register Bulletin 15).

**Direct Supervision:** for purposes of this Agreement, direct supervision means the activities of a field survey team must be directly overseen (i.e., in the field) by a crew chief, field director, project director, or principal investigator listed on the relevant permit and/or meeting the SOI Standards for Archaeology or the OPM 0193 series Archaeologist, grade GS-9 or higher.

**Ecological Site:** a distinctive kind of land with specific soil and physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation and its ability to respond similarly to management actions and natural disturbances.

**Effect:** an alteration to a historic property that results when an undertaking changes the characteristics of a property that qualifies it for inclusion in the National Register (36 C.F.R. § 800.16(i)). Direct and indirect effects may include physical, visual, atmospheric, and auditory effects; cumulative effects must also be considered.

**Emergency or Disaster:** a disaster or emergency under Section 106 is one declared by the President, tribal government, or the governor of a state and that poses an immediate threat to life (human or animal) or property (36 C.F.R. § 800.12(a)). Local emergencies, as described in Stipulation XIV (Emergency Actions) are declared by state agencies, county governments, municipal governments and, on a case by case basis, the landowner.

**Feeling**: an aspect of integrity, feeling is a property's expression of the aesthetic or historic sense of a particular period of time. It results from the presence of physical features that, taken together, convey the property's historic character. For example, a rural historic district retaining original design, materials, workmanship, and setting will relate the feeling of agricultural life in the 19th century. A grouping of prehistoric petroglyphs, unmarred by graffiti and intrusions and located on its original isolated bluff, can evoke a sense of tribal spiritual life (National Register Bulletin 15).

**Fence:** a barrier typically installed to control the movement of animals, humans, and/or vehicles. They are typically constructed of upright posts with horizontal boards, rails, pickets, or wire. Fences may also include iron structures with open work of horizontal or vertical bars.

**Fire Management:** all activities related to wildfires including planned and unplanned ignitions, initial attack and fire suppression activities such as digging lines, dozer/mechanical lines, hand lines, road improvements, mastication, black lining fuel breaks, and the use of prescribed or managed fire for fuel and habitat management activities.

**Fire Sensitive Sites:**

- Historic sites with standing or downed wooden structures (including telephone trees) or other flammable features or artifacts;
- Rock art sites (depending on rock type, exposure, fuel type, and fuel loading);
- Cliff dwellings;
- Prehistoric sites with flammable architectural elements and other flammable features or artifacts;
- Prehistoric sites with exposed building stone of soft or porous material such as volcanic tuff;
- Culturally modified trees, including aspen art and peeled/scarred trees;
- Certain TCPs (based on consultation with Tribes).

**Hand Thinning:** removal of vegetation using handheld tools (e.g., rakes or hoes, shovels, hand-held saws, chainsaws, pruning tools).

**Historic Property:** any prehistoric or historic district, site, building, structure, or object listed in, or eligible for inclusion in, the National Register. This term includes artifacts, records, and remains that are related to and located within such properties. The phrase "eligible for inclusion in the National Register" means properties formally determined as such by the SOI or by the federal agency in consultation with SHPO/THPO. Properties that have been determined eligible for inclusion are accorded the same protections as properties listed in the National Register (36 C.F.R. § 800.16(l)(1)).

**Historic Period:** for purposes of this Agreement, the historic period shall be defined as beginning when Europeans first entered an area or made recorded observations of the area. In the Southwest, that is usually around the year 1540. The historic period is defined as ending 50 years before the present.

**Invited Signatory:** an agency with specific duties, as outlined in this Agreement, and with the same rights as signatories to terminate or amend the Agreement.

**Lead Federal Agency:** the agency responsible for ensuring compliance under Section 106 when multiple federal agencies are involved in the undertaking.

**Limited Ground Disturbance:** ground disturbance limited to the existing construction footprint, or ground disturbance that does not exceed 2 feet in any direction, or as listed in Appendix E (Screened Undertakings) that has little potential to alter, directly or indirectly, any of the characteristics that qualify a historic property for inclusion in the National Register.

**Location**: an aspect of integrity, location is the place where the historic property was constructed or the place where the historic event occurred. The relationship between the property and its

location is often important to understanding why the property was created or why something happened. The actual location of a historic property, complemented by its setting, is particularly important in recapturing the sense of historic events and persons. Except in rare cases, the relationship between a property and its historic associations is destroyed if the property is moved (National Register Bulletin 15).

**Materials**: an aspect of integrity, materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property. A property must retain the key exterior materials dating from the period of its historic significance. If the property has been rehabilitated, the historic materials and significant features must have been preserved. The property must also be an actual historic resource, not a recreation; a recent structure fabricated to look historic is not eligible. Likewise, a property whose historic features and materials have been lost and then reconstructed is usually not eligible (National Register Bulletin 15).

**National Register of Historic Places (NRHP, National Register):** the official list of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture maintained by the Keeper of the National Register on behalf of the SOI (36 C.F.R. Part 60).

**Negative Survey:** a cultural resources inventory survey in which no cultural resources, excluding isolated occurrences, are identified, and a finding of "No Historic Properties Affected" is appropriate, following Arizona SHPO Guidance Point No. 10: *SHPO Guidance for Use and Submittal of the Survey Report Summary Form*.

**No Adverse Effect:** applies when an undertaking will not alter, directly, indirectly, or cumulatively, any of the characteristics that qualify a historic property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

**No Historic Properties Affected:** applies when there are no cultural resources in the APE, there are cultural resources in the APE but none are determined to be National Register eligible, or there are historic properties in the APE but they will be avoided by the undertaking.

**Predictive Modeling:** an application of statistical sampling techniques (Class II "Sample" Inventory), based on known scientific data that projects or extrapolates the number, classes, distribution, and frequencies of properties. Predictive models can be used in land use planning, during the early stages of planning for an undertaking, for targeting field survey, or other management purposes.

**Prescribed Fire:** a planned fire used for vegetation management in accordance with the applicable laws, policies, and regulations to meet specific objectives.

**Previously Disturbed:** refers to areas where previous construction or other activity by human or natural agents, has physically altered soils within the APE to the point where there is no potential for an *in situ* archaeologically significant property to be affected by a federal undertaking as

determined by the land managing agency archaeologist. These areas can include, but are not limited to, the original footprint of existing structures (e.g., ponds, tanks, distribution canals), and plow zones, as documented historically or by a producer's signed affirmation.

**Producer:** an owner, operator, manager, landlord, or tenant who produces food, fiber, or plant materials - typically a farmer, rancher, dairy farmer, nurseryman, or private forester.

**Property Type:** buildings, sites, structures, districts, and objects that are listed in or eligible for inclusion in the National Register.

**Qualified Archaeologist:** a professional archaeologist who meets the SOI Standards for Professional Qualifications (48 Federal Register 44716, September 29, 1983) or the OPM 0193 series Archaeologist, grade GS-9 or higher. For projects on state, county, and municipal land, the qualified archaeologist must also be listed as a Principal Investigator on an AAA permit.

**Range Management:** any activity or program on or relating to the management of lands used primarily as watersheds, for the grazing of animals, for recreation, and as habitat for wildlife. These activities include, but are not limited to, restoring or harvesting vegetation, managing livestock grazing activities, range improvements such as providing reliable water for livestock and wildlife, reducing or stabilizing soil erosion problems, and reducing or controlling excess runoff.

**Setting**: an aspect of integrity, setting is the physical environment of a historic property. Whereas location refers to the specific place where a property was built or an event occurred, setting refers to the *character* of the place in which the property played its historic role. It involves *how*, not just where, the property is situated and its relationship to surrounding features and open space (National Register Bulletin 15).

**Signatories or Signatory:** per 36 C.F.R. § 800.6, parties who assume obligations under this Agreement. Signatories can agree to amend this Agreement. The term includes full and invited signatories but does not include others who sign this Agreement as concurring parties.

**Significance:** used to indicate a cultural resource's eligibility for the National Register according to the criteria in 36 C.F.R. § 60.4.

**Slope:** the steepness of the terrain. Normally documented using percent slope. Slopes of 40% or greater are generally not surveyed.

**State Historic Preservation Officer (SHPO):** the official appointed or designated by the Governor, pursuant to Section 101(b)(1) of the NHPA, to administer the State Historic Preservation Program (36 C.F.R. § 800.16(v)).

**Structures:** a property type that is not designed to shelter human activity but to perform other necessary functions (e.g., bridges, dams, canals, roads, railroads, fences, wells, roads, pipelines, storage tanks, troughs, dams, gully treatments).

**Traditional Cultural Property (TCP):** as defined in National Register Bulletin 38, is a property that is listed in, or is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that are: (1) rooted in that community's history; and (2) important in maintaining the continuing cultural identity of the community.

**Tribal Historic Preservation Officer (THPO):** an individual designated by a Tribe to administer the tribal historic preservation program, through appointment by the Tribe's chief governing authority or as a tribal ordinance may otherwise provide (NHPA Section 101(d)(2)(B)). On tribal lands, a THPO, representing the Tribe, may assume the duties of the SHPO, in whole or in part, as certified by the NPS (36 C.F.R. § 800.16(w)).

**Tribal Lands:** all lands within the exterior boundaries of any Indian reservation and all dependent Indian communities (36 C.F.R. § 800.16(x)). Within the scope of this Agreement, the NHPA definition is identical to the NAGPRA definition (25 U.S.C. § 3001(15)).

**Undertaking:** a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency; those carried out with federal financial assistance; and those requiring a federal permit, license or approval. (36 C.F.R. § 800.16(y)).

**Vegetation Management:** vegetation treatment methods include prescribed fire treatments, hand thinning treatments, mechanical thinning treatments, chemical thinning treatments, biological treatments, wood cutting permits, and planting.

**Workmanship**: an aspect of integrity, workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory. It is the evidence of artisans' labor and skill in constructing or altering a building, structure, object, or site. Workmanship can apply to the property as a whole or to its individual components. It can be expressed in vernacular methods of construction and plain finishes or in highly sophisticated configurations and ornamental detailing. It can be based on common traditions or innovative techniques. (National Register Bulletin 15).

## APPENDIX B: DESIGNATING THE LEAD FEDERAL AGENCY

Once an agency determines it has an undertaking with the potential to affect historic properties, it should also determine whether other federal agencies are likely to be responsible for carrying out the undertaking, providing funding, or issuing licenses, permits, approvals, or assistance. The federal agencies involved shall collectively designate the lead federal agency for each individual undertaking or undertakings grouped together under this Agreement. There can be co-leads.

A. Circumstances when agencies should consider designating a lead federal agency for Section 106 review:

   1. Where a lead agency must obtain approval by another federal agency (e.g., a project requires a permit, right-of-way, or easement from another federal agency);

   2. Where one agency's project crosses or impacts another agency's property (e.g., range management activities such as a waterline or fence line crosses land managed by more than one federal agency);

   3. Where one agency's project involves funding from another federal agency; and

   4. Where multiple federal agencies, with varying responsibilities in approving or assisting an undertaking, conducting independent Section 106 reviews would impose significant workloads and confusion, on Consulting Parties as well as duplication of efforts (e.g., large scale, multi-jurisdictional projects).

B. In general, the lead federal agency should be the agency with the greater degree of involvement in the undertaking. An agency generally has a greater degree of involvement in the following order of priority:

   1. The agency manages the land where most of the undertaking, or its effects, take place;

   2. The agency provides all or a significant amount of financial assistance for the undertaking;

   3. The agency has broader control over how the undertaking may be designed or located.

C. Resolving disputes regarding which federal agency should be designated as the lead federal agency for a Section 106 review should be guided by the following provisions:

   1. To resolve disputes involving the identification of a lead federal agency, the federal agencies shall schedule a conference call or in-person meeting with the SHPO/THPO to discuss the undertaking and each agency's Section 106 responsibilities.

   2. If no agreement on the designation of the lead federal agency can be reached, then each agency remains individually responsible for complying with Section 106 for the

undertaking either using this Agreement, another appropriate agreement, or 36 C.F.R. 800, subpart B, and informing the SHPO/THPO of the decision.

3. No agency can be forced to take over as the lead federal agency or accept another agency as lead federal agency for the undertaking.

4. Making changes to the lead federal agency for a Section 106 review involves the following:
    a. If a federal agency decides it no longer wants an agency to continue as lead on its behalf, it must notify that agency, Tribes, SHPO/THPO, and other Consulting Parties that it is going to individually be responsible for its Section 106 obligations.

    b. If a lead federal agency chooses to stop being the lead federal agency in the Section 106 review for an undertaking, it must notify the non-lead federal agencies, Tribes, SHPO/THPO, and other Consulting Parties that it will no longer be representing other federal agencies. The federal agencies may designate a new lead federal agency, or otherwise each agency remains responsible for their own individual Section 106 reviews.

D. Documenting and formalizing the designation of a lead federal agency for a Section 106 review involves the following:

1. Develop an appropriate written document memorializing which federal agency is the lead federal agency for Section 106 review for the undertaking. The document should outline:
    a. How the agencies intend to coordinate information sharing, including the treatment of any confidential information, and other tasks;

    b. Any work that non-lead federal agencies may have during the Section 106 review (e.g., any work to identify and evaluate historic properties, host consultation meetings, review reports, or provide other administrative support); and

    c. How the lead federal agency will involve non-lead agencies by describing agency roles and responsibilities, communication protocols, and points of contact.

2. Notify all Consulting Parties of this lead federal agency arrangement in writing.
    a. The document should include provisions for dispute resolution among the agencies to address situations where agencies may disagree on the steps taken to comply with Section 106, such as level of consultation or outreach effort.

## APPENDIX C: ELIGIBLE PROPERTIES

List of cultural resources automatically considered eligible for the purpose of this Agreement:

A. For eligibility determinations under this Agreement, the following types of cultural resources, provided they are 50 years old or older and retain some aspect(s) of integrity (i.e., association, design, feeling, location, materials, setting, workmanship), shall be automatically considered eligible for the National Register without further SHPO/THPO consultation or concurrence:

   1. Archaeological sites with clear evidence for the presence of architecture (pueblos, pit houses, sleeping circles, wikiups, rock rings, sweat lodges, etc.);

   2. A prehistoric site that contains a diverse artifact assemblage with temporally or culturally diagnostic materials and can yield additional information important in prehistory;

   3. Historic or prehistoric sites with clearly visible evidence of human remains and/or funerary objects;

   4. Rock art sites (e.g., petroglyphs, pictographs);

   5. Intaglios/geoglyphs and other ground figures; and

   6. TCPs that meet the definition of a historic property per NRB 38.

B. The list may be expanded to include other properties in consultation with the SHPO and other Signatories to this Agreement.

C. Unevaluated archeological sites and other cultural resources shall be treated as eligible properties for purposes of Section 106 until a formal determination has been completed in consultation with SHPO/THPO.

## APPENDIX D: EXEMPTED UNDERTAKINGS

Signatories agree that the following activities have no or limited ground disturbance and therefore have no or limited potential to adversely affect historic properties. The agency archaeologist must review the scope of work to ensure the conditions for an exemption are met. Agencies should document exempt undertakings in the annual report according to Stipulation XV. The list of exempted undertakings is below:

1. Permitted activities or acquisition of easements, rights-of-way, and leases that do not authorize surface disturbance or have the potential to affect historic structures or TCPs.

2. Minor, routine, or preventive operation and maintenance of existing structural range improvements less than 50 years old (e.g., cattle guards, gates, fences, signs, storage tanks, troughs, earthen berms, dams) that do not involve additional ground disturbance beyond the original footprint.

3. Planning, vegetation or wildlife monitoring activities, enhancements, or practices that do not involve ground disturbance.

4. Pond/canal/ditch cleaning/repair/replacement or lining projects limited to activities occurring within the previously disturbed construction area and disposal of spoil on an existing spoil bank.

5. Replacement of gas, water, or electric lines associated with range or wildlife facilities within the same footprint.

6. Stocking native fish.

7. Hand planting of native plants involving minimal excavation of less than 6 inches in depth and width.

8. Routine maintenance of existing designated trails using hand-held tools (e.g., rakes, hoes, shovels, hand-held saws, chainsaws, pruning tools) and involving no new ground disturbance beyond the existing footprint.

