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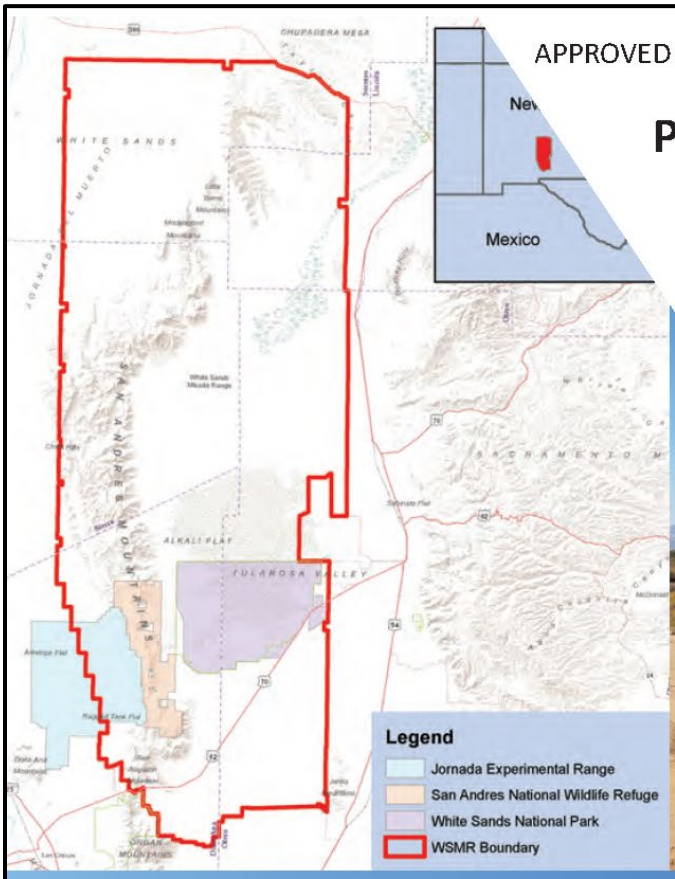
Programmatic Environmental Assessment for Construction and Maintenance of Boundary Markings for White Sands Missile Range New Mexico

Final

August 2021



Prepared by:
Chloeta Fire, LLC and
Scout Environmental, Inc.

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Finding of No Significant Impact

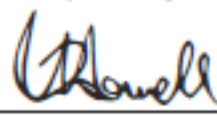
Name of the Proposed Action: Programmatic Environmental Assessment for Construction and Maintenance of Boundary Markings for White Sands Missile Range, New Mexico

Description of the Proposed Action: The White Sands Missile Range (WSMR) Garrison Directorate of Emergency Services has prepared a Programmatic Environmental Assessment (EA) to install new boundary markings along portions of the WSMR boundary. The preferred alternative for this EA is Alternative 1. Under the preferred alternative (Alternative 1) WSMR would construct up to 50 miles of fencing, up to 8 unmanned vehicle control gates, and 4 one-way livestock gates. The preferred alternative also includes the regular maintenance/repair of the new and existing range fence and boundary markings. Under the No Action Alternative, maintenance of existing fence lines would continue to occur on an as- needed basis and as funding allows; however, WSMR would not install new fence, signs, or gates.

Purpose and Need: The purpose of the Proposed Action is to clearly delineate the boundary of WSMR. The Proposed Action is needed to meet requirements and statutes pertaining to physical security, and to protect WSMR resources. WSMR prepared a Programmatic EA because the proposed activities would occur multiple times over several years and be constructed in a similar way.

Environmental Consequences: The Final Programmatic EA assessed potential environmental impacts. Through implementation of best management practices (BMPs) there would be no significant impacts on the environment if the Proposed Action was implemented. Example BMPs include avoidance of known sensitive cultural resources during the planning process or through a cultural resources monitor directing placement of fence posts to avoid damage to a site; unnecessary disturbance of soil by limiting support vehicles to existing roads where possible; implementation of various biological resource BMPs to include conducting site-specific surveys prior to construction to identify restrictions, using biological monitors during the breeding season, limiting vegetation removal, and removing all waste products; or limiting the types of vehicles such as all-terrain vehicles/all-terrain utility vehicles to be used in areas of limited or no access to the existing fence line.

CONCLUSION: Based on the information and analysis presented in this EA and on the guidelines for determining the significance of proposed federal actions in 40 Code of Federal Regulations (CFR) 1508.27 and Army guidelines under 32 CFR 651, and review of public and agency comments submitted during the 30-day comment period, WSMR has concluded that implementation of the Proposed Action will not result in significant impacts on the quality of human and natural environments. In addition, all applicable federal, state, and local laws and regulations would be followed. For these reasons, a Finding of No Significant Impact is made, thereby making the preparation of an Environmental Impact Statement unwarranted.



8 SEP 21

M. RYAN HOWELL
Colonel, U.S. Army Commanding

Date

U.S. ARMY WHITE SANDS MISSILE RANGE, NEW MEXICO
PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

Title: PROGRAMMATIC ENVIRONMENTAL ASSESSMENT FOR CONSTRUCTION AND MAINTENANCE OF BOUNDARY MARKINGS FOR WHITE SANDS MISSILE RANGE, NEW MEXICO

PROPONENT:

Thomas Benavidez — 17 Aug 2021

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Date

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Commanding

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14. ABSTRACT
This Programmatic Environmental Assessment contains the results of an impact analysis of the proposed action, alternative, and the No Action Alternative on the affected environment, including cultural resources; soil erosion; biological resources; and facilities and traffic and transportation. No significant impacts on the environment have been identified for the construction and maintenance of boundary markings and fence.

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ABBREVIATIONS AND ACRONYMS

ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effect
AR	Army Regulation
ATV	All-terrain vehicle
BISON-M	Biota Information System of New Mexico
BLM	Bureau of Land Management
BMP	Best Management Practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FR	Federal Register
INCRMP	Integrated Natural and Cultural Resources Management Plan
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NHNM	Natural Heritage New Mexico
NHPA	National Historic Preservation Act
NMACP	New Mexico Avian Conservation Partners
NMDGF	New Mexico Department of Game & Fish
NMRPTC	New Mexico Rare Plant Technical Council
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
PL	Public Law
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Office
SOI	Species of Interest
UFGS	United Facilities Guide Specification
U.S.	United States
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
UTV	All-terrain utility vehicle
VECs	Valued Environmental Components
WEG	Wind Erodibility Groups
WSMR	White Sands Missile Range

1 INTRODUCTION

This Programmatic Environmental Assessment (EA) evaluates the potential environmental effects associated with construction and maintenance of the White Sands Missile Range (WSMR) boundary markings. This section states the purpose and need of the Proposed Action and outlines the scope of the environmental analysis for the considered alternatives.