9. Activities, such as the removal of log jams and debris, limited to within active stream beds, not including terraces, cut banks, etc. Activities must be completed by hand.

10. Aerial or hand broadcast seeding with no ground disturbance.

11. Gathering of fuelwood, using existing access roads only, under authorization of a personal use fuelwood permit.

12. Installing bear feeding stations (for the purpose of capture and relocation of nuisance bears), bird nesting platforms, and temporary animal traps.

13. Fishery habitat management activities confined to stream beds or below the high-water mark within lakes, ponds, and reservoirs (such as willow plantings or placement of fish habitat).

14. Establishing long-term study plots for range monitoring or botanical research projects that do not include ground disturbance.

15. Inventory, data, and information collection including the collection of samples that do not include ground disturbance; This may apply to land use and land cover, geologic, mineralogic and resource evaluation activities; cadastral and geophysical surveys; and the approval of permits for such activities.

16. Placement, repair, and maintenance of monitoring stations or stream gauges in active stream beds.

17. Traditional tribal collecting activities provided the activities are on federal land. Permits are required on state trust land.

18. Actions already allowed under an existing permit, like routine maintenance, that has an existing Section 106 review up to current standards and will not require a new Section 106 review unless otherwise stated.

## APPENDIX E: SCREENED UNDERTAKINGS

Signatories agree that the following activities involve limited ground disturbance and therefore have limited potential to adversely affect historic properties. Screening by a qualified archaeologist is necessary to determine if any known historic properties are present within the proposed APE. If there is existing inventory that meets current standards, or the proposed activity has limited potential to adversely affect a historic property, an activity on the screened list maybe be exempted from further review. If the screening requirements are not met, the project will follow the provisions in Stipulation V (Consultation Process).

Screened undertaking criteria on this list do not require formal consultation if the criteria for exemption from further review are met; however, the federal agency using these screened undertakings is responsible for documenting how the criteria of exemption are met and informing Consulting Parties, if applicable. The screening and criteria of exemption are listed below:

1. Activities, enhancements, and practices applied by aerial application of chemical or biological agents. The screening process for such undertakings shall include determining whether the aerial application would affect areas of traditional collection or is within TCPs; required consultation is with Tribes only.

2. Applications involving sprayers attached to vehicles that remain on existing roadways. See Appendix H (Vegetation Management Protocol), Part F.3 for best management practices involving all-terrain vehicle (ATV)-mounted equipment. The screening process for such undertakings shall include determining whether the aerial application would affect areas of traditional collection or is within TCPs; required consultation is with Tribes only.

3. Herbicide application on foot or by vehicle-mounted equipment, provided application does not occur within an archaeological habitation site or known traditional plant gathering places; See Appendix H (Vegetation Management Protocol), Part F.3 for best management practices involving ATV-mounted equipment. The screening process for such undertakings shall include determining whether the aerial application would affect areas of traditional collection or is within TCPs; required consultation is with Tribes only.

4. All types of new fence construction (e.g., wild horse and burro, pronghorn, elk fences, snow fences, barbed wire and T-post fences, small exclosures) and associated corner braces. The screening process for such undertakings shall include determining whether the new fence construction and associated activities would affect historic properties.

5. Installation of above-ground pipeline provided there is no ground disturbance. The screening process for such undertakings shall include determining whether there are known historic sites in the area that could be affected and that should be avoided.

6. Activities that involve less than 1 square meter of cumulative ground disturbance, including geotechnical boring and exploratory potholing, unless within known historic properties.

7. Activities where previous natural or human disturbance has modified the landscape so extensively that the likelihood of finding eligible historic properties is negligible (e.g., vertical expansion of existing pits, parking lots, and areas of heavy vehicle disturbance).

8. Road maintenance within existing road prisms that have been previously surveyed and have no known historic properties. This does not include reconstruction, re-alignment, installation, or replacement of existing culvert or new road construction.

9. Installation and repair of signposts and monuments unless within known sites.

10. Vegetation inventory-related activities (e.g., auguring soil holes, vegetation sampling) that will not involve subsurface disturbance except individual auger or hand excavations that do not exceed 1 square foot in depth and width and that are spaced at least 8 feet apart. The screening process for such undertakings shall include determining whether there are known sensitive sites in the area that could be affected and that should be avoided.

11. Conservation activities, enhancements, and practices implemented in areas of agricultural development and within the existing depth of tillage documented by historic record or producer's signed statement. If actions will exceed the historic tillage depth, then standard consultation will be required.

12. Routine operations, repairs, modification, maintenance, or the demolition of any building or structure less than 50 years old.

13. Activities involving construction, repair, or improvements to a building or structure. The screening process for such undertakings shall include determining whether the building or structure is less than 50 years old and not in a historic property.

14. Tenant-type maintenance of historic buildings, i.e., routine maintenance and repair of historic buildings entailing no structural change, or any change of color, form, function, design, workmanship, or materials. The screening process for such undertakings shall include determining whether the activity will not have an adverse effect on a historic property.

15. Seismic activities on the surface of regularly maintained roads (i.e., within existing road prism) that do not affect known sites. The screening process for such undertakings shall include determining whether there are known sites in the area and if additional survey may be required depending on the activity being proposed.

16. Hand cutting of vegetation where slash is lopped and scattered but not dragged, piled, or burned within known site boundaries. The screening process for such undertakings shall include determining whether there are known sites that need to be avoided.

17. Broadcast seeding equipment attached to a rubber-tired or rubber-tracked vehicle following best management practices for herbicide in Appendix H (Vegetation Management Protocol), Part F.3. The screening process for such undertakings shall include determining whether there are known historic properties that should be avoided.

18. Vegetation removal where the trees or brush are removed using soil surface disturbing treatment methods, such as shearing, chipping, grinding, or shredding tools attached to a rubber-tired or rubber tracked vehicle in areas where the target woody species canopy does not exceed 40% and there is at least 20% ground cover from any combination of live basal vegetation, litter, and/or gravel cover. Work will not be performed during times when soil moisture and temperature exceeds the level at which rutting will occur. Operators will be instructed to avoid rocky or other areas in which standing structures may occur. See Appendix H (Vegetation Management Protocol), Part B, for details on determining these metrics.

19. Repair/replacement of water bars, culverts, and other existing trail infrastructure. The screening process for such undertakings shall include determining whether these are within or near known historic properties that should be avoided or if additional inventory is needed.

20. Removal of recent (less than 50 years old) structures and materials (e.g., abandoned automobiles, dumps, fences, and buildings) and reclamation of the site if the reclamation does not expand previous surface disturbance and is not within a historic property. The screening process for such undertakings shall include determining whether the building or structure (e.g., culverts) is less than 50 years old and not in a historic property.

21. Drilling of new wells may occur within a 10-foot radius of an existing well, provided that the new well or excavated soils are not placed within a known historic property.

**APPENDIX F: STANDARD MEASURES FOR RESOLVING ADVERSE EFFECTS**

Avoidance of effects on historic properties is advocated as the first protection measure. The federal agency shall propose and carry out standard measures for resolving adverse effects on specific categories of historic properties in consultation with the SHPO/THPO, Tribes, and other Consulting Parties.

The following standard measures will apply:

A. Development of a Historic Properties Treatment Plan which shall include, but is not limited to, the following:

1. Discussion of the National Register significance, eligibility, and integrity of a property within an appropriate historic context;

2. Research design and questions that are directly pertinent to those data sets that qualify the property for inclusion in the National Register under relevant criteria;

3. Provisions for tribal perspectives in the preparation of research designs, data recovery plans, and reports;

4. Results of previous research relevant to the affected property type;

5. Proposed data needs and proposed methods and techniques to acquire the data, including any special studies;

6. Field methods and techniques that will cost-effectively address the property's structure and content in the context of the defined research questions and the property's stratigraphic and geomorphic context;

7. Assumptions about the number and types of features expected and a proposed sampling strategy;

8. Site-specific maps portraying the proposed data recovery (i.e., proposed trench or test unit placement);

9. Laboratory processing and analyses, with justification of their relevance to the property and its research values;

10. Methods and techniques used in artifact, data, and other record management;

11. Provisions for ongoing tribal consultation, monitoring, and coordination, if tribal values or concerns are known or anticipated;

12. Qualifications of key personnel;

13. Disposition, including curation, of recovered materials and records resulting from implementation of the data recovery plan;

14. All required permits;

15. A report preparation schedule;

16. A Monitoring and Discovery Plan including provisions and procedures for evaluating and treating discoveries of unexpected finds shall be developed when necessary;

17. A plan for tribal community involvement and educational or interpretive programs; and

18. A plan for public involvement on educational or interpretive programs, focusing on the community or communities that may have interest in the results.

B. Historic Americans Buildings Survey/Historic American Engineering Record (HABS/HAER) documentation.

C. Standards and Guidelines

1. All archaeological data recovery will be conducted following:
   a. Archaeology and Historic Preservation: SOI's Standards and Guidelines, September 1983, U.S. Department of the Interior, NPS (48 Federal Register 44716, as updated) or its successor regulation;

   b. AAA standards, for archaeological investigations on state, county, and municipal lands in Arizona.

2. All HABS/HAER documentation will be completed by a professional architect or architectural historian per the SOI professional qualifications standards, and include the following:
   a. SOI Standards for Architectural and Engineering Documentation; and

   b. SOI Standards for the Treatment of Historic Properties, July 1997, U.S. Department of the Interior, NPS (36 C.F.R. Part 68) or its successor regulation.

## APPENDIX G: RANGE MANAGEMENT PROTOCOL

Range management activities, authorizations and approvals, or funding of range management activities are considered undertakings subject to Section 106 review and analysis as defined in 36 C.F.R. 800.16(y). The effects of such undertakings on historic properties will vary depending on the type of range management activity, historic property types, and site density where management activities would be implemented. Participating agencies to this Agreement will follow this protocol to identify historic properties, to provide for the protection of historic properties, and to avoid and minimize adverse effects that may occur from implementation of range management activities.

Range management activities covered under this protocol only apply to federal undertakings (federal license or permit required or implemented using federal funding). These range management activities include grazing permit and lease renewals that involve planned ground disturbing activities; installation, maintenance and decommissioning of fencing, storage tanks and troughs, erosion control structures, corrals and holding pens, water pipelines, wildlife guzzlers, cattle guards, and wells; water haul sites (drinkers); dirt tank construction and cleaning; road maintenance (including culverts, ditches, signage, plating); and re-seeding or planting.

Additional range management activities may be considered for addition to the protocol following the procedures outlined in Stipulation XVIII (Additional Protocols, Screened Undertakings, or Exemptions) of this Agreement.

A. Cultural Resource Compliance for Grazing Permit and Lease Renewals

1. This section addresses Section 106 compliance for grazing, permit, and lease renewals. The regulations that implement Section 106 of the NHPA (36 C.F.R. Part 800) do not require a federal agency to conduct a 100% survey of the APE. Rather, the identification efforts should be conditioned by where effects are likely to occur and the likely impact of these effects on unevaluated, eligible, or listed properties. The following guidelines will be used to determine survey strategies under this protocol.

B. Level of Identification Efforts

1. The federal agency shall verify whether the proposed activity is covered under Appendix D (Exempted Undertakings) or Appendix E (Screened Undertakings). If the proposed activity qualifies as an exempted or screened undertaking, the federal agency shall follow that process.

2. The level of need and extent of new field surveys or inspections for grazing impacts will be determined through consultation with applicable landowners, permittees, or lease holders as needed. In making the decision on the level of survey to be conducted, if any, the archaeologist will consider the following and document the decision:
    a. Grazing history;
    b. Proposed changes in grazing management practices;

c. Known incidents of or high potential for damage to sites;
d. Presence of grazing-sensitive sites;
e. Presence of areas where cattle congregate;
f. Amount of the allotment previously surveyed for cultural resources;
g. Site density;
h. Information provided by employees, permittees, or other users.

3. The federal agency will review existing information to assess the project's potential to affect historic properties and ascertain the expected nature and distribution of historic properties that may be affected. Sources of information may include, but are not limited to published and unpublished documents and reports, land managing agency cultural resource inventory records, institutional site files (including ASM's Archaeological Records Office, grazing allotment management plans, and others), State and National Registers, statewide AZSITE cultural resources online database, tribal knowledge, local user/producer knowledge, and other information sources. Pursuant to SHPO Guidance Point No. 5: *SHPO Position on Relying on Old Archaeological Survey Data*, previous surveys should be evaluated to determine if they meet current standards; field visits may be necessary to assess the adequacy of the previous information.

4. If there are no known historic properties in areas that are being heavily impacted by livestock (e.g., areas where livestock are likely to congregate such as water sources, salt and mineral licks, shade areas) and the land management agency determines that the areas hold little to no potential for the presence of historic properties, then no further inventory work need be done.

If impacts may have occurred in areas that are likely to contain historic properties and there has been no previous field survey, the land management agency shall conduct additional survey of these areas.

C. Agreed-Upon Standard Site Protection Measures

1. Routine and repetitive range management activities tend to have similar effects that can be anticipated based upon previous implementation of similar practices. Routine and repetitive activities include installation, maintenance, and decommission of fencing, storage tanks and troughs, erosion control structures, corrals and holding pens, water pipelines, wildlife guzzlers, cattle guards, wells, water haul sites (drinkers), dirt tank construction and cleaning, road maintenance (including culverts, ditches, signage, plating), and re-seeding or planting.

2. When historic properties are identified as being impacted by range management activities, and the characteristics that make these properties eligible for the National Register are affected, the land managing agency shall implement protection measures to minimize and mitigate effects to historic properties.

3. The agencies may draw from the following mitigation measures to ensure that effects on historic properties are avoided or minimized. Once the mitigation measures are applied, the project can move forward without consultation.

D. Minimization and/or Mitigation Measures

1. Fencing or exclosures of livestock from individual sensitive historic properties or areas containing multiple sensitive historic properties being impacted by grazing;

2. Relocation of existing range management facilities and salting locations enough to ensure the protection of historic properties being impacted by concentrated grazing use;

3. Relocation or redesign of proposed range management activities and ground-disturbing management practices to avoid direct and indirect impacts to historic properties; and

4. Periodic monitoring to assess site conditions and to ensure that protection measures are effective.

5. Other mitigation measures, such as data recovery, will be developed and implemented in consultation with the SHPO/THPO and other Consulting Parties (see Stipulation X, Assessment of Effects).

E. The protection measures used to minimize and mitigate impacts to historic properties should be documented in the project file.

## APPENDIX H: VEGETATION MANAGEMENT PROTOCOL

Authorizations and approvals or funding of vegetation management treatments are considered federal undertakings subject to Section 106 review and analysis as defined in 36 C.F.R. § 800.16(y). The effects of such undertakings on historic properties will vary, depending on the type of vegetation activity and the historic property types and site density where management activities are proposed. Consulting Parties to this Agreement will follow this protocol to identify historic properties and provide for the protection of historic properties to avoid and minimize adverse effects that may occur from implementation of vegetation management treatments.

Vegetation management treatments covered under this protocol includes but are not limited to prescribed fire, hand thinning, mechanical thinning, chemical thinning, and the use of grazing animals.

Vegetation management using goats or other grazing animals to reduce woody vegetation cover, control noxious weeds, reduce fuel loads for fire breaks, and similar targeted vegetation control activities are low impact activities, and may or may not be surveyed at the discretion of the federal agency archaeologist, without further consultation.

New activities may be considered for addition to the protocol following the procedures outlined in Stipulation XVII (Amendments) of this Agreement.

A. Pre-field Existing Information Research
   Consulting Parties to this Agreement will review all reasonable, existing information to assess the project's potential to affect historic properties and ascertain the expected nature and distribution of historic properties that may be affected. Sources of information may include, but are not limited to, published and unpublished documents and reports, land managing agency cultural resource inventory records, institutional site files (including ASM Archaeological Records Office and others), State and National Registers, statewide AZSITE cultural resources online database, tribal knowledge, local user/producer knowledge, and other information sources.

B. Survey Strategies
   A federal agency is not expected to conduct a 100% survey of the APE. Rather, the identification efforts should be conditioned by where effects are likely to occur and the likely impact of these effects on listed or eligible properties. The following guidelines will be used to determine survey strategies under this protocol:

   1. The magnitude (severity) and nature of anticipated effects, based on:
      a. Type and intensity of mechanical treatment.
      b. Type and intensity of prescribed fire, including fuel loading and fire prescription.
      c. Construction of containment lines, safety zones, and staging areas.

   2. The expected nature and distribution of historic properties, based on:
      a. Local knowledge and expertise from agency archaeologists.
      b. Local knowledge and expertise of landowners and lessees.

c. Cultural geographic information system (GIS) survey and site layers or hard copy survey and site atlases/maps.
d. Previous cultural heritage reports and site forms.
e. Cultural resources overviews and planning assessments.
f. Information obtained through tribal consultation or public input.
g. Information provided by other resource specialists or private landowners familiar with the project area.
h. Topographic maps, aerial photographs, or digital ortho-photo quadrangles.
i. Other available GIS layers, including soils, vegetation type, slope, and water.
j. Determination of known/expected fire-sensitive sites.

C. Mechanical Equipment Exemption
Mechanical removal of brush and other vegetation may not require survey if the ground cover and canopy cover meet the following criteria, as determined by a natural resource professional in coordination with a professional archaeologist:

1. The targeted woody species (such as Juniper, Pine, Mesquite, chaparral species) canopy cover does not exceed 40%, and at least 20% of the soil surface is covered by any combination of live basal vegetation, litter, rock, or gravel (i.e., bare ground is < 80%).
   a. Determination of ground cover and canopy cover will involve a combination of pedestrian survey and a cover estimation tool capable of estimating tree and shrub canopy cover as well as the percentage of the soil surface (ground) not covered by litter, live basal vegetation, gravel, or rock cover (i.e., bare ground), such as the Rangeland Analysis Platform (RAP) or a similar tool.

   b. A minimum of one pedestrian survey will be conducted for each major ecological site found in the project area. If either the targeted woody species canopy cover or ground cover appears to vary substantially within the ecological site area, additional surveys will be conducted to represent these areas.

   c. When supplementing pedestrian survey with the RAP or similar tool, the analysis areas should, to the extent possible, correspond to ecological sites. If either the targeted woody species canopy cover or ground cover appears to vary substantially within the ecological site area, additional analysis will be conducted to represent these areas.

   d. No single analysis area will exceed 640 acres. A minimum of one pedestrian survey will be conducted for each project area and at least 10% of the project area will be represented by pedestrian surveys.

2. Work will not be performed during times when soil moisture and temperature exceeds the level at which rutting will occur.

3. Work may be performed on frozen ground, provided that the conditions of this Appendix, Part B are met.

4. Operators will be instructed to avoid rocky or other areas in which standing structures may occur.

5. Documentation will be added to the project file and included in the annual report.

D. Field Survey

In most cases, the federal agency will be able to determine the level of survey needed, based on the following guidance. Where not specifically addressed below, the federal agency is encouraged to discuss sampling survey designs with the SHPO/THPO.

The following will guide the identification of areas selected for survey and the level of survey coverage:

1. For activities in areas previously surveyed to current standards (SHPO Guidance Point No. 5: *SHPO Position on Relying on Old Archaeological Survey Data*), no new survey is necessary.

2. For activities conducted within areas that were previously disturbed by chaining, disking, plowing, windrowing, crushing, or other extensive ground disturbing treatments, a sample survey strategy may be approved by the federal agency without consultation. The nature, degree, and extent of previous ground disturbing activities and the likelihood of finding cultural resources or locations within the treated areas that remain undisturbed shall be considered when making the decision to survey at less than 100%. This information will be documented and discussed in the survey report.

3. Activities conducted on slopes greater than 40% can be excluded from survey at the discretion of the federal agency without consultation.

4. For hand thinning activities, see Appendix E (Screened Undertakings), Part 16.

5. For mechanical vegetation treatments that are considered to have a low potential to adversely affect historic properties, a sample survey strategy may be approved by the federal agency in coordination with the SHPO/THPO and land managing agency. Information concerning the nature of the undertaking, site density, and evaluation of potential effects that led to this determination will be discussed in the survey report.

6. If existing inventories do not indicate the site density is lower than the regional average, or if the federal agency determines that the undertaking will result in ground disturbance that will adversely affect historic properties, the APE will be surveyed at 100%, except for the provisions in paragraphs H.D.1-3 above, or a

proposed sample survey strategy will be submitted to the SHPO/THPO and land managing agency for review.

7. For prescribed fire activities, surveys will include locations likely to contain fire-sensitive sites, based on existing pre-field information research, expected fire behavior, and other relevant data. Additional survey may be conducted at the land managing agency's discretion. The survey strategy shall identify the types of sites that are considered fire-sensitive, based on the list in Part H.E below, for each proposed project conducted under this Agreement, using the procedures described in Stipulation VIII (Identification and Evaluation or Historic Properties). If existing inventories indicate the presence or likelihood of fire-sensitive properties throughout the APE, the area will be surveyed 100% or a proposed sample survey strategy will be submitted to the SHPO/THPO for review.

E. Fire-Sensitive Sites

Cultural resources affected by fire fall into two categories. The first consists of sites vulnerable to the effects of even low-temperature fires and/or light fuel loads. The second group includes sites that generally have less risk for fire effects. However, depending on field conditions as well as specific site characteristics and expected fire behavior, the site types listed below may be fire-sensitive in certain fuel-reduction projects.

1. Known Fire-Sensitive Sites
    a. Historic sites with standing or downed wooden structures (including telephone trees) or other flammable features or artifacts.
    b. Rock art sites (depending on rock type, exposure, fuel type, and fuel loading).
    c. Cliff dwellings.
    d. Prehistoric sites with flammable architectural elements and other flammable features or artifacts.
    e. Prehistoric sites with soft or porous material such as volcanic tuff.
    f. Culturally modified trees, including aspen art and peeled/scarred trees.
    g. Certain TCPs (based on consultation with Tribes).

2. Other Project-Specific Fire-Sensitive Sites
    a. Other sites based on local field conditions and land managing agency specific concerns.
    b. Other sites based on consultation with SHPO/THPO, tribes, and others with local knowledge.
    c. Other sites based on consultation with fire management staff, fire behavior specialists, or fire effects researchers.

F. Agreed-Upon Standard Site Protection Measures

Various combinations of the following protection measures may be approved by the federal agency to protect sites for projects listed in this protocol without consultation.

1. Prescribed Burning
    a. Protect fire-sensitive sites with one or more of the following measures:

i. Exclude from project area;
ii. Hand line;
iii. Black line;
iv. Wet line;
v. Foam retardant;
vi. Structural fire shelter;
vii. Remove heavy fuels from site by hand;
viii. Prevent *in situ* heavy fuels that cannot be removed from ignition (e.g., flush cut, bury stumps);
ix. Implement the same protective measures for future maintenance burns;
x. Protect selected other sites from burning (judgmental);
xi. Allow burning over non-fire-sensitive sites, provided no ignition points are within site boundaries;
xii. No staging of equipment within site boundaries;
xiii. No slash piles within site boundaries.

b. Allow construction of safety zones and additional containment lines in areas surveyed at 100% and with archaeological monitoring, as appropriate, to assure historic properties are avoided.

2. Thinning, Hand, and Mechanical Treatments
   a. No mechanical treatments or ground disturbance within site boundaries; or
   b. Allow treatments within site boundaries, provided:
      i. Cutting is accomplished using hand tools only;
      ii. Large diameter trees are felled away from all features;
      iii. No dragging or piling of logs, trees, or thinned material across or within site boundaries;
      iv. All features and artifact concentrations are recorded and avoided;
      v. Periodic monitoring is used to assess impacts and, if impacts are noted, fuelwood cutting will be prohibited in the area;
      vi. No use of vehicles or other mechanized equipment within site boundaries except on existing roads during dry surface conditions or if there is at least two feet of snowpack and the ground is frozen (no digging in of equipment);
      vii. No staging of equipment within site boundaries; and
      viii. No slash piles within site boundaries.
   c. The federal agency may approve additional measures to further protect sites in consultation with land managing agencies and SHPO/THPO.

3. Herbicide Application Best Management Practices
   a. No application within the reported boundaries of prehistoric habitation sites.
   b. ATV use under dry surface conditions only and at speeds no greater than 10 miles per hour.

## APPENDIX I: AGENCY COMMUNICATION PROTOCOLS

All participating agency contact information may be found at the Government to Government Consultation Toolkit website: https://sites.google.com/view/az-consultation-toolkit/home. Also see Appendix J (Links to Policy, Regulations, and Statutory References) for more information. Participating agencies will be required to maintain the contact and protocol information for the duration of this Agreement.

ACHP
Protocol: Use the e-106 system to notify of any adverse effects at: https://www.achp.gov/e106-email-form.

ADOT
Protocol: Letter addressed to the Environmental Planning Group Manager, cc: Cultural Resources Program Manager.

ASLD
General Process: Any projects involving state land require consultation with the Cultural Resources Section and the Grazing Unit. Projects will require the lessee to apply for an ASLD Range Improvement or Land Treatment permit. Projects involving a grazing lease will not require a separate right-of-entry permit.

Protocol: Coordinate with the appropriate Range Resource Area Manager and complete the online application at https://land.az.gov/applications-permits.

AGFD
General Process: Projects involving AGFD lands will involve AGFD decisions, rights-of-ways, permits, or other authorizations requiring individual review and analysis by AGFD. Therefore, the AGFD requests advanced coordination with the local regional office and the Project Evaluation Program.

Protocol: Letter addressed to Habitat, Evaluation, and Lands Branch Chief, cc: Project Evaluation Program Supervisor and Land and Water Program Supervisor. Submit letter(s) and documentation to PEP@azgfd.gov.

ASPT
General Process: Projects involving ASPT decisions, rights-of-ways, permits, or other authorizations will require individual review by ASPT.

Protocol: Letter addressed to Project Development Manager, ASPT Central Office.

BIA
General process: Agency managers for projects involving Indian lands should concurrently consult with the Tribe and BIA. Early notification is preferred, because those projects involving BIA funding or approval will require review and analysis under NEPA. BIA can provide advanced coordination with Tribal officials and Superintendents.

Protocol: Letter addressed to the Regional Director cc: Regional Archaeologist.

BLM
General Process: Projects involving BLM-managed public lands will involve BLM decisions, rights-of-ways, permits, or other authorizations requiring individual review and analysis under NEPA. Accordingly, the BLM requests advanced coordination with local field offices for projects initiated by other agencies.

Protocol: Letter addressed to Field Office Manager, cc: Field Office Cultural Specialist.

Mohave County
Protocol: Letter addressed to Mohave County Board of Supervisors, cc: Planning and Zoning Manager, Department of Development Services.

Pima County Office of Sustainability and Conservation
Cultural Resources & Historic Preservation Division
Protocol: Letter addressed to Pima County Administrator, cc: Governor's Archaeology Advisory Commission.

SHPO
Protocol: Letter addressed to State Historic Preservation Officer.
Submit initial consultation letters and documentation to azshpo@azstateparks.gov.

Town of Marana
Protocol: All letters should be sent to the Environmental Project Coordinator and Town Engineer.

USFS
General Process: Projects involving USFS-managed lands will involve USFS decisions, rights-of-ways, permits, or other authorizations requiring individual review and analysis under NEPA. Accordingly, the USFS requests advanced coordination with local Ranger Districts for projects initiated by other agencies.

Protocol: Letter addressed to the District Ranger that describes the undertaking and its location, decision(s) to be made, and description of the USFS nexus or role in the undertaking.

USFWS
General Process: Projects involving Fish and Wildlife Service - managed public lands or actions involving Fish and Wildlife Service decisions, rights-of-ways, permits, or other authorizations requiring individual review and analysis under NEPA. Accordingly, the Fish and Wildlife Service requests advanced coordination with local field offices for projects initiated by other agencies.

Protocol: Letter addressed to Field Office Manager, cc: Field Office Cultural Specialist.

## APPENDIX J: LINKS TO POLICY, REGULATIONS, AND STATUTORY REFERENCES

Arizona Revised Statutes
A.R.S. § 41-844- https://www.azleg.gov/ars/41/00844.htm
A.R.S. § 41-865- https://www.azleg.gov/ars/41/00865.htm
A.R.S. § 39-125- https://www.azleg.gov/ars/39/00125.htm

Code of Federal Regulations
36 C.F.R. Part 60- https://www.energy.gov/sites/prod/files/2016/02/f29/CFR-2012-title36-vol1-part60.pdf
36 C.F.R. § 63- https://www.govinfo.gov/content/pkg/CFR-2001-title36-vol1/pdf/CFR-2001-title36-vol1-part63.pdf
36 C.F.R. Part 68- https://www.nps.gov/tps/standards/four-treatments/36cfr68.pdf
36 C.F.R § 79- https://www.nps.gov/archeology/tools/36cfr79.htm
36 C.F.R. § 800- https://www.achp.gov/sites/default/files/regulations/2017-02/regs-rev04.pdf
43 C.F.R. § 10- https://www.law.cornell.edu/cfr/text/43/part-10

Federal Register
48 FR 44716- https://www.govinfo.gov/content/pkg/FR-1983-09-29/pdf/FR-1983-09-29.pdf
48 FR 44738-44739- https://www.govinfo.gov/content/pkg/FR-1983-09-29/pdf/FR-1983-09-29.pdf

Government-to-Government Consultation Toolkit
https://sites.google.com/view/az-consultation-toolkit/home

National Historic Preservation Act
https://www.nps.gov/history/local-law/FHPL_HistPrsrvt.pdf

National Register Bulletin
Bulletin 15- https://www.nps.gov/subjects/nationalregister/upload/NRB-15_web508.pdf
Bulletin 38- https://www.nps.gov/subjects/nationalregister/upload/NRB38-Completeweb.pdf

Office of Personnel Management
0193 Supervisory Archeology series- https://www.opm.gov/policy-data-oversight/classification-qualifications/classifying-general-schedule-positions/standards/0100/gs0193.pdf

Secretary of the Interior's Standards for Archaeology
https://www.nps.gov/history/local-law/arch_stnds_9.htm

State Historic Preservation Office
Guidance Point No. 5- https://d2umhuunwbec1r.cloudfront.net/gallery/asp-archive/SHPO/downloads/SHPO_5_Old_Survey.pdf
Guidance Point No. 10- https://d2umhuunwbec1r.cloudfront.net/gallery/asp-archive/SHPO/downloads/SHPO-Guidance_Point10-2016.pdf

United States Code
5 U.S.C. § 552- https://www.justice.gov/oip/freedom-information-act-5-usc-552
7 U.S.C. § 8791(b)(2)(A)- https://www.law.cornell.edu/uscode/text/7/8791
16 U.S.C. § 470hh- https://www.law.cornell.edu/uscode/text/16/470hh
25 U.S.C. § 3001(15)- https://www.law.cornell.edu/uscode/text/25/3001
31 U.S.C. § 1341- https://www.law.cornell.edu/uscode/text/31/1341
54 U.S.C. §§ 300101 to 307108- https://www.achp.gov/sites/default/files/2018-06/nhpa.pdf
54 U.S.C. § 307103- https://www.law.cornell.edu/uscode/text/54/307103

# G. 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 NHPA AND THE NATIONAL PROGRAMMATIC AGREEMENT AMONG THE BLM, THE ACHP, AND THE NATIONAL CONFERENCE OF STATE HISTORIC PRESERVATION OFFICERS

# STATE PROTOCOL AGREEMENT

BETWEEN

THE BUREAU OF LAND MANAGEMENT, ARIZONA

AND

THE ARIZONA STATE HISTORIC PRESERVATION OFFICE

REGARDING THE MANNER IN WHICH

THE BUREAU OF LAND MANAGEMENT, ARIZONA

WILL MEET ITS RESPONSIBILITIES UNDER

THE NATIONAL HISTORIC PRESERVATION ACT

AND

THE NATIONAL PROGRAMMATIC AGREEMENT

AMONG

THE BUREAU OF LAND MANAGEMENT,

THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, AND

THE NATIONAL CONFERENCE OF STATE HISTORIC PRESERVATION OFFICERS

DECEMBER 2014

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## 1. PURPOSE

The Bureau of Land Management (BLM) executed a national Programmatic Agreement (National PA) in 1997, as amended on February 9, 2012, with the Advisory Council on Historic Preservation and the National Council of State Historic Preservation Officers to help guide the BLM's planning and decision making as it affects historic properties as defined in the National Historic Preservation Act (NHPA). Successful execution of the components of the National PA will satisfy the BLM's obligations under Section 106 and serve as partial satisfaction of the BLM's obligations under Sections 110(f) and 111(a) of the NHPA.