This Programmatic EA has been prepared to fulfill the requirements of the National Environmental Policy Act (NEPA) in accordance with the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA, 40 Code of Federal Regulations (CFR) 1500 to 1508 and 32 CFR Part 651 Environmental Analysis of Army Actions (United States [U.S.], Army, 2011), and Army policy (U.S. Army, 2017).

WSMR prepared this Programmatic EA as construction and maintenance of WSMR boundary markings are anticipated to occur over multiple times over several years, and not all the site-specific project details are known at this time. A programmatic EA is appropriate when the proposed actions are similar in nature or broad in scope (32 CFR 651.14). The Proposed Action does not meet the screening criteria for a categorical exclusion as described in 32 CFR 651.29 because the linear path of disturbance is greater than five acres.

WSMR has a sustained commitment to avoiding impacts to natural and cultural resources as part of their overall environmental program; no aspect of the Proposed Action would reduce current levels of stewardship. This Programmatic EA establishes a programmatic approach to NEPA compliance at WSMR that would support the implementation of future construction and recurring and predictable fence repairs to proceed in a more efficient and standardized manner. Proposed project-specific fence projects, as with all proposed projects on WSMR, would undergo an environmental review, screening and decision process to determine whether a proposed project fits under activities and actions analyzed in this EA or other NEPA documents. If not, further environmental impact analysis may be required.

1.1 Background

The U.S. Army Garrison WSMR manages the installation. The current mission of WSMR is to provide the Army, Navy, Air Force, Department of Defense, and other customers high-quality services for research, development, test, and evaluation and training operations in support of national defense. WSMR currently functions as an outdoor laboratory consisting of a large complex of test ranges, launch sites, impact areas, and instrumentation sites required to develop and test tactical and strategic weapons and weapons systems. The air and ground space at WSMR are critical for weapon systems research, development, testing, and evaluation for the Army, Air Force, Navy, other Department of Defense agencies, non-Department of Defense governmental agencies, and private organizations.

WSMR is remotely located with expansive and varied terrain (Figure 1.1-1). The installation encompasses about 2.2 million acres within a contiguous boundary, extending approximately 40 miles from east to west, and 118 miles from north to south. This area spans five counties in New Mexico which include Socorro, Sierra, Dona Ana, Otero, and Lincoln. The elevation ranges from 3,887 feet to 8,500 feet above mean sea level (WSMR, 2009a).

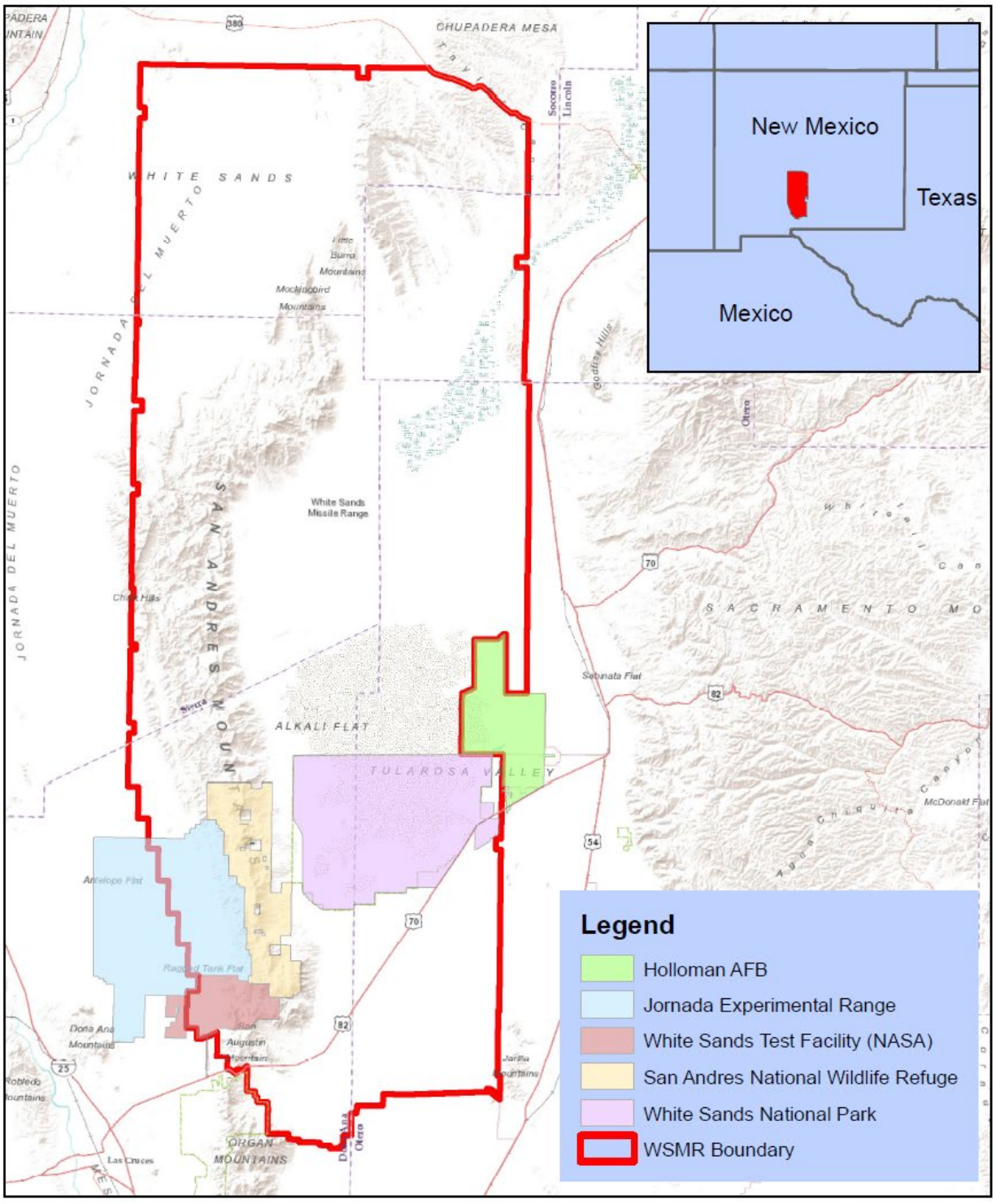

Figure 1.1-1: Location of White Sands Missile Range

WSMR can be separated into four functional geographic areas: Southern, Western Mountains, Northern, and Eastern Boundaries. Mountains on the western side of WSMR are rough, almost providing a natural barrier. Holloman Air Force Base and the White Sands National Park are to the east of WSMR. The northern portion of WSMR is adjacent to government and privately owned land. Highway 70 bisects the southern and northern portion of the installation. The largest populated communities near Main Post and the southern portion of WSMR, include Las Cruces, New Mexico, and El Paso, Texas. Socorro, New Mexico is the largest community located northwest of WSMR. To the east are Alamogordo, Carrizozo, Tularosa, and La Luz.

Hunting is important to WSMR personnel as well as the community, locally, regionally, and nationally (U.S. Army, 2019a). WSMR hunting includes public big game hunts which are security controlled. Understanding the physical boundaries of the Range is important to ensuring recreational hunting events occur in a manner consistent with physical security and safety requirements.

Physical security and notification are essential for protecting the public from safety hazards and protecting WSMR resources. Fencing and posted signs warn the public of hazards and direct people to seek legal entry following Army procedures through secured gates. Fences also exclude livestock from entering WSMR. Livestock can be a safety issue for personnel working within the boundary, can transport nonnative plant species, and can damage natural resources.

1.2 Related Environmental Documentation

The following previously prepared reports were used to inform this Programmatic EA as they are relevant to the Proposed Action

- **EA for Cantonment Fence and Access Control Point Construction**. In 2005, WSMR completed an EA for the Cantonment Fence and Access Control Point Construction (WSMR, 2005). The assessment reviewed and evaluated the impacts from construction of the proposed fence and access control points installed around the Main Post and the outlying support facilities. The document serves as a reference for potential impacts to be considered under the Proposed Action.
- **Environmental Impact Statement for Development and Implementation of Range-Wide Mission and Major Capabilities.** In 2009, WSMR completed this Final Environmental Impact Statement (EIS) examining the environmental effects of developing new test and training capabilities to meet current and future mission requirements at WSMR (WSMR, 2009a). The EIS serves as a comprehensive reference for multiple resource areas considered under this Programmatic EA.
- **White Sands Missile Range Integrated Natural and Cultural Resources Management Plan and Environmental Assessment (INCRMP).** This plan updates the 2002 Integrated Natural Resources Management Plan. It also updates the 2004-2009 Integrated Cultural Resources Management Plan and combines both plans into a single document with required NEPA documentation (an EA) (WSMR, 2015).

1.3 Purpose and Need

Army Regulation (AR) 190-13, The Army Physical Security Program (U.S. Army, 2019b), defines the requirements for the physical security of Army installations. Additionally, 18 U.S. Code (USC) § 1361, 18 USC § 1382, and 18 USC § 1857 are the legal drivers concerning government property, trespassing, and fencing[1]. Range fencing and signs serve as clear physical markers and legal notice that an individual has entered an unauthorized area and give people notice that they are trespassing and cannot take or damage government property. Photographs 1 through 4 depict typical fencing, signage and areas at WSMR.

Portions of the WSMR boundary do not have consistent markings. The lack of clear boundary markings can lead to trespassing by both humans and livestock.

Portions of WSMR are adjacent to private ranch lands where livestock are managed under New Mexico's open range law. According to New Mexico Statutes § 77-16-1 through 77-16-18, *Fences* (New Mexico, 2011a), "every gardener, farmer, planter, or other person having lands or crops that would be injured by trespassing animals, shall make a sufficient fence about the land" to keep livestock off their property. Therefore, it is WSMR's responsibility to erect fencing to ensure no livestock trespass. However, under New Mexico Statutes § 77-14-1 through 77-14-39, *Trespass and Running at Large* (New Mexico, 2011b), it allows for the impoundment of "any livestock found to be in trespass upon the lands of another or running at large … within the limits of a military reservation." While WSMR actively protects and manages their natural and cultural resources in accordance with their INCRMP (WSMR, 2015), livestock intrusions into WSMR lands can result in negative impacts to WSMR resources and operations.

The purpose of the Proposed Action is to clearly delineate the boundary of WSMR. The Proposed Action is needed to meet requirements and statutes pertaining to physical security and to protect WSMR resources.

Installing additional fencing and signs would provide clear visual and legal notice that an individual has approached an unauthorized area. Boundary markings would support WSMR's compliance with AR 190-13 and help prevent crimes against the aforementioned listed statutes. Fencing would also reduce the potential for livestock intrusions onto WSMR lands.

1.4 Scope of Environmental Analysis

Per CEQ's updated NEPA regulations promulgated in July 2020, this EA considers the potential impacts of the Proposed Action and alternatives on the potentially affected environment and the degree of the effects of the action. Specifically, this EA considers:

1. Both short- and long-term effects;
2. Both beneficial and adverse effects;
3. Effects on public health and safety; and
4. Effects that would violate federal, state, tribal, or local law protecting the environment.

[1] 18 USC § 1361: Government Property or Contracts
18 USC § 1382: Entering Military, Naval, or Coast Guard Property
18 USC § 1857: Fences Destroyed; Livestock Entering

Photograph 1: Example of Discontinuous Fence

Photograph 2: Example of Typical Range Fence

Photograph 3: Typical Range Area

Photograph 4: Example of Fence Needing Repair

The Army's decision is whether to implement the Proposed Action and alternatives (including the No Action Alternative). The Army would issue a Finding of No Significant Impact (FONSI) if the selected alternative would result in no significant impact to human or environmental health. If the selected alternative results in a significant impact, the Army would prepare an EIS.

A team of WSMR subject matter experts identified the Valued Environmental Components (VECs) for detailed evaluation in this EA (see Chapter 3).

1.5 Public Participation

To facilitate the analysis and the decision-making process, the Army maintains a policy of open communication with interested parties and invites public participation. The Army urges all federal and state agencies, public and private organizations, and members of the public that have a potential interest in the Proposed Action, including minority, low-income, disadvantaged, and Native American groups to participate in the Army's NEPA and decision-making processes, as guided by CEQ regulations at 40 CFR Parts 1500-1508 and 32 CFR Part 651.

The Programmatic Draft EA and Draft FONSI were made available online to federal, state, and local agencies, Native American tribes, and the public for review and comment for 30 days at https://home.army.mil/wsmr/index.php/about/garrison/directorate-public-works-dpw/enivronmental. WSMR also published a Notice of Availability with the entirety of the Draft FONSI in the Alamogordo Daily News and the Las Cruces Sun-News newspapers on June 24, 2021 and June 26, 2021(see Appendix A). The EA and FONSI were also available for viewing at the following libraries:

- Thomas Branigan Memorial Library, 200 E. Picacho Avenue, Las Cruces, New Mexico 88001; and
- White Sands Missile Range Post Library, Building 465, White Sands Missile Range, New Mexico 88002.