As set forth in component 2(a) of the National PA, each BLM State Director is tasked with developing a mutually agreed upon State Protocol Agreement (Protocol) with the respective State Historic Preservation Officer (SHPO). This two-party protocol serves to formalize the BLM-SHPO relationship and structure the consultation process by encouraging streamlined consultations on evaluations of cultural resources for eligibility for listing in the National Register of Historic Places and for findings of No Historic Properties Affected, No Adverse Effect, and Adverse Effect in those cases when the BLM and the SHPO reach agreement on how to resolve the adverse effects. This Protocol also guides the BLM planning and decision making as it pertains to historic properties and historic preservation.

The Arizona Protocol has been developed pursuant to the provisions of the National PA. As per components 2(b)(2) and 6(b)(1) through (4) of the National PA, the BLM will consult with the SHPO/THPO, the public, Indian tribes, and other consulting parties for all undertakings that will adversely affect properties that are eligible for listing in, or are listed on, the National Register of Historic Places, and for the development of any other procedures such as a project-specific memorandum of agreement (MOA) or programmatic agreement (PA). It is the intent of this Protocol to provide BLM Arizona with a substitution for the standard procedures associated with Section 106 of the NHPA as well as a process for consistent compliance with these procedures. Where referenced, the provisions of 36 Code of Federal Regulations (CFR) Part 800, "Protection of Historic Properties," incorporating amendments effective August 5, 2004, will apply.

## 2. RELATIONSHIP TO AGREEMENTS AND OTHER AUTHORITIES

***NOTE:*** This Protocol supersedes the provisions of the previous Protocol between the BLM Arizona State Director and the Arizona SHPO, which was executed on November 9, 1997. The previous Protocol will terminate and have no further force and effect upon the date of the last signature on this revised Protocol. Any undertaking-specific agreements in force at the time of the execution of this Protocol shall continue to function according to the terms of the 1997 Protocol.

The BLM and the SHPO may agree, by reference or by incorporation, to use any specific procedures mentioned in this Protocol in cultural resource management plans, memoranda of agreement, and programmatic agreements. These procedures include, but are not limited to, notification and consultation with the SHPO; definition of an undertaking and the area of potential effects; identification and evaluation of cultural resources; recordation of cultural

resources; reporting procedures; tribal involvement; public participation; professional qualifications; inadvertent discoveries; monitoring; and, avoidance measures.

As agreed upon between the BLM State Director and the SHPO, individual agreements may be developed to define project-specific procedures or manage Section 106 compliance for specific types of undertakings as set forth in 36 CFR 800.14, "Federal Agency Program Alternatives."

### 3. Roles and Responsibilities of Federal and State Agency Personnel

The BLM State Director shall designate a Deputy Preservation Officer to represent Arizona on the BLM Preservation Board and advise BLM Managers in the development and implementation of BLM policies and procedures for compliance with the NHPA. The Deputy Preservation Officer shall oversee the implementation of this Protocol by providing technical oversight and training to Managers and Cultural Resource Specialists. The Deputy Preservation Officer will also submit an annual report to the SHPO and organize an annual meeting with the Managers, Cultural Resource Specialists and the SHPO. If funding levels preclude meeting in person, the annual meeting may be facilitated through video teleconferencing. The Deputy Preservation Officer will provide the SHPO with other information concerning the implementation of this Protocol, as requested.

The BLM State Director may delegate the authority and responsibility for compliance with Section 106 to BLM District Managers who may, in turn, delegate to BLM Field Managers provided each Manager has received training in the use and application of the Protocol. The Managers are authorized to speak for the BLM and have delegated project-level decision-making authority. The Cultural Resource Specialists shall, without formal SHPO consultation, advise their Managers on the following: the appropriate level of effort required to identify historic properties that may be affected by an undertaking including properties of cultural and/or religious significance to Indian tribes; determinations of the area of potential effects including the potential for direct, indirect, and cumulative effects to historic properties; determinations of eligibility to the National Register of Historic Places; and, findings of No Historic Properties Affected and/or No Adverse Effect. The Cultural Resource Specialists shall also advise the Managers on when consultation with the SHPO is required and when undertakings are outside the scope of this Protocol.

In coordination with their respective Cultural Resource Specialists, the Managers shall represent the United States in government-to-government consultation with Indian tribes and establish working relationships with tribal officials comparable to the BLM's relationships with State and local government officials. Managers shall engage in open and ongoing consultation and ensure the documentation of tribal consultation is maintained and complete. All consultation letters sent to the SHPO shall include a summary of the relevant tribal consultation efforts including any substantive comments and how these comments were addressed. The information may also be submitted in table format.

The SHPO has responsibilities under Section 101(b)(3) of the NHPA including to "advise and assist as appropriate, Federal and State agencies and local governments in carrying out their historic preservation responsibilities," and to "consult with the appropriate Federal agencies in accordance with the NHPA on Federal undertakings that may affect historic properties, and the

content and sufficiency of any plans developed to protect, manage, or to reduce or mitigate harm to such properties." For Federal undertakings that are proposed to cross tribal lands, if the tribe has a designated Tribal Historic Preservation Officer (THPO), then the THPO will perform the functions mentioned above in lieu of the SHPO. This Protocol will not apply on tribal lands.

## 4. UNDERTAKINGS NOT REQUIRING SHPO CONSULTATION

Under the regulations at 36 CFR 800, undertakings are subject to SHPO consultation on identification efforts, determinations of eligibility, project effect, and treatment prior to authorization; however, this Protocol modifies the process by developing a set of understandings and standard operating procedures that eliminate the need for SHPO consultation prior to project authorization for those projects that will not cause adverse effects to historic properties. Within the limits defined herewith, the BLM Manager may act **without** consulting the SHPO on BLM administered lands on those undertakings that culminate in No Historic Properties Affected or No Adverse Effect findings. The BLM Manager will initiate consultation with the SHPO on the types of undertakings referenced in section 5 (Thresholds for SHPO Consultation) and **must consult** under the 36 CFR 800 regulations on the categories of undertakings referenced in section 6 (Undertakings Outside the Scope of this Protocol).

## 5. THRESHOLDS FOR SHPO CONSULTATION

The BLM Manager shall initiate consultation with the SHPO in the following situations to determine whether or not to follow the procedures set forth in 36 CFR 800 instead of continuing under this Protocol. In these threshold circumstances, the BLM and the SHPO may agree to continue proceeding under the Protocol if both parties agree that the details of a specific undertaking merit staying under the Protocol or if the BLM and SHPO agree to specific conditions that allow the review to stay under the Protocol.

Unless BLM and the SHPO **both** agree that the undertaking can continue under this Protocol, these categories of undertakings shall require formal consultation:

A. Undertakings that may have **adverse effects** as defined by 36 CFR 800.5(a)(1) to properties listed in or eligible for listing in the National Register
B. Undertakings that adversely affect National Historic Landmarks;
C. Undertakings that involve interstate or interagency projects or programs regardless of lead federal agency;
D. Undertakings that require an Environmental Impact Statement;
E. Undertakings that are phased, segmented, or would otherwise require a project-specific Programmatic Agreement prior to implementation;
F. When the BLM lacks access to the appropriate professional expertise (e.g., a historical architect or architectural historian);
G. Undertakings that are determined by either the BLM or the SHPO to be outside the scope of this Protocol;
H. Undertakings that involve a transfer, lease, or sale of public lands out of BLM administration;

I. When the SHPO agrees to consult on an undertaking because SHPO review has been requested by a tribal government, a local government, an applicant for a BLM authorization, a member of the public, or other interested person;
J. Where treatment options for historic properties may be limited due to land status or statutory authority (i.e., private or non-federal lands);
K. Undertakings initiated or authorized by the BLM that involve lands administered by the State, county, or municipal agencies; State-funded projects that require authorization by the BLM; and/or State-funded grants for projects on BLM-administered lands;
L. Undertakings that involve Mining Plans of Operation;
M. When the proposed undertaking may be controversial or becomes controversial during the initial stages of the project (Controversy in this context does not mean opposition to the proposed undertaking.); and
N. For State or non-federally funded undertakings proposed on BLM-lands that are administered through Recreation and Public Purpose (R&PP) leases: If Section 106 compliance was not completed prior to the issuance of the R&PP lease, and unless the stipulations in the lease state otherwise, then the BLM retains responsibility for complying with Section 106 and conducting appropriate SHPO and tribal consultation.

## 6. Undertakings Outside the Scope of this Protocol

This Protocol is not applicable to certain categories of undertakings that shall instead be processed under the regulations at 36 CFR 800. Most large scale renewable energy projects including solar, wind, and geothermal energy production and associated transmission facilities shall not be processed under this Protocol. Several other types of projects are excluded from the Protocol. These involve major infrastructure projects designated by the BLM Washington Renewable Energy Office as having national interest; projects that have the potential for presenting procedural problems; cases with substantial public controversy related to historic preservation issues; cases with disputes among or about consulting parties which the Advisory Council may be invited to help resolve; and cases that are involved or likely to be involved in litigation on the basis of Section 106 as per Appendix A of 36 CFR 800.

Anytime the threshold is reached for the Advisory Council to participate (refer to section 8), the BLM must operate under the regulations at 36 CFR 800. In addition, the development and approval of program alternatives, including project-specific memoranda of agreement or programmatic agreements, will follow the process under 36 CFR 800.14.

## 7. SHPO Review of BLM Resource Management Plans

As per component 6(d) of the National PA, the BLM State Director will seek, as appropriate, the active participation of the SHPO, the Indian tribes, and the interested public in BLM land-use planning and associated resource management activities consistent with section 202 of Federal Land Policy and Management Act (FLPMA), 43 USC 1712, and the implementing regulations at 43 CFR 1610.2. This participation will be sought so that historic preservation considerations may influence large-scale decisions and inform the analysis of cumulative effects of more routine decisions before the BLM makes key commitments and its management options become limited.

*Planning Efforts*. Each BLM office responsible for preparing or amending a land use plan or preparing any activity plan (e.g., travel management, fuels reduction, etc.) at the regional or local level will, when beginning planning efforts, invite the SHPO to participate. As part of the process for the National Environmental Policy Act (NEPA) analysis, draft land use plans shall be submitted to the SHPO for review and comment for a minimum of ninety (90) calendar days per 43 CFR 1610.2(e).

*Use Allocations.* The BLM shall invite the SHPO to comment on any proposed cultural resource use allocations whether these are made in regional, local, or project plans. The BLM shall allocate cultural resources in a planning area whether or not these resources have already been recorded or are projected to occur on the basis of existing data. Resources can be designated to one or more of the following uses according to their nature and relative preservation value: Scientific Use, Conservation for Future Use, Traditional Use, Public Use, Experimental Use, or Discharge from Management.

## 8. CONSULTATION

When the BLM has established that an undertaking may have the potential to adversely affect historic properties, then the BLM will initiate consultation. Appropriate consulting parties include the SHPO, the THPO, the Indian tribes, other federal agencies, the Advisory Council, proponents or applicants, State or local governments, advocacy or friends groups, historic trail associations, and others.

Individuals and organizations with a demonstrated interest in the undertaking may participate in the Section 106 process as consulting parties due to the nature of their legal or economic relationship to the undertaking or affected properties, or their concern with the undertaking's effects on historic properties. Members of the public must be kept aware of Section 106 consultations and provided the opportunity to comment.

*The SHPO*. Under the regulations at 36 CFR 800, undertakings are subject to SHPO consultation; however, this Protocol modifies the process by developing standard operating procedures that allow the BLM to consolidate the process by including the definition of the area of potential effects, results of identification efforts, determinations of eligibility to the National Register of Historic Places, and findings of project effect in one consultation letter. As per 36 CFR 800.3(c)(4), if the SHPO fails to respond within thirty (30) calendar days of receiving a request for review of a finding or determination, the BLM Manager shall communicate with the SHPO by phone or email before proceeding to the next step in the process based on the finding or determination or consult with the Advisory Council in lieu of the SHPO.

*The THPO*. If a tribe has assumed the responsibilities of the SHPO on tribal lands, then the THPO is the official representative for the purposes of Section 106 consultations on tribal lands, defined as all lands within the exterior boundaries of any Indian reservation and all dependent Indian communities, consistent with 36 CFR 800.16(x). The Manager shall consult with the THPO (in lieu of the SHPO) regarding undertakings occurring on or affecting historic properties on tribal lands. If an Indian tribe does not have a THPO, then the Manager will consult with a

representative designated by the tribe in addition to the SHPO regarding proposed BLM undertakings occurring on or affecting historic properties on tribal lands.

The BLM National PA and this Protocol do not apply to tribal lands; therefore, compliance on tribal lands must be carried out according to the procedures of 36 CFR 800 unless there is an agreement with a tribe and the SHPO (if there is no THPO) specifying alternative procedures for compliance with the NHPA. For undertakings resulting in an Adverse Effect finding, an MOA or PA will specify how the THPO will be consulted throughout the Section 106 consultation process for the given undertaking.

*Tribal Consultation*. Consultation must recognize the government-to-government relationship between the Federal Government and Indian tribes. Federally recognized tribes have the status of independent domestic nations and will be treated accordingly. In most cases it is appropriate for the Managers and their Cultural Resource Specialists to meet face-to-face with the elected representatives of a tribal government on operational matters such as review of BLM management plans and potential effects on properties of traditional religious or cultural importance. Tribes shall be consulted early and often in the process.

As per component 6(e) of the National PA, if it is deemed helpful and appropriate by an individual tribe and the BLM, then the BLM will seek to establish agreements and/or other formalized working arrangements with the tribe relative to identifying undertakings, identifying properties, evaluating properties, determining effects, and protecting historic properties. An individual tribe may wish to enter into a Memorandum of Understanding (MOU) with the BLM to delineate procedures for consultation efforts. Such memoranda have been successful in Arizona. For undertakings resulting in an Adverse Effect finding, an MOA or PA will specify how Indian tribes will be consulted throughout the Section 106 consultation process for the given undertaking.

*The Advisory Council*. When specific circumstances and conditions are met as defined in Appendix A of 36 CFR 800, then the BLM must notify the Advisory Council. At a minimum, the BLM will notify and request the Advisory Council's participation in the following classes of undertakings:

A. Non-routine interstate and/or interagency projects or programs;
B. Undertakings adversely affecting National Historic Landmarks;
C. Undertakings that the BLM determines to be highly controversial (i.e., may generate substantial public controversy related to historic preservation issues); and
D. Undertakings that will have an adverse effect and with respect to which disputes cannot be resolved through a formal agreement between the BLM and the SHPO such as a memorandum of agreement.

The Advisory Council reserves the right to participate, on its own initiative or at the request of the SHPO/THPO, an Indian tribe, a local government, an applicant or other consulting party, in any proceeding taking place in fulfillment of the BLM's Section 106 responsibilities under the regulations, the National PA, or BLM-SHPO protocols, in a manner consistent with its role under 36 CFR 800 and the criteria under Appendix A of 36 CFR 800 and will notify the responsible

BLM State Director, and/or District or Field Office Manager and the Director of BLM when it decides to participate.