Following the 30-day review period, the Army addressed all relevant comments received. The Programmatic EA did not identify significant impacts, the Army finalized the Programmatic EA and prepared and signed a FONSI.

2 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This chapter describes the Proposed Action and the alternatives. This chapter also describes the location and area under consideration, as well as the timing of the Proposed Action. Additionally, this chapter provides the screening criteria used by the Army to develop the alternatives, a description of the alternatives carried forward, and concludes with identifying the alternatives considered but not carried forward.

To address the purpose and need, this EA analyzes three alternatives, one of which is the No Action Alternative (mandated in CEQ 40 CFR Parts 1500-1508 and Environmental Analysis of Army Actions 32 CFR Part 651.34). Section 2.1 describes the action alternatives, Section 2.2 describes the No Action Alternative, and Section 2.3 describes the alternatives WSMR considered but did not carry forward for analysis.

2.1 Proposed Action

2.1.1 Overview

WSMR identified two action alternatives for implementing the Proposed Action. Descriptions of each action alternative follow. Regardless of the alternative selected, authorized WSMR hunting would continue consistent with the WSMR policy to restrict access for hunting based on security requirements (U.S. Army, 2019a).

2.1.2 Environmental Review Process

WSMR completes individual Records of Environmental Consideration to document the environmental review of installing new fence or repairing existing boundary fencing. These repairs often qualify for NEPA compliance via a categorical exclusion for the “construction of an addition to an existing structure or new construction on a previously undisturbed site if the area to be disturbed has no more than 5.0 cumulative acres of new surface disturbance...” under 32 CFR 651 App B Sec II(c)(1); however, the Proposed Action is greater than 5.0 acres of new surface disturbance which exceeds the categorical exclusion requirements.

Under the Proposed Action, WSMR would continue to implement their environmental review process as individual fence projects are identified. This would consist of the project proponent submitting a project description to the Garrison Environmental Division, Customer Support Branch, who initiates an environmental review. During the review process, subject matter experts would identify conditions of use to prevent environmental impacts or alert the proponent to other environmental requirements. The review process would also facilitate coordination among internal stakeholders, the proponent, and neighboring federal agencies (when involving adjacent boundary fencing) to ensure consistency with environmental requirements and agency coordination procedures (e.g., cultural, natural, real property, security, NEPA).

Following the review and comment period, the Customer Support Branch would determine if the action would meet the screening criteria for a categorical exclusion, falls within the scope of this Programmatic EA, or if there are extraordinary circumstances that require a “harder look” with an environmental analysis. If necessary, WSMR would prepare supplemental (tiered) NEPA

analyses for specific future fence construction and fence maintenance/repair if it is determined that the future action(s) have not been adequately addressed in this Programmatic EA.

2.1.3 Action Alternatives

2.1.3.1 Alternative 1 (Preferred Alternative)

Under Alternative 1, WSMR would mark the WSMR boundary with up to 50 miles of new fence and signs, install up to 8 unmanned vehicle control gates and 4 one-way livestock gates (total of 12 gates), and perform as-needed fence maintenance/repair activities to the existing and new boundary markings. Figure 1.1-1 illustrates the entire WSMR boundary but the specific location of proposed new fencing is not identified due to operational security. WSMR has 122 known locked gates that could possibly require maintenance. No new roads would be created.

Implementation of Alternative 1 could start in calendar year 2021 and may occur in phases over four to five years depending on funding. Maintenance/repair of the fence would be an ongoing process depending on repair needs and funding availability.

Boundary Markings. The maximum amount of disturbance associated with the construction of 50 miles of new fence and signs would include up to a 5-foot area on either side of the fence for a total of approximately 60 acres of temporary disturbance. Permanent disturbance would total less than one-acre in size based on fence posts measuring a maximum width of 5 inches spaced a minimum of 10 feet apart (New Mexico Department of Game & Fish [NMDGF], 2003; Montana Fish, Wildlife and Parks, 2012) and 6 posts per gate with each post measuring 8.625 inches in diameter (Unified Facilities Guide Specification [UFGS], 2016).

Proposed construction activities would include:

- Conducting pre-construction planning surveys as part of WSMR environmental review process to identify specific locations for fence construction and maintenance.
- Accessing areas with all-terrain vehicles (ATV) or all-terrain utility vehicles (UTV), but nothing larger than a full-size pickup truck.
- Removing of old fence materials, vegetation, and/or soil/rocks to allow for a straight fence line.
- Using a truck-mounted mechanical post pounder and auger.
- Establishing staging areas on existing roads and pull outs to the maximum extent possible.
- Installing warning/safety/hazard signs along the boundary.

The type of range fence would typically consist of a 3- to 4-strand wire fence supported by wooden or metal t-posts with a smooth bottom wire to allow for wildlife passage (See Photograph 5). The fence design for a particular boundary area would be based on:

- terrain considerations,
- neighboring agency requirements,
- prevalence of wildlife species in an area, and
- military mission requirements.

Warning/safety/hazard signs would be installed either as part of the fence or in some instances (e.g., areas of rough terrain or in an arroyo) by themselves to minimize environmental impacts (such as avoidance of a cultural site) but still provide clear demarcation of the WSMR boundary. The signs (see Photograph 6) would be consistent with AR 190-13, Chapter 6, and be:

- Posted in conspicuous and appropriate places to identify the site as a restricted area;
- Positioned to not provide concealment or obstruct visual assessment;
- Be easily readable from a reasonable distance of no less than 50 feet and consistent with United Facilities Criteria 3-12-01;
- Posted in sufficient numbers so the warning can be readily seen; and
- Posted in English and Spanish.

Photograph 5: Example 4-strand Wire Fence with T-Posts

Photograph 6: Example Warning Sign in English (signs will be bilingual)

Gates. Alternative 1 includes the construction of up to eight unmanned control gates and four livestock gates (total of 12 gates). The unmanned control gates would be a pipe gate design, single wide for narrower roads (see Photograph 7) and double wide for wider roads (see Photograph 8) (preferably with an opening width of 20 feet). Gates would be installed at roads crossing existing fence lines. For gates that require movement of personnel and military equipment (see Photograph 9), the gate design would be consistent with UFGS for Chain Link Fence and Gates (UFGS, 2016). For example, for an opening width of 18 feet, an approximately 8.625-inch pipe is recommended (UFGS, 2016).

Road/fence crossings may require the installation of a cattle guard. Along some of the new boundary markings there could be a need for one-way livestock gates (see Photographs 10 and 11). One-way livestock gates may be locked for WSMR to control access.

There are no plans to include lighting at any of the gates associated with the Proposed Action.

Photograph 7: Gate Single Swing Design

Photograph 8: Gate Double Swing Design and Cattle Guard

Photograph 9: Example of Chain Link Fence Gate

Photograph 10: Gate Livestock One Way Passage

Photograph 11: Cow on WSMR

Maintenance Activities. Alternative 1 also includes regular maintenance of the existing fence and of the proposed fence and associated gates. As previously mentioned, WSMR has 122 known locked gates that could possibly require maintenance. Maintenance and repair activities would include similar processes as construction activities.

WSMR would only maintain fence lines on WSMR lands. Coordination would occur, as appropriate, with any entities prior to any maintenance activities. For example, WSMR would coordinate with adjacent agencies when using public roads on adjacent lands. Alternative 1 would also include continuing to maintain current access roads that run parallel to existing fence based on funding.

White Sands National Park, adjacent to WSMR would be responsible for maintaining the boundary fence that aligns with WSMR, therefore this action does not consider White Sands National Park boundary fence maintenance (Public Law [P.L.] 116-92, 2019).

2.1.3.2 Alternative 2

Under Alternative 2, WSMR would mark the WSMR boundary with up to 25 miles of new fence and signs, install up to 4 unmanned vehicle control gates and 4 one-way livestock gates, and perform as-needed fence maintenance/repair activities to the existing and new boundary markings. The proposed new fence, signs, gates, and maintenance activities would be the same as described for Alternative 1. Figure 1.1-1 illustrates the entire WSMR boundary but the specific location of proposed new fencing is not identified due to operational security. The amount of temporary disturbance would be approximately 30 acres and the total permanent disturbance would be less than half an acre. While Alternative 2 meets the purpose and need, it does not provide as many miles of new fence and signs and gates as preferred to meet physical security requirements.

2.2 No Action Alternative

Under the No Action Alternative, maintenance of existing fence lines would continue to occur on an as-needed basis and as funding allows; however, WSMR would not install new fence, signs, or gates. Therefore, the No Action Alternative would not meet the purpose and need for the Proposed Action.

2.3 Alternatives Considered But Not Carried Forward

The purpose and need statement (see Section 1.3) served as a basis to identify potential alternatives to carry forward for environmental analysis. The Army did not consider potential alternatives that would require increased patrols, drone surveillance, and/or increased communication/notification to adjacent landowners because they would not meet the purpose and need, nor would they exclude livestock from entering the WSMR. Therefore, WSMR eliminated these potential alternatives from further study.

Additionally, areas that posed substantial geographic/topographic challenges to access were eliminated from consideration as alternatives. For example, WSMR also considered conducting a survey of the entire WSMR boundary to install new boundary markings and perform repairs of the existing fence of the entire boundary all at once. However, this would require substantial

funding and labor hours to construct and maintain the entire boundary at one time. Therefore, WSMR eliminated this potential alternative from further study.

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter presents a description of the environmental resources and baseline conditions that could be affected from implementation of the alternatives. It also presents an analysis of the potential effects of each alternative to each environmental resource area. The affected environment has been determined using the criteria in NEPA, CEQ, and the Army NEPA Guidance Manual (U.S. Army, 2007).

The action area is defined as the area of analysis that could be affected directly or indirectly by a Proposed Action, and not merely the immediate impact area involved in the action. For this Programmatic EA, the action area consists of a 1,000-foot wide area centered on the boundary markings and gates. The 1,000-foot wide buffer is the area analyzed for the purposes of potential environmental impact analysis, which is larger than the presumed area of disturbance associated with fence construction and maintenance activities. The presumed area of disturbance is defined as the area impacted by construction and maintenance activities and would include up to a 5-foot area on either side of the fence. The permanent disturbance associated with the action would total less than one-acre in size (based on fence posts measuring a maximum width of 5 inches spaced 10 feet apart and 6 posts per gate with each post measuring 8.625 inches).

Specific affected environment definitions are provided for each resource area carried forward for detailed analysis.

3.1 Valued Environmental Component (VEC) Analysis

This Programmatic EA applies a method described in the NEPA Analysis Guidance Manual used to rate VECs typically addressed in Army NEPA analyses (U.S. Army, 2007). This analytical process allows a level of consistency in evaluating impacts and comparing impacts across installations to help with Army-wide decision-making. It also advocates a process for focusing analysis on areas where impacts are most likely to occur, considering the type of actions involved in a geographic context. Participants included subject matter experts at WSMR who have extensive knowledge of the various resources on the installation.

Table 3.1 summarizes the degree to which each VEC would potentially be affected by the Proposed Action. Possible ratings for each VEC range from low, moderate, to high. VECs rated low indicate that potential impacts to those resource areas were considered to be negligible or nonexistent so they are not analyzed in detail in this EA. This EA identified four VECs with a rating of medium. No VECs were identified with a high rating. Therefore, this EA evaluates the following four VECs: Cultural Resources, Soil Erosion, Biological Resources, and Facilities and Traffic/Transportation.