*The Public*. Members of the public are essential to making informed decisions in the Section 106 process. The Manager will seek and consider the views of the public in a manner that reflects the nature and complexity of the undertaking and its effects on historic properties. The public shall be invited to consult early in the process if they have expressed an interest in an undertaking or action subject to this Protocol, or if they have expressed an interest in a particular historic property or a class of cultural resources (e.g., historic trails). All proposed undertakings will be posted for review on the BLM's ePlanning NEPA Register website. The public may submit comments by following the instructions provided on the project webpage in the NEPA Project Summary for each undertaking.

Before the project review is completed the information regarding the proposed finding of effect will be made available for public inspection and comment for a recommended seven (7) calendar days for Categorical Exclusions and Determinations of NEPA Adequacy. For Environmental Assessments the information will be available for a minimum of fifteen (15) calendar days and usually for thirty (30) calendar days. Environmental Impact Statements will be available as per the Council of Environmental Quality regulations and BLM policy for a minimum of forty-five (45) calendar days. The BLM Manager shall take into consideration any comments received before proceeding.

*Federal and State Agencies*. When the BLM is the lead agency for an undertaking that involves lands administered by other Federal or State agencies, this Protocol will not apply and BLM will follow the regulations at 36 CFR 800. Typically, a programmatic agreement is developed for complex or multiple undertakings as per 36 CFR 800.14. A programmatic agreement substitutes for Subpart B of 36 CFR 800 and specifies how each federal agency will meet its Section 106 responsibilities.

Determinations of eligibility and findings of project effect for cultural resources located outside BLM-administered lands must be made in consultation with the appropriate state and/or federal land managing agencies. In formal correspondence with the SHPO, the BLM shall note that it has made its determinations in consultation with the other agencies. The BLM shall provide the SHPO with a copy of the written/e-mailed response from the land managing agencies indicating their concurrence with the BLM's determinations of eligibility for cultural resources on lands managed by other federal or non-federal agencies.

In addition, as it is the intent of the NHPA to consider the effects of federal decision-making on historic properties regardless of the land status involved, the BLM will ensure that its actions and authorizations are considered in terms of the effects on cultural resources located on non-federal (including county, municipal, and private) lands.

## 9. MONITORING AND DISCOVERY SITUATIONS

*Monitoring*. In conjunction with the development of a memorandum of agreement to resolve adverse effects or a programmatic agreement, the BLM may require monitoring during construction or project implementation to ensure that there are no adverse impacts to known

historic properties and to report any inadvertent discoveries. Monitoring and Discovery Plans will be developed in consultation with the SHPO/THPO, Indian tribes, and other consulting parties. Archaeological monitoring shall be performed by qualified cultural resource professionals meeting the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation. In specific situations, tribal monitors may be appropriate, for example, monitoring of Traditional Cultural Properties. When monitoring activities are complete for an undertaking, a final report summarizing the results will be submitted to the BLM, who will then send it to the SHPO, THPO, Indian tribes, and other consulting parties for their information.

*Discovery Situations.* Cultural resources that are discovered after the successful completion of the Section 106 process are categorized as either anticipated (planned for) or unanticipated (unplanned) discoveries, in accordance with 36 CFR 800.13. The procedures for evaluating the National Register eligibility and project effect(s) on these discoveries are presented below.

*Anticipated Discoveries*. For undertakings that involve land disturbance in areas suspected of containing subsurface deposits, the BLM will require a Monitoring and Discovery Plan prepared in advance of construction. At a minimum, the Monitoring and Discovery Plan will include: the number of monitors required and when monitors must be present on-site; the name and/or position of the individual(s) with the authority to suspend construction; the specific procedures to follow if human remains are encountered; an education plan and sensitivity training for construction workers; and, the procedures the workers must follow if discoveries are made. The proposed Monitoring and Discovery Plan will be forwarded to the SHPO/THPO, Indian tribes, and other consulting parties for review and comment along with the Historic Properties Treatment Plan, if a treatment plan is required. With concurrence from the SHPO, the Monitoring and Discovery Plan will govern how discoveries will be handled as part of the mitigation of adverse effects.

With an approved Historic Properties Treatment Plan and/or Monitoring and Discovery Plan in place, the Manager can meet the requirements of Section 106, the National PA, and any other applicable laws by following the plan when cultural resources are discovered during implementation of an undertaking. The Manager will take prudent and feasible steps to ensure that any activities associated with the undertaking are halted within 30 meters (100 feet) of the discovery; the discovery will be protected until a Cultural Resource Specialist has advised the Manager on the eligibility of the property, and the Manager has consulted with the SHPO on the determination of eligibility.

If the property is determined eligible, then the Cultural Resource Specialist shall advise the Manager if an adverse effect exists. If an adverse effect is found, then the BLM Manager will notify the SHPO/THPO, Indian tribes, and other consulting parties, and consult with them on appropriate treatment measures. If the threshold for consultation with the Advisory Council is met (as per Appendix A to 36 CFR 800), then the BLM shall notify the Advisory Council and consider the Advisory Council's comments on the discovery. The consulting parties will have two working days from the initial notification to review and comment on the BLM's proposed mitigation strategy. The BLM will take any recommendations into account and will then implement appropriate actions.

If evaluation of the discovered cultural resource results in a determination that the resource is not eligible, then the BLM will notify the SHPO/THPO, Indian tribes, and other consulting parties. The consulting parties will have two working days from the initial notification to review and comment, and then the BLM may issue a Notice to Proceed.

*Unanticipated Discoveries*. If a Monitoring and Discovery Plan has not been developed and the BLM determines, after completion of the review process outlined in this Protocol, that an undertaking may affect or has affected a previously unidentified property that may be eligible for the National Register, the BLM will ensure that activities associated with the undertaking are halted within 30 meters (100 feet) of the discovery and the discovery is appropriately protected, until the BLM Cultural Resource Specialist has advised the Manager on the eligibility of the discovered property, and the Manager has consulted with the SHPO on the determination of eligibility.

If the property is determined eligible, then the Cultural Resource Specialist shall advise the Manager if an adverse effect exists. If an adverse effect is found, then the BLM Manager will notify the SHPO, Indian tribes, and other consulting parties, and consult with them on appropriate treatment measures. If the threshold for consultation with the Advisory Council is met (as per Appendix A to 36 CFR 800), then the BLM shall notify the Advisory Council and consider the Advisory Council's comments on the discovery. The consulting parties will have two working days from the initial notification to review and comment on the BLM's proposed mitigation strategy. The BLM will take any recommendations into account and will then implement appropriate actions.

*Native American Graves Protection and Repatriation Act (NAGPRA) Situations*. During initial identification efforts, the Cultural Resource Specialists should advise the Manager on the likelihood that Native American cultural items including human remains, funerary objects, sacred objects, and objects of cultural patrimony will be discovered during the implementation of an undertaking. Prior to initiating or authorizing the undertaking, if the inadvertent discovery of human remains is likely, then a Plan of Action should be developed for the treatment of such items including consultation requirements and compliance with NAGPRA and applicable state laws (i.e., ARS 41-844 and 41-865). Developing a NAGPRA written Plan of Action is an integral part of the consultation process whenever there is activity affecting or likely to affect Native American human remains, funerary objects, sacred objects and objects of cultural patrimony on Federal or tribal lands. The responsibility to comply with NAGPRA lies with the Federal agency administering the land where the cultural items are discovered, even if this agency is not the lead federal agency for the undertaking.

*Human Remains, Funerary Objects, Sacred Ceremonial Objects or Objects of National or Tribal Patrimony on Arizona State or Private Lands.* Arizona Revised Statutes § 41-844 and § 41-865, outline the discovery and consultation process for the discovery of human remains, funerary objects, sacred ceremonial objects or objects of national or tribal patrimony on Arizona State or private lands. Prior to initiating or authorizing the undertaking, if the inadvertent discovery of human remains is likely, then the BLM will encourage the project proponent to initiate a burial agreement with Arizona State Museum.

## 10. EMERGENCY SITUATIONS

As per 36 CFR 800.12, the BLM Manager in consultation with the SHPO/THPO, Indian tribes, and the Advisory Council is encouraged to develop procedures for taking historic properties into account during operations which respond to a disaster or emergency as declared by the President, a tribal government, or the Governor, or which respond to other immediate threats to life or property. If approved by the Advisory Council, these procedures shall govern the BLM's historic preservation responsibilities during any disaster or emergency in lieu of 36 CFR 800.3 through 800.6.

In the event the BLM proposes an emergency undertaking as an essential and immediate response to a disaster or emergency declared by the President, a tribal government, or the Governor or another immediate threat to life or property, and the BLM has not previously developed procedures, then the Manager shall comply with Section 106 by following a programmatic agreement or memorandum of agreement developed pursuant to 36 CFR 800.14(b) that contains specific provisions for dealing with historic properties in the emergency situation or notify the Advisory Council, the SHPO/THPO, and any Indian tribe(s) that may attach religious and cultural significance to historic properties likely to be affected prior to the undertaking and afford them an opportunity to comment within seven (7) calendar days of notification. If the Manager determines that circumstances do not permit seven (7) calendar days for comment on the proposed emergency undertaking, then the Manager shall notify the Advisory Council, the SHPO/THPO, and the Indian tribe(s) and invite any comments within the time available.

## 11. INTEGRATING NEPA AND NHPA

In-depth guidance on integrating NEPA and NHPA is provided by *NEPA and NHPA: A Handbook for Integrating NEPA and Section 106* compiled by the Council on Environmental Quality (CEQ), the Executive Office of the President, and the Advisory Council. To gain efficiencies in the environmental review process, the BLM is tasked with coordinating procedures to the fullest extent possible for compliance with NEPA and Section 106 of the NHPA, and in meeting the BLM's tribal consultation responsibilities. If an action is categorically excluded from NEPA review, the BLM Manager shall determine if it still qualifies as an undertaking requiring review under Section 106 as per 36 CFR 800.8(b).

The BLM shall begin early when integrating the NEPA and NHPA processes. NEPA documents will be used to facilitate Section 106 consultations, and the results of the Section 106 process will inform the development and selection of alternatives in the NEPA documents. In situations where an Environmental Impact Statement is being prepared, the BLM shall coordinate the NEPA and Section 106 reviews by referencing both authorities when publishing a Notice of Intent (NOI) or Notice of Availability (NOA) in the *Federal Register* and notices of public meetings in newspapers or other media. Referencing both statutory processes informs the public of their opportunity to bring forward any Section 106-related concerns, as well as any broader environmental issues that will inform the NEPA process. In addition, the BLM shall use public scoping, tribal consultation, and Section 106 consultations to identify historic properties and key issues, especially landscape level concerns.

Under the authority of Section 304 of the NHPA and consistent with Section 9 of the Archaeological Resources Protection Act (ARPA), public disclosure of the location and character of cultural resources may put these resources at risk; therefore, sensitive cultural resource information or locational data under the control of the BLM, regardless of ownership of the resource, shall not be disclosed to the general public. Such information shall not be stored in documents open to the general public. For the purposes of analysis under NEPA, however, the BLM may sufficiently characterize cultural resources in writing while withholding sensitive and locational data.

Synchronizing the timing of NEPA and Section 106 reviews enhances the BLM's ability to develop and ultimately select alternatives that minimize or avoid potential adverse effects. The BLM shall coordinate the Section 106 and NEPA processes, including tribal consultation and public involvement, into an overall project schedule that includes and tracks milestones. In addition, an integrated strategy to complete studies to fill any data gaps will be formulated. Prior to issuing the final decision, the Section 106 process must be completed.

Integrating the Section 106 process with NEPA analysis allows the BLM to use the procedures and documentation required for the NEPA analysis to comply with Section 106 in lieu of the procedures set forth in 36 CFR 800.3 through 800.6; however, the BLM **must notify** the SHPO/THPO and the Advisory Council **in advance in writing** that it intends to do so as per 36 CFR 800.8(c). Managers shall include language in the notification of scoping, including the Notice of Intent, stating the NEPA review will be used to comply with Section 106 as an alternative to the process set in 36 CFR 800.3 to 800.6. In addition, the BLM must include this language in the Notices of Availability and other public notices.

The BLM will review the comments received through the NEPA process to identify any unresolved cultural, historic, and/or tribal issues, and will continue to consult with Indian tribes by keeping them informed about the project and the proposed scheduling for NEPA review periods. The BLM will also continue to keep the public informed of the status of the NEPA and Section 106 reviews. When appropriate to resolve adverse effects, the BLM will describe the mitigation commitments in the NEPA decision document and include the final signed programmatic agreement or memorandum of agreement in the final NEPA document.

If during the preparation of the NEPA document, the BLM determines that the effects of an undertaking on historic properties would be adverse, then the BLM in consultation with the SHPO/THPO, Indian tribes, and other consulting parties shall develop measures to avoid, minimize, or mitigate such effects. The BLM's responsibilities under Section 106 will be satisfied when a binding commitment to the proposed measures is incorporated in the right-of-way grant stipulation or Plan of Development, in the NEPA decision document, and a PA or an MOA is executed with the appropriate consulting parties in compliance with 36 CFR 800.6(c).

## 12. Program Review and Oversight

The Deputy Preservation Officer, in consultation with Managers and Cultural Resource Specialists, shall document each District and Field Office's professional staffing capabilities in the annual report to the SHPO. Documentation will include any recommended limitations on the

nature and extent of authorized functions. When a Manager's immediate staff does not possess the necessary qualifications to perform specialized preservation functions (e.g., historical architecture, historical landscape architecture, or ethnography), the Manager will seek specialized expertise from outside the immediate staff.

The BLM is committed to employing professional Cultural Resource Specialists. In hiring new staff, the BLM shall follow Section 112(a)(1)(B) of the National Historic Preservation Act and select candidates that meet the Secretary of the Interior's Professional Qualifications Standards or the education and experience standards called for by the U.S. Office of Personnel Management. Managers in Field Offices that do not have the services of a professional Cultural Resources Specialist, either on staff or through arrangement with another BLM office, shall consult with the SHPO on all undertakings.

The BLM student training programs may be used to recruit new staff to assist the Cultural Resource Specialists but the trainees shall not perform professional duties without appropriate direct oversight by qualified professional Cultural Resource Specialists. The BLM may also employ individuals who do not meet the Secretary of the Interior's standards for professional Cultural Resource Specialists (i.e., student interns working towards a degree). In these instances individuals who do not meet these standards shall work under the direct technical supervision of BLM professional Cultural Resource Specialists and may not substitute for Cultural Resource Specialists in making recommendations regarding efforts to identify and evaluate resources, determinations of eligibility, or findings of project effect.

Components 9 and 10 of the National PA assign duties to the Preservation Board to ensure that cultural resource policies and procedures are being followed appropriately by BLM offices. When a problem is identified, the Preservation Board is responsible for working to correct the matter. The Preservation Board may also review an office's status to operate under terms of the National PA and this Protocol. The BLM State Director, Managers, the Advisory Council, or the SHPO may also request the Preservation Board initiate a review.

This Protocol establishes the internal process of program review and also provides a process for the SHPO to review and comment on the BLM Arizona Annual Review:

*Levels of Deputy Preservation Officer Review*. There are three levels of review for the Deputy Preservation Officer: the Annual Review, Technical Review, and Program Review. These reviews are relevant for the purposes of assessing certification status of BLM offices. The SHPO or a BLM Manager may also request a review of a BLM office's status and its capability for carrying out the terms of this Protocol.

*Annual Review*. The Deputy Preservation Officer will assess each Field Office's ability to implement the provisions of this Protocol and provide the SHPO with an annual report that contains summary information on the activities conducted under the Protocol. The report will detail by Field Office the number of acres surveyed; the number of cultural properties recorded and the eligibility determinations of those properties; and the number of undertakings with determinations of No Historic Properties Affected, No Adverse Effects, and Adverse Effects. The report will also reference any new properties listed in the National Register or any

nominations being prepared, discuss successful preservation efforts, and share any preservation issues or needs.

The information in the SHPO annual report will be excerpted from the annual report provided to the BLM's Washington Office (WO) and will be submitted to the SHPO by December 31. The SHPO will have thirty (30) calendar days in which to provide the Deputy Preservation Officer with any comments and/or questions. The Deputy Preservation Officer in consultation with the appropriate Field Office will provide a written response to the SHPO's comments within ninety (90) calendar days of receipt of the SHPO's comments.

The Deputy Preservation Officer will set up a meeting between the Field Office Cultural Resource Specialists and the SHPO, after the SHPO has had an opportunity to review and comment on the annual report, and after the Deputy Preservation Officer has had an opportunity to review the SHPO's comments. This meeting can occur prior to the ninety (90) calendar days in which BLM has to respond to SHPO's comments on the annual report; timing of the meeting during this period could help the BLM and the SHPO resolve the SHPO's comments/questions prior to BLM's written response.

*Technical Review*. The Deputy Preservation Officer is responsible for determining whether BLM offices are maintaining an appropriate level of technical capability and performance specifically in particular program elements such as documentation of Protocol actions; Section 110 actions; curation; inventory documentation; determinations of eligibility; findings of project effect; and the information gathered in support of the Annual Reviews. The Deputy Preservation Officer will also monitor the Field Office Cultural Resource Specialists to ensure that consultations with SHPO occur when required under this Protocol when the threshold for consulting with the SHPO is met.

*Program Review*. The Deputy Preservation Officer is responsible for determining whether BLM offices are fully functional in their ability to implement this Protocol. Program reviews are broad-based, some of which take place at the District or Field Office level. As determined necessary, review teams will consist of the Deputy Preservation Officer, representation from the Arizona SHPO, and any other BLM staff the State Director deems appropriate. The review team shall have the ability to interview Cultural Resource Specialists, other resource staff and managers, and have access to cultural resource records and maps, NEPA files, and other relevant documentation. The team will be responsible for presenting their findings and generating a set of recommendations in a report to the BLM State Director. After the BLM State Director reviews and accepts the report, it will be sent to the appropriate District or Field Manager and forwarded to the SHPO.

*Action Plan for Compliance Problems*. When specific recommendations to correct deficiencies receive SHPO concurrence and are acknowledged by the BLM State Director, it shall become the responsibility of the Manager to initiate corrective actions within sixty (60) calendar days from the date the recommendations are acknowledged by the BLM State Director. Deficiencies may include a BLM office that lacks professional expertise yet continues to use the Protocol; or an office that proceeds in violation of or in opposition to this Protocol, for example, an office that uses the Protocol in situations where the regulations at 36 CFR 800 should be followed. The

BLM State Director may ask the Deputy Preservation Officer to prepare an action plan in consultation with the SHPO that, when implemented, would bring that office into compliance with this Protocol. In the first deficiency cited above, a corrective action might be for the problem office to share qualified help from another office.

Depending on the nature of the identified deficiencies, the BLM State Director may elect to place a Field Office in provisional status according to the procedures described in this Protocol, or the Deputy Preservation Officer in consultation with the SHPO may recommend that the BLM State Director place a District or Field Office on a provisional status based on findings from any of the reviews described in this Protocol. The SHPO will be notified within seven (7) calendar days of any change in status of a District or Field Office.

*Provisional Status*. While in provisional status, a District or Field Office will have the opportunity to correct deficiencies within eight (8) months while continuing to operate under the terms of the Protocol. The SHPO and the Deputy Preservation Officer shall convene sixty (60) calendar days before the term of the provisional status expires to determine whether sufficient progress has been made in correcting identified deficiencies. The findings shall be conveyed to the BLM State Director. If the SHPO and the Deputy Preservation Officer agree that sufficient progress has been made to correct the problems, the BLM State Director will issue a memorandum to the affected district or field office manager, the Deputy Preservation Officer, and SHPO that the District or Field Office is once again in compliance and restored to certified status. Should the SHPO and the Deputy Preservation Officer determine that such deficiencies remain uncorrected, or should new deficiencies be identified that the parties deem significant, the BLM State Director shall initiate the decertification process.

*Decertification for Cause*. If a BLM office has not maintained the basis for its certification (e.g., lacks the professional capability to carry out policies and procedures or is proceeding in violation of or in opposition to this Protocol or BLM internal guidance) and the Manager has not voluntarily suspended use of this Protocol, then the Preservation Board will recommend that the BLM State Director decertify the office. If the BLM State Director determines that a BLM office remains out of compliance, he or she may decertify a Field Office from operating under the terms of this Protocol. A BLM office that is decertified will follow the procedures at 36 CFR 800.3 through 800.7 until it is recertified. The BLM State Director, in consultation with the Deputy Preservation Officer and the SHPO, shall develop an action plan to bring any decertified office into compliance. When the decertified office confirms that it has successfully completed the actions specified in the plan, it will notify the BLM State Director through the BLM Deputy Preservation Officer.

The BLM State Director, a Manager, the Deputy Preservation Officer, or the SHPO may request that the Preservation Board review a District or Field Office's certification status. As per the National PA, components 9(a) and 10(d), the Preservation Board may also choose to review a District of Field Office's certification. The Preservation Board will respond under the terms of the National PA. If the Board finds that a BLM office does not maintain the basis for its certification (e.g., the professional capability is no longer available to carry out these policies and procedures, or the office is not in conformance with this Protocol), and the BLM Manager has not voluntarily suspended participation under this Protocol, then the Preservation Board will

recommend that the BLM State Director decertify the district or office, per the National PA. A Manager may ask the BLM State Director to review the Preservation Board's decertification recommendation. In turn, the BLM State Director may ask the BLM Director to review the Preservation Board's decertification, in which case the BLM Director will request the Advisory Council's participation in the review, per the National PA.

*BLM Staff Training Program.* Within ninety (90) calendar days of their report date, new Cultural Resource Specialists and Managers with Section 106 responsibilities will be trained in the procedures outlined in this Protocol and in the National PA, which provides the foundation for this Protocol. In cooperation with the Advisory Council and National Conference of SHPOs, the BLM may identify outside partners as appropriate to assist in developing and implementing or conducting training programs. The BLM may also seek the active participation of Indian tribes and the SHPO in training sessions.

The Deputy Preservation Officer may request that the Preservation Board assist the Managers and Cultural Resource Specialists in assessing the need for special skills not presently available on the immediate staff and also opportunities for professional development and career enhancement through training, detail assignments, part-time graduate education, and other means. The BLM may request the assistance of the SHPO in such cases or may obtain the necessary expertise through contracts, BLM Cultural Resource Specialists from other administrative units, or arrangements with other agencies.

## 13. COOPERATIVE ACTIVITIES

In this Protocol, pursuant to component 6(b)5-9 in the National PA, the BLM will address data sharing and synthesis and how data backlogs will be reduced; public education and community involvement in preservation efforts; cooperative stewardship; and proactive work including preservation planning.

*Data Sharing and Synthesis.* The BLM and the SHPO recognize the advantages of working together to share and facilitate the use of data. Each Field Office will ensure that any records, including electronic copies of final reports, for cultural properties under its jurisdiction are entered into the statewide automated cultural resource database, or AZSITE, within ninety (90) calendar days of project completion. The BLM and the SHPO will continue working together on interagency cooperative data sharing and provide funding, as available, to further develop the AZSITE database to better serve the needs of agencies, academia, and the private sector.

*Public Education and Community Involvement*. The BLM and the SHPO will work together on the following:

- *Arizona Archaeology and Heritage Awareness Month*. The BLM will participate in activities including the Arizona Archaeology Expo, public presentations, field tours, and exhibits.

- *Avocational Societies*. Cultural Resource Specialists may participate as advisors to avocational archaeological society members, encouraging members' interest in learning about the archaeology of Arizona and the use of professional standards in fieldwork.

- *Cooperative Stewardship*. The BLM and the SHPO will continue their strong partnership in the Arizona Site Steward Program. The BLM will support the Program financially as funding is available and through participation as land managers' representatives. In some cases, BLM personnel may serve as regional coordinators to further the goals of the Program. Under the supervision and guidance of the appropriate Field Office Cultural Resource Specialists, trained Site Stewards may provide important and beneficial contributions through long-term monitoring of cultural sites.

*Proactive Work.* As considered in the National PA, greater efficiencies in the Section 106 process realized through the use of this Protocol will enable the BLM and SHPO staff to devote a larger percentage of their time and energy to proactive work including (1) analysis and synthesis of data accumulated through decades of Section 106 work; (2) historic property identification where information is needed, not just in reaction to proposed undertakings; (3) long-term preservation planning; (4) National Register nominations; (5) planning- and priority-based historic resource management; (6) creative public education and interpretation; (7) more efficient and effective BLM, SHPO, tribal, and Advisory Council coordination including program monitoring and dispute resolution; and, (8) other activities that will contribute to readily recognizable tribal and public benefits.

## 14. Dispute Resolution Process

Component 6(b)(13) of the National PA requires provisions be included in this Protocol for resolving disagreements:

*Disputes Involving BLM and SHPO*. The BLM or the SHPO may object to an action proposed or taken pursuant to this Protocol. When informal resolution at the District or Field Office level is not effective or satisfactory, the objecting party shall notify the other parties and the Deputy Preservation Officer in writing. Within seven (7) calendar days following receipt of notification, the Deputy Preservation Officer shall initiate a formal thirty (30) calendar day consultation period with the District/Field Office and the SHPO to resolve the objection. If the objection is resolved within this time frame, the parties shall proceed in accordance with the terms of that resolution.

If the objection is not resolved within thirty (30) calendar days, and the parties have not agreed to extend the consultation period, then the Deputy Preservation Officer shall refer the objection to the Preservation Board, which will provide the BLM State Director with its recommendations. If the BLM State Director accepts the Board's recommendations, the BLM State Director shall promptly notify the SHPO of such acceptance, provide a copy of the Board's recommendations, and afford the SHPO thirty (30) calendar days following receipt of the notification to comment on the recommendations. If the SHPO concurs with the Board's recommendations within this time frame, the BLM State Director and the SHPO shall proceed in accordance with the Board's recommendations to resolve the objection.

If either the BLM State Director or the SHPO rejects the Board's recommendations after a period of consideration not to exceed thirty (30) calendar days, the BLM State Director shall promptly notify the Board in writing of the rejection, and immediately thereafter submit the objection, including copies of all pertinent documentation, to the Advisory Council for comment. Within

thirty (30) calendar days following receipt of any Advisory Council comments, the BLM State Director shall make a final decision regarding resolution of the objection and in writing notify the Board, the SHPO, and the Advisory Council of that decision. The objection shall thereupon be resolved. In reaching a final decision regarding the objection, the BLM State Director shall respond in writing to any comments received from the Board, the SHPO, and the Advisory Council pursuant to this stipulation.

*Disputes by a Member of the Public or a Federally-Recognized Indian Tribe or Individual*. If a member of the public or a Federally-recognized tribe or individual objects in writing at any time to the manner in which this Protocol is being implemented, the BLM shall consult with the objecting party for a period not to exceed thirty (30) calendar days. If the objecting party requests, the BLM will also consult with the SHPO to resolve the objection. If the objecting party and the BLM resolve the objection within thirty (30) calendar days, the BLM shall proceed in accordance with the terms of that resolution. The BLM should inform the SHPO of any objections and the outcome of attempts at resolution within ten (10) calendar days after the period of resolution has expired.

If the objection cannot be resolved, and if neither the objecting party nor the BLM has requested review by either the SHPO or the Advisory Council, then the Deputy Preservation Officer shall refer the objection to the Preservation Board, which will provide the BLM State Director and the objecting party with its recommendations for resolving the objection. If the BLM State Director and the objecting party accept the Preservation Board's recommendations, then the BLM State Director shall proceed in accordance with these recommendations to resolve the objection, and shall notify the SHPO of the procedures to be followed to fulfill the Preservation Board's recommendations.

If either the BLM State Director or the objecting party rejects the Preservation Board's recommendations for resolving the objection, the BLM State Director shall refer the objection to the Advisory Council. Once the BLM State Director has received the Advisory Council's recommendations for resolving the objection, the BLM State Director shall make a final decision regarding the resolution of the objection and shall in writing notify the Board, the objecting party, the SHPO, and the Advisory Council. The objection shall thereby be resolved. In reaching a final decision regarding the objection, the BLM State Director shall take into account any comments received from the Board, the objecting party, the SHPO, and the Advisory Council pursuant to this paragraph. Any objection filed pursuant to this paragraph shall not prevent the BLM from proceeding with project planning; however, project implementation shall be deferred until the objection is resolved pursuant to the terms of this paragraph.

## 15. AMENDING AND TERMINATING THE PROTOCOL

*Amending the Protocol*. Amendment refers to the process of adding supplemental guidance or modifying current procedures when the BLM or the SHPO wish those procedures to be made explicit. Either the BLM or the SHPO may propose amending this Protocol at any time, whereupon the parties shall initiate a ninety (90) calendar day consultation period to consider such amendment. The amendment process shall include opportunities for the public and tribes to comment on the proposed amendments and will culminate in the issuance of Protocol

Amendments, which are administratively appended in an appropriate and designated part of the Protocol. Protocol Amendments become effective upon the signature of both parties.

*Terminating the Protocol*. The BLM or the SHPO may choose to terminate this Protocol or any Protocol Amendment. The party proposing termination shall notify the other party in writing of the intent to terminate and explain the reasons for proposing termination. Within seven (7) calendar days following receipt of such a notification, the parties shall initiate a ninety (90) calendar day consultation period to seek alternatives to termination. Should such consultation result in agreement on an alternative to termination, the parties shall proceed in accordance with the terms of that agreement. Should such consultation fail, the party proposing termination may terminate this Protocol or any Protocol Amendment by providing the other party with written notice of such termination. Termination shall render this Protocol or any affected Protocol Amendment to have no further force or effect, as appropriate.

***NOTE:*** In the event of termination of this Protocol, the BLM shall comply with the provisions of the latest version of 36 CFR 800 for all undertakings previously covered by this Protocol.

*Automatic Termination of the Protocol*. This Protocol will automatically terminate or "sunset" on the tenth anniversary of its execution and have no further force or effect, unless it is extended by written agreement of the parties. The BLM shall notify the SHPO ninety (90) calendar days prior to this sunset date so that the SHPO can provide the BLM with its comments on whether or not the existing Protocol should be extended, or if a revised or amended Protocol should be developed, as per the Amendment stipulation. The BLM shall also solicit and consider public and tribal comments concerning any issues related to the Protocol and any Protocol Amendments during the previous ten years.