Table 3-1: Valued Environmental Components

VEC	Rating	Rationale/Special Considerations
Air Quality	L	Construction and maintenance activities would result in temporary and negligible fugitive dust and vehicle emissions. The attainment status of air pollutants would not be affected. No new permanent sources of emissions would be established. Therefore, negligible impacts to air quality would occur.
Airspace	L	The Proposed Action would not involve any airspace operations nor impede existing airspace use or management. Therefore, no impacts to airspace would occur.
Cultural Resources	M	Unsurveyed areas of WSMR boundaries may contain cultural resources and therefore would have the potential to be impacted by the Proposed Action.
Noise	L	Temporary and localized noise would be generated from mechanized post hole digging operations and vehicle activity. There are no sensitive receptors in the vicinity of WSMR boundaries. Therefore, no impacts to the noise environment would occur.
Geological Resources (Soil Erosion)	L/(M)	No impact to topography or potential for seismic events to impact inhabited structures. Short-term surface soil disturbance may occur during construction activities.
Biological Resources	M	Temporary and permanent impacts to vegetation types. Potential to impact Todsen's pennyroyal *(Hedeoma Todsenii)* habitat. Potential to disrupt migration pathways for wildlife.
Water Resources	L	The Proposed Action would avoid wetlands and perennial streams. Fences or markers would not be placed in a way that would disrupt drainage processes. Construction related traffic would be restricted to dry upland/ephemeral arroyos/drainages. Therefore, no impacts to water resources would occur.
Facilities and Traffic/ Transportation	M	Impacts would be localized to fence construction and maintenance activities; no other buildings, infrastructure, or utilities would be impacted. Maintenance on existing fences, gates, and roads would continue.
Socioeconomics	L	Minor, temporary increases to the local economy from purchase of labor and products but not to such an extent to affect the general economy. Therefore, no impacts to socioeconomic resources would occur.
Environmental Justice and Protection of Children	L	The Proposed Action would occur entirely within WSMR lands isolated from the general population; thus, there would be no impact to any populations, including minority populations, low-income populations, and children. Therefore, the Proposed Action would not disproportionately affect minority or low-income populations or children.
Land Use	L	The Proposed Action would occur entirely within WSMR lands and would not change the way in which the land is used or managed. Hunting and associated access would continue as described in Garrison Policy Letter #12 *WSMR Installation Hunting Program* (U.S. Army, 2019a). Therefore, no impacts to land use would occur.
Health and Safety	L	WSMR or contractor personnel would be responsible for ensuring ground safety and compliance with all applicable occupational health and safety regulations and worker compensation programs, including Unexploded Ordnance training. WSMR or contractor personnel would conduct

VEC	Rating	Rationale/Special Considerations
		construction activities in a manner that would not pose any risks to personnel. Non-hazardous solid waste generated from construction activities, including but not limited to old fence posts and wire, would be recycled or disposed following procedures identified by *the Garrison Environmental Compliance branch, such as the Pollution Prevention and the Solid Waste Management Plans.* The fence and signs would notify people of the WSMR boundary and the associated hazards posed by trespassing. Therefore, no impacts to health and safety would occur.
Hazardous Waste and Hazardous Materials	L	Any petroleum, oils, and lubricants generated would be collected and stored in properly labeled, approved containers and recycled or disposed through the WSMR Hazardous Management Center in accordance with WSMR Regulation 200-1, Hazardous Waste Management. WSMR would also follow the respective installation Spill Prevention Plan. No impacts to known environmental restoration sites. In addition, in the unlikely event that an unmarked drum or other container, spill, or unidentified substance is discovered near adjacent landowners, WSMR would coordinate with respective landowners according to regulations. Therefore, no impacts from hazardous materials or wastes would occur.

Notes:
L rating = negligible or minor impact anticipated.
M rating = moderate impact anticipated (less than significant).
H rating = significant impact potential anticipated (likely to be mitigated to less than significant).

3.2 Cultural Resources

Archaeological resources consist of the material remains of prehistoric and/or historic human activity. The Archaeological Resources Protection Act of 1979 defines archaeological resources as “pottery, basketry, bottles, weapons, weapon 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” (16 USC 470bb).

Architectural resources also include manmade structures including, but not limited to, standing buildings, dams, bridges, and canals. Under the National Historic Preservation Act of 1966 (NHPA) (16 USC 470 et seq.), only architectural resources older than 50 years are considered for protection; however, younger structures can be afforded the same protection under special circumstances.

Traditional cultural properties may include archaeological resources, architectural resources, topographic features, plant and animal habitat, and any other inanimate object deemed essential to the continuance of a traditional culture by Native Americans and other groups.

The NHPA provides for establishment of the National Register of Historic Places (NRHP), an official list of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture. Section 106 of the NHPA requires federal agencies with jurisdiction over a proposed federal project to take into account the undertaking’s effect on cultural resources listed or eligible for listing in the NRHP and affords the State Historic

Preservation Office (SHPO) and the Advisory Council on Historic Preservation (ACHP) opportunity to comment with regard to the undertaking.

NRHP eligibility criteria have been defined by the Secretary of the Interior's Standards for Evaluation (36 CFR 60). Cultural resources are NRHP-eligible if they display the quality of significance in American history, architecture, archaeology, engineering, and culture present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, workmanship, feeling, and association, and meet at least one of the following criteria:

- Criterion A: The resources are associated with the events that have made a significant contribution to the broad patterns of American history;
- Criterion B: The resources are associated with the lives of persons significant in our past;
- Criterion C: The resources embody the distinctive characteristic of a type, period, or method of construction, or represent the work of a master, or possess high artistic value, or represent a significant or distinguishable entity whose components may lack individual distinction;
- Criterion D: The resources have yielded or may likely yield information important in prehistory or history.

The process of agency review and assessment of the effect of an undertaking on cultural resources is set forth in the implementing regulations formulated by the ACHP (36 CFR 800, Protection of Historic Properties). Other applicable laws and guidelines include:

- Executive Order 11593, Protection and Enhancement of Cultural Environment (16 USC 470 [Supp. 1, 1971]);
- Native American Graves Protection and Repatriation Act (25 USC 3001 – 3013);
- Determination of Eligibility for Inclusion in the NRHP (36 CFR 63);
- Recovery of Scientific, Prehistoric, and Archaeological Data (36 CFR 66);
- Curation of Federally Owned and Federally Administered Archaeological Collections (36 CFR 79); and
- Department of Defense Directive 4710.1, Archeological and Historic Resources Management.

Section 101(d)(6)(B) of the NHPA requires federal agencies to consult with Indian tribes that attach religious or cultural significance to historic properties. Compliance with 36 CFR 800.2, which implements consultations with Native Americans, may be conducted by federal agencies as part of a government-to-government undertaking.

In accordance with Section 101(b)(3) of the Act, SHPOs advise and assist federal agencies in carrying out their Section 106 responsibilities and assist agencies, organizations, and individuals to ensure that historic properties are taken into consideration at all levels of planning and development. In New Mexico, the State Historic Preservation Officer is the director of the New Mexico Historic Preservation Division of the Department of Cultural Affairs. Consultation between WSMR and SHPO is an ongoing process for undertakings at WSMR.

The management of cultural resources falls within the objectives identified in the INCRMP (WSMR, 2015). All activities on WSMR are informed by the Programmatic Memorandum of Agreement among the Department of the Army, White Sands Missile Range, the State Historic Preservation Officer, and the Advisory Council on Historic Preservation (U.S. Army, 1985).

3.2.1 Affected Environment

The area of potential affect (APE) for cultural resources consists of a 1,000-foot wide area centered on the boundary markings and gates. The actual footprint of temporary and permanent construction activities (anticipated to be 5-feet wide) is smaller than the analysis area (1,000-foot wide buffer).