## 16. SIGNATURES OF APPROVAL

BUREAU OF LAND MANAGEMENT

**/S/ Raymond Suazo** **12/10/2014**

*Raymond Suazo* *Date*
*State Director, Arizona*

STATE HISTORIC PRESERVATION OFFICE

**/S/ James W. Garrison** **12/14/14**

*James W. Garrison* *Date*
*Arizona State Historic Preservation Officer*

# H. RESPONSE TO PUBLIC COMMENTS FROM APRIL 6-MAY 6, 2022, PUBLIC COMMENT PERIOD

| Commenter | Cmt # | Topic | Comment | BLM Response |
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| WWP | 1 | Climate change | It is important for the Bureau to investigate whether or not prescribed fire and/or chemical and mechanical treatments will have a chance to achieve the desired outcomes in light of the rapidly accelerating impacts of climate change. This analysis should be completed before any actions are taken on the ground, and before projects are approved. | As described under Section 2.1, the BLM will use adaptive management strategies to administer appropriate treatment methods. Treatment effectiveness will be evaluated following treatments. BLM has a history of implementing adaptive management strategies on Las Cienegas National Conservation Area (NCA) that use the continual formal, systematic, and rigorous approach of learning from the outcomes of management actions. Applying adaptive management strategies to prescribed fire, chemical, and mechanical treatments will help the BLM determine whether treatments are achieving desired outcomes given temperature and precipitation trends.<br><br>In addition, the BLM and The Nature Conservancy collected effectiveness data on vegetation treatments that took place on Las Cienegas from 2007-2011. That data is referenced throughout the EA as Tiller et al. 2012a.<br><br>The proposed action also includes criteria that would be reviewed by an interdisciplinary team to determine whether or not a treatment is appropriate. These criteria take into consideration factors such as temperature and precipitation trends. |
| Burgess | 2 | Cost | Figure 2, however, indicates that extensive previous vegetative manipulation treatments in the project area have been implemented on the Vera Earl Ranch. For some reason, however, the EA doesn't mention the  Veral Earl, even | The proposed action for the EA analyzes the impacts of erosion control and vegetation treatments throughout the project area (216,732 acres as shown in Figure 1 of the EA). The EA specifically mentions the Pima County ranches |

| Commenter | Cmt # | Topic | Comment | BLM Response |
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| | | | though it mentions other ranches in the project area. Perhaps this is because these upland vegetative treatments are expensive for the taxpayers, as they are typically government subsidized, and the Vera Earl Ranch has already benefited from large amounts of government assistance? | because Pima County has quantitative resource objectives for those ranches. Erosion control and vegetation treatments could be implemented on other ranches (including on the Vera Earl) in the project area as this EA discloses the impacts of implementing erosion control and vegetation treatments throughout the project area and across land jurisdictions.<br><br>The amount of funding that ranches in the project area have received previously for vegetation treatments was not considered as part of this EA. |
| WWP | 3 | Grazing | The Bureau must take a hard look at livestock grazing impacts, in light of climate change, and must consider whether or not removing livestock from Bureau managed lands would be a more efficient, cost-effective way to meet the primary objective of achieving long-term native plant stability. | In response to public comments, the BLM considered an alternative where livestock grazing would be removed from Las Cienegas NCA in Section 2.3.<br><br>The proposed action does not include the renewal of livestock grazing leases for BLM grazing allotments. The BLM would consider any changes to the BLM livestock grazing leases as part of the livestock grazing lease renewal process.<br><br>Livestock grazing impacts are considered for each resource as part of the affected environment as that use is reflected in the current conditions of the resources on Las Cienegas NCA as well as in the cumulative effects.<br><br>Public Law (PL) 106-538, which established the Las Cienegas NCA, explicitly states that livestock grazing will be permitted on Las Cienegas NCA. Therefore, removing livestock from Las Cienegas NCA is outside of BLM's control as the use is required per PL 106-538. |
| WWP | 4 | Grazing | Instead of using livestock for targeted grazing within riparian areas, WWP recommends the Bureau consider changing pasture rotations to ensure that livestock are not in pastures | As described in the response to comment #3, the proposed action for the Las Cienegas Landscape Restoration EA does not include the renewal of livestock grazing leases for BLM grazing |

| Commenter | Cmt # | Topic | Comment | BLM Response |
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| | | | adjacent to riparian areas in the spring or during wet periods, such as the monsoon or winter rainy seasons. This would allow for an extra layer of fencing between the livestock and the riparian area that may be more successful at keeping livestock out during important growing seasons for riparian vegetation. | allotments. Any pasture rotation requirements would be in the terms and conditions of the livestock grazing lease. The BLM would consider changes to the terms and conditions of the BLM livestock grazing leases as part of the livestock grazing lease renewal process which is outside the scope of this EA. |
| WWP | 5 | Grazing | Levick et al. (2008) provide a comprehensive review of the ecological and hydrological importance of riparian systems, which provide important habitat also for many plant species (not just riparian dependent species), refugia for plants and animals in times of drought (and climate change), a source of water for upland wildlife, and migration/dispersal corridors. Further, the relationship of the riparian and xeroriparian areas to the uplands are a critical component of wildlife habitat in the project area. Upland vegetation is directly related to winter species richness and abundance of avian species. Overgrazing and destruction of grasslands are leading causes of bird imperilment in the southwest. Livestock grazing has numerous known impacts to uplands, including the effects of range developments on habitat integrity. How livestock grazing impacts invasive species of plants is critical in understanding the relationship between livestock grazing, non-native invasive plant encroachment, and fire in the project area. The Bureau must therefore analyze the cause and effect relationship of livestock grazing with the woody vegetation, specifically mesquite. | See the response to comment #3 and comment #4. The proposed action does not include renewal of the BLM livestock grazing leases. Therefore, the impacts from livestock grazing are considered in the affected environment and in the cumulative effects.<br><br>In addition, the BLM is not proposing riparian grazing as part of the proposed action in this EA. The BLM is proposing targeted livestock grazing in selected wetlands on the NCA to control invasive vegetation such as Johnson grass. Targeted livestock grazing will be used as a vegetation management tool and is not part of permitted livestock grazing. Livestock would only be allowed into the selected wetlands long enough to meet treatment objectives. During a targeted livestock treatment, the vegetation would be closely monitored by a BLM Rangeland Management Specialist and Biologist to determine when the treatment objectives have been met. |
| Spotts | 6 | Grazing | If this restoration is not linked to grazing management, BLM cannot be relied upon to prevent livestock grazing from continuing to degrade these habitats and undercutting the intended restoration benefits. This | See the response to comment #1. The BLM has a long history on LCNCA of implementing collaborative adaptive management including to implement vegetation treatments (see Section 1.1 of the EA). |

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| | | | disconnected approach is an irresponsible travesty. | While the proposed action for this EA does not include the renewal of the BLM livestock grazing leases, the BLM collects robust upland monitoring data every fall, compares the monitoring data results to the Las Cienegas Resource Management Plan (RMP) objectives, and considers the monitoring data results in upcoming management decisions. This continuous feedback of monitoring data allows the BLM to ensure that livestock grazing is not degrading habitats and undercutting the intended restoration benefits. |
| Spotts | 7 | Grazing | In summary, while I support the proposed restoration, this deficient EA and BLM's grazing bias undermine BLM's credibility that these restoration actions may ultimately prove successful over time. Instead, they may simply provide more forage for fatter cattle sold by weight at auction for greater rancher profits. | See the response to comment #1 and #6.<br><br>In addition, the BLM will not be making any increases to Animal Unit Months (AUMs) on the BLM livestock grazing leases as a result of the proposed erosion control and vegetation treatments described in the EA. The BLM has implemented vegetation treatments (see Table 2 in the EA) on approximately 18,000 acres and has not increased AUMs. |
| WWP | 8 | Grazing/targeted grazing | Clearly, livestock grazing generally, and targeted livestock grazing in particular, in the Las Cienegas NCA does not comport with the fundamental tenets of the FLPMA because the risk to the resources is both unnecessary and undue and has the potential to permanently impair the very values the Las Cienegas NCA was designated to protect. The Bureau has failed to conduct the necessary analysis as to whether livestock grazing should even continue, and has therefore failed to prevent unnecessary and undue degradation. | Public Law (PL) 106-538, which established the Las Cienegas NCA, explicitly states that livestock grazing will be permitted on Las Cienegas NCA. Therefore, removing livestock from Las Cienegas NCA is outside of BLM's control as the use is required per PL 106-538.<br><br>In addition, the BLM collects robust upland monitoring data every fall, compares the monitoring data results to the Las Cienegas Resource Management Plan (RMP) objectives, and considers the monitoring data results in upcoming management decisions. This continuous feedback of monitoring data allows the BLM to ensure that resource objectives are being met and that livestock grazing is not degrading habitats. |
| WWP | 9 | IVM | If prescribed burning is utilized as a management tool (or if natural ignitions are | Following prescribed fire treatments, the BLM would defer livestock grazing for a minimum of two |

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| | | | allowed to burn) WWP recommends that no livestock grazing be authorized for a period of ten years in these areas to reduce the chances of continuing disturbance that can lead to cheatgrass and other non-native plant invasions. | growing seasons to allow plant communities to recover after burning.<br><br>In addition, the BLM would conduct post-treatment monitoring to ensure burnt areas have recovered before livestock grazing can resume.<br><br>Research in semi desert grasslands show that semi desert grasslands generally recover to/or exceed pre-burn coverage levels of grasses around 2-4 years post-burn. This is dependent on summer and winter precipitation and other factors in the treatment unit. The BLM would take precipitation and other factors in the treatment unit into consideration in determining the amount of time that livestock need to be deferred from a treatment unit following a prescribed fire treatment. |
| Burgess | 10 | IVM | The EA explains that the proposed vegetative manipulation methods include mechanical, manual, and herbicide treatments - mainly to kill native mesquite trees. The justification given for destroying these trees is that they are "invasive." But there's little documentation in the EA about their increased numbers. And if there really are more mesquites these days, there's hardly any discussion of why. Perhaps there used to be fewer because they were a very popular source of firewood? Or maybe the local vegetation type is changing due to ongoing climate change? | Section 1.2 (Purpose and Need) describes how multiple data sources were used to assess the current vegetation cover in the project area. This section goes on to describe which datasets were specifically used for each vegetation community. In addition, Table 3 of the EA describes how many acres of each vegetation community are not meeting the tree/shrub cover objectives.<br><br>The changes to the desert grasslands in southern Arizona have been well documented through research for many years. The Nature Conservancy summarized many of the studies and associated causal factors for the changes, including native and non-native species encroachment in a series of reports developed for the BLM, please see:<br>Gori, D.F., and C.A.F. Enquist. 2003. An Assessment of the Spatial Extent and Condition of Grasslands in Central and Southern Arizona, Southwestern New Mexico and Northern Mexico. |

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| | | | | Prepared by The Nature Conservancy, Arizona Chapter. 28 pp.<br>As well as:<br>Schussman, Heather and Gori, David. 2004. An Ecological Assessment of the Bureau of Land Management's Current Fire Management Plans: Materials and Recommendations for Future Fire Planning. Prepared by The Nature Conservancy, Arizona Chapter. |
| Burgess | 11 | IVM | In other words, if the natural local vegetative community now includes more mesquites, then why should we keep spending money to help kill them? Also, mesquite trees are a keystone species in the Southwest and research (Germano 1983) has shown there's significantly more wildlife in areas with mesquites because they provide valuable habitat. | The shift in the vegetation communities to a more shrub encroached state has resulted in a decrease in perennial grass cover, with a potential for increases in soil erosion as described under Section 1.1 of the EA. Section 3.1.3 under Issue 2 of the EA describes how infiltration and resistance to flow are higher on grasslands than on shrublands, aiding in overall land health. In addition, Appendix A.2 of the EA describes goals and objectives from the LCNCA RMP, including maintaining less than 5% tree cover in desert grassland communities for pronghorn fawning requirements. |
| Burgess | 12 | IVM | Moreover, these vegetative treatment methods are very destructive in the near term, especially when there's drought so new vegetation is unable to grow to replace the plants that are killed. | Both the short-term impacts and the long-term benefits from the vegetation treatment methods are discussed and disclosed in the analysis of the EA in Section 3: Affected Environment and Environmental Consequences.<br><br>The proposed action includes criteria that would be reviewed by an interdisciplinary team to determine whether or not a treatment is appropriate. These criteria take into consideration factors such as temperature and precipitation trends. |
| Burgess | 13 | IVM | The primary danger of using tebuthiuron is that, even though it targets woody vegetation, it's still toxic to a lot of herbaceous plants – including some grasses. This means the land can be | See the response to comment #1. |

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| | | | practically denuded, and stay that way if there's drought, leaving no wildlife habitat and little vegetation to hold the soil during rainstorms. | In addition, the impacts of herbicide use on nontarget native vegetation is described in Section 3.2.3 under Issue 2 of the EA. |
| Burgess | 14 | IVM | These extra man-made disturbances are in addition to the increasing frequency of wildfires in the project area, as mentioned on page 3-6 of the EA. The effects of the increased number of fires are made worse when areas are dominated by invasive Lehmann lovegrass, as it creates more intense and rapidly spreading fires. Furthermore, Lehmann lovegrass is more prolific than native vegetation after a fire, which helps it spread. This means that by adding man-made disturbances to the project area you are likely contributing to the spread of the lovegrass, which provides poorer wildlife habitat. | The proposed action includes criteria that would be reviewed by an interdisciplinary team to determine whether or not a treatment is appropriate in any given area. One of the criteria is whether there are native seed sources available in the proposed treatment unit in sufficient quantities to allow natural vegetation reestablishment. This criterion should help ensure that vegetation treatments are implemented in areas where native vegetation can reestablish following a treatment. This should help prevent the spread of Lehmann lovegrass following vegetation treatments.<br><br>In addition, as described under Section 2.1.5 of the EA, the BLM will use Assessment, Inventory, and Monitoring (AIM) protocols to assess post-treatment effectiveness and effects.<br><br>Further, the issue of whether the proposed treatments would increase the spread of Lehmann lovegrass is addressed in Section 3.2.3 under Issue 3 of the EA. This section states that the actual acres of each restoration treatment would be smaller compared to the amount of acres of vegetation that are available for treatment in the project area and would occur over several days to weeks which would decrease the likelihood of the spread of Lehmann lovegrass. |
| Burgess | 15 | IVM | The EA discusses the many options for implementing these destructive upland vegetation treatments, but it fails to mention where each one might be employed. (Figure 3 in the EA shows where the proposed erosion control projects would be implemented, but it doesn't show where the vegetative manipulation projects would be done.) | Figure 3 depicts the locations of the following three vegetation groups: desert grassland uplands, scrub uplands, and drainages, lowlands, and other. While the EA does not specifically depict where vegetation treatments would take place, the EA describes in Table 4 what the target species are for these three vegetation groups and the maximum number of acres per year that would be |

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| | | | | treated with herbicide and/or mechanical grubbing as initial treatments and the maximum number of acres per year that would be treated as maintenance treatments with prescribed fire, manual, and targeted grazing. Table 4 provides the information for understanding the spatial scope of potential vegetation treatments. |
| TNC | 16 | IVM | **Regarding the use of broadcast aerial herbicide application**: We recognize the need for spot treatments of exotic invasives where they pose problems, and where native species will be able to re-establish natural ecosystem function after exotics are removed. However, we have concerns over non-target impacts of larger scale aerial chemical treatments. These risks argue for using more due diligence, and for limiting their use to rare circumstances, e.g. when an exotic species poses a grave threat to the natural functioning of the ecosystem, and no other treatment options will succeed. Analyses need to look carefully at costs versus benefits across multiple resources and compare these with alternative approaches such as fire and/or other changes in management. | The treatment unit selection process, described in 2.1.1, would address if/where broadcast herbicide is necessary. The BLM agrees that broadcast aerial herbicide should only be used if completely necessary and if the treatment unit meets the criteria described in 2.1.1. |
| TNC | 17 | IVM | **Regarding the use of techniques such as counter ripping (key line plowing)**: We request additional information on the criteria of where this treatment is appropriate. Given the unpredictability of precipitation in the region, and the increase in high intensity precipitation events, we have concerns that techniques that involve large-scale ground disturbance such as counter ripping have the potential to result in increased erosion. | The proposed action includes criteria that would be reviewed by an interdisciplinary team to determine whether or not a treatment is appropriate in any given area. One of the criteria is whether or not the proposed treatment method is the most appropriate based on target species, soil type, topography, weather, and other site characteristics. This criterion would be applied to any proposed treatments that would consider the use of counter ripping and would thus take into consideration the susceptibility of the soils to erosion. |
| TNC | 18 | IVM | **Regarding the use of rock structures for erosion control**: We are supportive of the extensive use of rock structures for erosion control. There is significant evidence that this is | Thank you for your comment. |

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| | | | a relatively low cost and low impact strategy that provides numerous ecosystem benefits. | |
| Spotts | 19 | NEPA | I believe that this EA has a NEPA "fatal flaw" that fundamentally taints and undermines the entire, interconnected analysis. This deficiency is the biased disconnect between how current and future commercial livestock grazing has or would adversely affect these same habitats and how it would continue to affect them despite restoration actions. BLM has a longstanding and improper bias toward commercial livestock grazing and gives undue deference to most ranchers. Despite the prolonged drought, and natural communities already under severe stress, BLM has no consistent requirements to suspend or reduce grazing pressures. Due to this bias, millions of acres of BLM lands do not meet BLM's required minimum standards for rangeland health. And now over half of BLM's renewal of grazing permits occur without bona fide NEPA analysis or public involvement. In short, BLM has largely abdicated its grazing management to the voluntary whims of ranchers. | Livestock grazing impacts are considered for each resource as part of the affected environment as that use is reflected in the current conditions of the resources on Las Cienegas NCA as well as in the cumulative effects.<br><br>While the proposed action for this EA does not include the renewal of the BLM livestock grazing leases, the BLM collects robust upland monitoring data every fall, compares the monitoring data results to the Las Cienegas RMP objectives, and considers the monitoring data results in upcoming management decisions. This continuous feedback of monitoring data allows the BLM to ensure that livestock grazing on Las Cienegas NCA is not creating resource damage nor is impacting the habitats that the BLM is trying to restore in light of precipitation and temperature trends that include prolonged drought. |
| Spotts | 20 | NEPA | This bias is specifically acknowledged and described in this EA in Section 1.6.3 where grazing is arbitrarily dismissed as a relevant issue for NEPA analysis. This text is pasted below with quotes:<br><br>"*Rationale for elimination—The BLM has a good working relationship with the grazing lessees in the proposed treatment area. These lessees have been actively involved in the planning and comment process and support the proposed treatment projects to improve the health of the land. Working together with the lessees, the BLM will consider the grazing system and rotation that is used and can plan* | The issue of "what would be the impact of the proposed vegetation treatments and erosion control treatments on livestock grazing in the project area" was dismissed from detailed analysis because the required deferments of livestock grazing prior to and following vegetation treatments would not have a significant impact on livestock grazing operators. Further, the text has been clarified to reflect that BLM would coordinate and work with grazing lessees on grazing deferments and when and where vegetation treatments would take place but that the decision on timing and type of vegetation treatments would ultimately be BLM's decision. |

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| | | | *the implementation without hindering the grazing operation. The BLM will work with the grazing lessees to develop an implementation plan that will work with each of their grazing schedules. If grazing deferment is required to implement a treatment, then the BLM and lessee will work together to ensure that the treatment will be at the appropriate time and will not cause unnecessary stress to the grazing operation. Grazing deferment will be voluntary by the lessee; in situations where a lessee is unable to defer grazing, treatments will not be conducted until deferment is possible. Each grazing allotment has a different grazing rotation depending on the number of pastures and the size of the allotment. All of this will be considered before a treatment is chosen.*"<br><br>This text shows that BLM is inappropriately delegating or conditioning decisions on the timing and type of restoration treatments to ranchers. This opens what may actually happen to speculation and conjecture. | |
| WWP | 21 | NEPA/alternatives | We strongly recommend that the Bureau reconsider the elimination of livestock grazing as one of the alternatives considered to improve the condition of vegetation on the Las Cienegas NCA. | In response to public comments, the BLM considered an alternative where livestock grazing would be removed from Las Cienegas NCA in Section 2.3<br><br>The proposed action does not include the renewal of livestock grazing leases for BLM grazing allotments. The BLM would consider any changes to the BLM livestock grazing leases as part of the livestock grazing lease renewal process.<br><br>Public Law (PL) 106-538, which established the Las Cienegas NCA, explicitly states that livestock grazing will be permitted on Las Cienegas NCA. Therefore, removing livestock from Las Cienegas |

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| | | | | NCA is outside of BLM's control as the use is required per PL 106-538.<br><br>As a result, the elimination of livestock grazing as an alternative is both outside of the scope of the EA and outside of the BLM's decision space. |
| WWP | 22 | NEPA/alternatives | The Bureau should also reconsider an alternative that would significantly reduce the amount of livestock grazing on the Las Cienegas NCA. The single most effective action the Bureau can take to restore and protect the Las Cienegas NCA would be to remove livestock grazing and related infrastructure. | In response to public comments, the BLM considered an alternative where livestock grazing would be reduced in Las Cienegas NCA in Section 2.3<br><br>See the response to comment #21 above. Changes to the BLM livestock grazing leases are outside of the scope of this EA and would be considered as part of the livestock grazing lease renewal process. |
| WWP | 23 | NEPA/impacts | The Bureau must also identify which anthropogenic activities are exacerbating the problem the Bureau seeks to solve through vegetation management. | See the response to comment #10. Section 3.2.1 discusses the factors (including anthropogenic activities) that have altered the vegetation communities from their historical composition. |
| WWP | 24 | NLCS | The Bureau identifies the Arizona Land Health Standards ("Arizona Standards") as common to all alternatives. However, the Bureau has not made any finding that the Arizona Standards further the primary purposes of the Las Cienegas NCA and therefore they should not be relied upon for identifying management that protects the area. | The Arizona Standards for Rangeland Health ("Arizona Standards") are applicable to all BLM lands in Arizona. In addition, to the Arizona Standards, RMPs establish more specific resource objectives to individual units of BLM land. For Las Cienegas NCA, the BLM has established quantitative resource objectives in the RMP. This EA uses those resource objectives as well as information from the Ecological Site Descriptions to describe objectives for the vegetation communities (see Table 3 in the EA). |
| WWP | 25 | NLCS | The FLPMA contains an exception to its overarching prescription for Bureau managed lands: multiple use management applies, except "…where a tract of such public land has been dedicated to specific uses according to any other provisions of law it shall be managed in accordance with such law." FLPMA, as | See the response to comment #24. The BLM has established quantitative resource objectives in the RMP that the BLM uses to manage the resources in Las Cienegas NCA. |

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| | | | amended, Public Law No. 94-579, Title III, Sec. 302(a).<br>The Bureau must apply this clarity of vision for the NLCS lands to the Las Cienegas Vegetation Management EA and NEPA process, which requires a higher standard for managing these particular lands. | |
| WWP | 26 | Prairie dogs/veg. management | The Bureau should consider the beneficial role that prairie dogs play in restoring the grasslands of the Las Cienegas NCA and identify prairie dog colonies as a method of vegetation management. | The BLM has considered the beneficial role that prairie dogs play in restoring the grasslands which is why the BLM – in collaboration with the Arizona Game and Fish Department (AZGFD) – has established three prairie dog colonies (Road Canyon, Cieneguita, and Mud Springs) on Las Cienegas NCA.<br>To establish the prairie dog colonies at Las Cienegas NCA, the BLM mechanically removed shrub cover at colony locations prior to the reintroduction of the prairie dogs. The BLM coordinates with the AZGFD annually to mow grasses around the three prairie dog colonies to assist with improving and expanding the colony locations. |
| WWP | 27 | Public health & safety | The increased likelihood of e. coli contamination with the proposed use of cows in the riparian areas must be considered, analyzed, and disclosed to the public and the Bureau must consider the public health impacts. This is especially important for compliance with the Best Management Practice (BMP) of coordinating with the interested public. | The BLM is not proposing riparian grazing as part of the proposed action. See response to comment #28. The wetlands are not designated for recreational use (e.g. swimming, water sports) by Arizona Department of Environmental Quality (ADEQ) under the Clean Water Act (CWA). This use is not present at the indicated wetlands, thus impacts to public health are not anticipated. The total number of AUMs authorized for livestock grazing under BLM grazing leases would not change under the proposed action, the proposed areas are inside authorized grazing leases, no increase in *E. coli* loading to downstream waters is expected. |
| WWP | 28 | Riparian | As the Bureau is well aware, livestock grazing is and has been a primary cause of stream, riparian, and xeroriparian habitat degradation in | The BLM is not proposing riparian grazing as part of the proposed action in this EA. The BLM is proposing targeted livestock grazing in selected |

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| | | | the western United States. The negative impacts of livestock grazing in riparian areas have been well documented. The scientific literature reveals that livestock grazing negatively affects water quality and seasonal quantity, stream channel morphology, hydrology, riparian zone soils, instream and streambank vegetation, and aquatic and riparian wildlife. Invertebrate and small mammal habitat is improved by livestock exclusion from riparian areas. The cessation of livestock grazing in riparian areas can increase the abundance of small mammals that require dense vegetation. The substantial increase of plant cover at low height intervals that followed the removal of livestock from southwestern riparian areas can substantially increase the abundance of small mammal species that prefer cover characteristic of grassland or riparian woodland habitats. | wetlands on the NCA to control invasive vegetation such as Johnson grass. Targeted livestock grazing will be used as a vegetation management tool. Livestock would only be allowed into the selected wetlands long enough to meet treatment objectives. During a targeted livestock treatment, the vegetation would be closely monitored by a BLM Rangeland Management Specialist and Biologist to determine when the treatment objectives have been met. |
| WWP | 29 | Targeted grazing | The EA indicates that livestock will be used for targeted grazing in riparian areas to remove Johnson grass. Beyond the fact that livestock grazing in riparian areas will cause more harm than should be allowed in an NCA, the Bureau's plan may cause harm to livestock and at the same time fail to achieve the objective of removing Johnson grass. As the Bureau is likely aware, Johnson grass is toxic to livestock when drought stressed (which is often in the Las Cienegas NCA, even in riparian areas) and after frost. | The BLM Biologist will work closely with the lessee on the timing of treatments to ensure that cattle do not consume Johnson grass at a time when it is likely toxic. The treatments are in restored wetlands not in the riparian corridor. |
| Burgess | 30 | Targeted grazing | The most objectionable feature in your proposed action is to allow cattle into the local wetlands to reduce invasive plant species in the riparian pastures and exclosures. It's labelled *Targeted Livestock Grazing in Wetlands* on page 2-9 of the EA. It explains that these species are "vary palatable" to cattle and says, | See the response to comment #28. During a targeted livestock treatment, the riparian and aquatic resources would be closely monitored by a BLM Rangeland Management Specialist and Biologist to ensure that those resources are not negatively affected. In addition, targeted livestock grazing treatments would be short in duration as |

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| | | | "Number of livestock will be limited to the minimum number of livestock needed to achieve objectives." But riparian vegetation on public land should not be considered potential livestock feed. It's difficult to believe there's any number of cattle that wouldn't hurt a desert wetland. Just one cow, in fact, could tear up the moist soil with its sharp hooves and deposit large amounts of feces in the water. And what about all of the riparian dependent species of amphibians, reptiles, or fish that would be negatively affected when the cattle trample their habitat? | the livestock would only be in selected wetlands long enough to achieve treatment objectives. |
| WWP | 31 | Targeted grazing | The use of livestock in Cienega Creek will harm Huachuca water umbel. WWP staff documented the presence of Huachuca water umbel in Cienega Creek in April 2022 in several locations in Empire Gulch. Below is a map of one of the locations and photo taken April 15, 2022, at Lat/Long 31.78824500, -110.63719500. There were three other clusters of Huachuca water umbel within 100 feet of this location. | The targeted grazing is a tool outlined in this EA for restored wetlands on the NCA. There will be no targeted grazing in Cienega Creek, Mattie Creek, or Empire Gulch. |
| WWP | 32 | Targeted grazing | the EA does not provide adequate information for the public to fully evaluate the proposed use of livestock for targeted grazing in riparian areas. There is only vague information about how this option will be implemented. An unspecified number of livestock will be allowed entry into unspecified areas for an unspecified amount of time under as yet unwritten goals and guidelines to meet as yet unidentified invasive plant targets. (EA at 2-9.) The locations and types of fencing are not described other than to indicate they will be either temporary or permanent. Id.<br>At least one type of invasive plant identified for control by targeted livestock use can be toxic or unpalatable for livestock, making the likelihood of the success of this type of treatment | The EA has been revised to include specific information about how targeted livestock grazing would be implemented including specifics about where these treatments would take place as well as for how long and when.<br><br>See the response to comment #29 regarding the toxicity of johnson grass for cattle.<br><br>Regarding the need for further treatments, all vegetation management treatments involve an initial treatment or treatments, often using multiple treatment methods, to achieve resource objectives (i.e., move the vegetation condition from not meeting resource objectives to meeting resource objectives). Once a vegetation community has been restored periodic maintenance treatments are |

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| | | | speculative at best. Finally, the Bureau acknowledges that targeted livestock treatments are likely to be ineffective by stating that "[l]ivestock treatments may require further treatments such as herbicide application, hand removal, or mechanical removal alone or in combination." Id. | needed to keep the vegetation conditions within resource objectives. In the case of many non-native or noxious species (ex. johnson grass, salt cedar) multiple treatments or treatment methods are required to meet resource objectives. |
| Burgess | 33 | Targeted grazing | This proposal also states that addition treatments to control the invasive wetland plants might still be required after the use of cattle - including the hand removal method. That would be more expensive, but if hundreds of thousands of government dollars can be spent to help kill woody vegetation on the uplands to create more herbaceous forage for livestock, then you should be able to easily find the money for this gentler removal method. | The cost of treatments is outside the scope of the NEPA analysis.<br><br>See the response to comment #32 regarding the need for further treatment following targeted livestock grazing treatments. |
| WWP | 34 | Targeted grazing | The Bureau must carefully consider and disclose whether the proposed "benefits" of allowing targeted livestock grazing (in other words, high impact grazing) in riparian areas for vegetation management will outweigh the certain impacts to threatened and endangered species. | The BLM considers and discloses both the benefits and impacts of targeted livestock grazing to threatened and endangered species in Section 3.3.3 under Issue 3 in the EA. |
| TNC | 35 | Targeted Grazing | **Regarding targeted grazing in wetland sites**: We believe additional study and analyses is required regarding the use of targeted grazing to achieve specific outcomes in riparian ecosystems. There are documented cases where, under specific circumstances and under highly controlled protocol, this can be a useful tool to achieve outcomes related reducing invasive species cover. We would prefer additional specifics regarding where, how, and why targeted grazing may be utilized in the management of wetland sites. | During a targeted livestock treatment, the riparian and aquatic resources would be closely monitored by a BLM Rangeland Management Specialist and Biologist to ensure that those resources are not negatively affected. |
| WWP | 36 | Unauthorized livestock | On a recent visit to the Las Cienegas NCA WWP staff noticed that livestock had trespassed into Cienega Creek just north of Empire Ranch | Unauthorized livestock use on the Las Cienegas NCA is outside the scope of this EA. |

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| | | | and had decimated the vegetation community, damaged bank structure, trampled the riparian area heavily, and left cow pies throughout the creek area, including in the creek itself and on the banks. After WWP reported our concern about this trespass livestock to Bureau staff and management of Las Cienegas NCA we were "assured" that the livestock had only trespassed in the creek for a single day and that the permittee was good at managing his livestock. We don't feel assured and, in light of the Bureau's proposal to use livestock to "manage" the vegetation in riparian areas, our concerns have deepened. The lack of willow and cottonwood recruitment was shocking and clearly a result of cows grazing in the riparian areas. | BLM handles unauthorized livestock use through its administrative processes, working with the livestock owner to resolve the issue. When BLM employees or the public document unauthorized livestock, every attempt is made to identify a brand, determine ownership, and have the livestock removed by the owner. The BLM is working to improve its tracking of such reports and its responsiveness back to the reporting public, acknowledging concerns and actions taken.<br><br>In addition, targeted livestock grazing treatments are not proposed in the riparian corridor of Cienega Creek, Mattie Creek, or Empire Gulch. Targeted livestock grazing treatments are only proposed in selected wetlands. |
| WWP | 37 | Unauthorized livestock | The proposed plan to allow targeted livestock use in riparian areas is likely to increase trespass livestock use in those riparian areas in the future. Livestock will return to the area where they were used for targeted grazing because the riparian areas have water, shade, and tasty vegetation that the livestock cannot find elsewhere on the Las Cienegas NCA. Furthermore, the Bureau acknowledges that maintaining fences to keep livestock out of the riparian areas is a challenge, meaning there is little to keep the cows used for targeted grazing from returning to an area that will meet more of their needs. | Targeted livestock grazing treatments are not proposed in the riparian corridor of Cienega Creek, Mattie Creek, or Empire Gulch. Targeted livestock grazing treatments are only proposed in selected wetlands. The selected wetlands have pipe rail fences surrounding them that are used to exclude livestock. The pipe rail fences surrounding the selected wetlands where targeted livestock grazing treatments are proposed, are extremely effective are excluding livestock. |
| TNC | 38 | Water | **Regarding the analysis on water resources affected**: We request that the water modeling studies used to determine the rate of spatial extent of groundwater drawdown be shared, to the extent possible, with stakeholders. | Citation for groundwater drawdown statement in cumulative effects section of Water Resource issue analysis has been added. Additional documentation regarding Rosemont Copper and groundwater modeling is available online at https://www.rosemonteis.us/ |