The vast size of the WSMR holdings means that there are large areas of WSMR and the APE that have not been surveyed. Approximately 25 percent of WSMR's 2.2 million acres have been surveyed for the presence of cultural resources. These efforts have demonstrated at least 10,000 years of human occupation in the area. Sample surveys conducted in the 1980s and 1990s established a baseline of various sites that occur in the areas of low activity. Another tool used to evaluate cultural resources potential is the application of a predictive model using data from both WSMR and Fort Bliss. For a comprehensive treatment of the WSMR historic context and documented cultural resources, see the WSMR INCRMP (WSMR, 2015).

3.2.2 Environmental Consequences

The definition of effect is contained within 36 CFR Part 800: "Effect means alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register." Per 36 CFR Part 800, an adverse effect occurs: …when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the 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…"

Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative. Examples of adverse effects may include, but are not limited to, the following:

I. Physical destruction of or damage to all or part of the property;

II. Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines;

III. Removal of property from its historic location;

IV. Change of the character of the property's use or of physical features within the property's setting that contributes to its historic significance;

V. Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;

VI. Neglect of a property that causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and

VII. Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

Per 36 CFR 800.5 adverse effects to historic properties can be direct, indirect, and cumulative. Direct effects include physical destruction or damage. Indirect effects include the introduction of visual, auditory, or vibration impacts as well as neglect of a historic property. Cumulative effects are the impacts of a project taken into account with known past or present projects as well as foreseeable future projects.

3.2.2.1 Alternative 1 (Preferred Alternative)

Under Alternative 1, up to 50 miles of boundary marking activity and gate construction would occur in areas where cultural resource surveys have not been completed or where surveys have been conducted but NHPA Section 106 consultation is not complete. As such, prior to construction, WSMR would assess each boundary marking and/or gate project for cultural resources through application of the WSMR environmental review process. Any new segment of range fence would connect to existing fence.

The WSMR Cultural Resources Manager would determine whether pre-test, site-specific cultural resource studies, or consultation would be required prior to implementing proposed activities in these areas. Any cultural resource identification and consultation requirements would be completed prior to implementation of activities. Associated project-specific APEs would require site-specific cultural resource surveys and/or evaluation.

The areas containing known sensitive cultural resources would be avoided through site selection during the planning process or through a cultural resources monitor directing placement of fence posts and avoiding damage to a site. Markers can also be used along the fence line to indicate off limits to vehicle traffic as well. In instances where a sign would suffice in lieu of a fence, especially if the boundary is in an area of cultural resource sensitivity, WSMR would consider this less impactful method for marking the boundary. No historic structures would be impacted.

The potential would exist for inadvertent discovery of cultural resources in these areas. As such, the WSMR inadvertent discovery policy and process specified in the INCRMP (WSMR, 2015) would be followed.

In accordance with Section 9 of the 1985 Programmatic Memorandum of Agreement with the SHPO (U.S. Army, 1985), WSMR would consult with the SHPO on any unidentified sites and findings of adverse effect on specific fence/signage locations that are identified. Each activity would apply the applicable measures as identified in the Programmatic Memorandum of Agreement and any project-specific consultation requirements. In all instances, WSMR would first aim to avoid impacting any cultural resources (e.g., by adjusting the location of the fence).

Therefore, implementation of Alternative 1 would result in no adverse effects to cultural resources.

3.2.2.2 Alternative 2

Under Alternative 2, impacts would be similar to those identified for Alternative 1 but with lower potential for cultural resource impacts due to a smaller APE. The same procedures, coordination, and measures described under Alternative 1 would be implemented under Alternative 2. Therefore, implementation of Alternative 2 would result in no adverse effects to cultural resources.

3.2.2.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to existing conditions. Livestock would continue to have the potential to impact cultural resources. WSMR would continue to implement the measures in the INCRMP and follow the Programmatic Memorandum of Agreement to manage and protect cultural resources. Therefore, implementation of the No Action Alternative would result in no adverse effects to cultural resources.

3.3 Soil Erosion

Soil refers to unconsolidated materials on the surface overlying bedrock or other parent material (Natural Resources Conservation Service [NRCS], 2017). Within a given area, soil erosion effects are a function of the geology, soils, topography, climate, and vegetative cover (WSMR, 2015).

3.3.1 Affected Environment

The area subject to potential direct impacts to soil erosion consists of a 10-foot wide area centered on the boundary markings and the proposed gate locations. Additionally, indirect impacts have the potential to occur outside this area due to erosion and deposition from wind and/or precipitation.

Geology

WSMR is located within the southeastern-most portion of the Basin and Range Physiographic Province (Hawley, 1986), a regional area typified by uplifted fault blocks forming mountains and downthrown blocks forming basins. Erosion of the uplifted fault blocks and deposition of the eroded sediments have resulted in thick sequences of alluvial materials accumulating within the basins (NRCS, 2017). The WSMR terrain consists of rugged mountain peaks and canyons, rolling grass-covered hills, sand dunes, lava flows, semi-arid yucca and grassland basins, and large playas with scattered springs and ponds (Muldavin et al., 2000a and 2000b).

Soils

Fifty-six soil map units occur within the affected environment. In general, soil characteristics within the affected environment include well drained to excessively drained soils with depths to

bedrock from shallow (less than two feet) to very deep (greater than seven feet). Soils tend to be moderately to slightly susceptible to water erosion (NRCS, 2020).

Of the 56 soil map units, 11 units exhibit very high susceptibility to wind erosion. Soils susceptible to wind erosion are assigned to wind erodibility groups (WEG) based on the properties of the soil surface layer. The WEGs range from 1 to 8, with soils assigned to group 1 (soil consisting of fine sand, sand and coarse sand) are the most susceptible to wind erosion and those assigned to group 8 (soils with a high concentration of rock fragments on the surface or wet soils) are the least susceptible.

In general, soils with a WEG of 2 (soils composed of calcareous loam, calcareous clay loam, calcareous silt, calcareous sandy clay loam, or calcareous clay loam) or lower have a very high susceptibility to wind erosion. WEGs with a very high susceptibility to wind erosion within the affected environment are listed in Table 3-2. For additional/specific map units, please refer to the NRCS Web Soil Survey for more detailed information: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.

Table 3-2: Soil Map Units with a Very High Susceptibility to Wind Erosion within the Affected Environment

Map Unit Name	Wind Erodibility Group
Brazito fine sand, 0 to 20 percent slopes	1
Brazito-Noum complex, 0 to 9 percent slopes	2
Copia-Patriot complex, 0 to 15 percent slopes	1
Copia-Wink-Tonuco complex, 0 to 18 percent slopes	1
Gyplaya gypsiferous sand, 0 to 4 percent slopes	1
Harses gypsiferous loamy fine sand, 0 to 5 percent slopes	2
Lark association, 0 to 60 percent slopes, duneland	1
Lark association, 5 to 90 percent slopes, duneland	1
Matador family gypsiferous sand, 5 to 90 percent slopes	1
Noum-Hembrillo association, 0 to 15 percent slopes	2
Whitlock-Pajarito-Nations complex, 1 to 8 percent slopes	2

Source: NRCS, 2020. https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

3.3.2 Environmental Consequences

3.3.2.1 Alternative 1 (Preferred Alternative)

Under Alternative 1, the primary short-term impact to soils would be the disturbance and compaction caused by vehicles driving along the fence during construction and maintenance, foot traffic, equipment usage, temporary placement of fencing supplies on the ground, fence/sign/gate installation and maintenance/repair, and clean-up activities. Temporary impacts to soils would be approximately 60 acres (50 miles x 10 feet) from installation of the fence/signs and an additional approximately quarter acre from the installation of up to 12 gates (12 gates, each with an area of disturbance approximately 50 feet by 20 feet). Long-term permanent soil impacts from the installation of fence posts and gate posts would be approximately one acre.

Fence and gate post holes measure between 5 and 8.625 inches in diameter and 3 to 4 feet in depth. Installation would result in a loss of soil structure, mixing of horizons, and the potential for excavated soils to mix with other soil and vegetation around the posts. Driving of posts into the ground would slightly increase compaction of soils adjacent to the posts. The soil removed from the holes would be sloped around the installed posts and along the length of the fence if necessary. Cattle guards would be constructed within existing roadways and excess soil would be used for grading around installed guards and roadway.

Construction and maintenance/repair actions may contribute to wind erosion on soils that have a severe susceptibility to wind erosion i.e., WEGs 1 and 2. Activities occurring in site-specific areas with susceptibility to wind erosion may require additional measures to reduce impacts such as the installation of silt fences, backpack sprayer for water application, and/or work restrictions due to high wind advisories. The project design could minimize potential impacts to soils by placing a sign to serve as a boundary marking (e.g., in an arroyo), rather than the construction of a range fence to reduce potential soil impacts.

Best management practices (BMPs) listed in Chapter 4 include limiting grading and ground disturbing activities to the frequency and the areas necessary to complete the proposed activities. Grading and construction activity would be curtailed during strong wind conditions to reduce the potential for soil erosion. Water trucks may be used to reduce dust during construction of cattle guards or gates spanning roadways. All applicable BMPs would be implemented (see Chapter 4, Table 4-1).

Livestock and to a lesser extent wildlife, would likely perpetuate trails along the new fence line, resulting in localized erosion. Livestock and wildlife already move about the area so the establishment of any worn trails along the fence line would not result in a noticeably increased erosion potential as compared to existing conditions. The range fence would also serve to reduce livestock and people from disturbing soils and contributing to soil erosion on WSMR. Therefore, implementation of Alternative 1 would not result in significant impacts to soil erosion.

3.3.2.2 Alternative 2

Implementation of Alternative 2 would include construction of up to 25 miles of boundary markings and up to 8 gates using the same methods as described for Alternative 1. Overall, the potential impacts to soil erosion presented for Alternative 1 would apply to Alternative 2; however, temporary impacts to soils would be limited to approximately 30 acres. Additionally, long-term permanent soil impacts from the installation of fence posts and gate posts would be less than half an acre. The BMPs presented for Alternative 1 would also be implemented for Alternative 2. Therefore, implementation of Alternative 2 would not result in significant impacts to soil erosion.

3.3.2.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to existing conditions. Therefore, implementation of the No Action Alternative would not result in significant impacts to soil erosion.

3.4 Biological Resources

Biological resources include native or naturalized plants and animals and the habitats (e.g., wetlands, forests, grasslands) in which they exist.

Protected and special status species include those species that are listed, proposed for listing, or are active candidates for listing, designated or proposed critical habitat; species of concern managed under conservation agreements or management plans; and state listed species as:

- Threatened or endangered under the federal Endangered Species Act ([ESA], 16 USC 1531 et seq.) by the U.S. Fish and Wildlife Service (USFWS);
- Threatened or endangered wildlife species under New Mexico Wildlife Conservation Act by the NMDGF;
- Protected species under the Migratory Bird Treaty Act ([MBTA], 16 USC 703-712);
- Bald and golden eagles, as protected under the Bald and Golden Eagle Protection Act (16 USC 668); or
- Army Species at Risk (see list in INCRMP [WSMR, 2015]).

3.4.1 Affected Environment

The action area for biological resource analysis consists of a 1,000-foot-wide area centered on the boundary markings and gates. The actual footprint of construction activities (anticipated to be 5-feet wide) is smaller than the analysis area (1,000-foot wide buffer).

3.4.1.1 Vegetation Communities

There is a wide diversity of vegetation types occurring on WSMR lands, ranging from low elevation barren alluvial flats to Rocky Mountain Conifer Forests along the mountain tops (Figure 3.4-1). WSMR is home to more than 1,000 species of plants.

Vegetation patterns at WSMR generally follow an elevational gradient (WSMR, 2015). A model for describing the vegetation communities of WSMR, called vegetation map units, was developed by Muldavin *et al.* (2000a and 2000b). The action area contains habitats ranging from barren playas to grasslands at low elevations to shrublands and woodland communities at high elevations. Appendix B includes descriptions of the more than 30 vegetation types that occur within the action area.

Nonnative Plants

Ten noxious or potentially noxious (nonnative) species on WSMR have been identified as target species that could threaten the integrity of habitats on WSMR. These include African rue (*Peganum harmala*), broadleaved pepperweed (*Lepidium latifolium*), Johnson grass (*Sorghum halepense*), Lehmann lovegrass (*Eragrostis lehmanniana*), Malta starthistle (*Centaurea melitensis*), Napa thistle (*Centaurea melitensis*), Russian knapweed (*Acroptilon repens*), Russian olive (*Elaeagnus angustifolia*), saltlover (*Halogeton glomeratus),* and saltcedar or tamarisk (*Tamarix ramosissima*). Of these ten, Lehmann lovegrass and African rue exhibit high invasive potential and are typically found in disturbed areas such as roadsides. Johnson grass, which has a moderate invasive potential, is also found in disturbed sites, forest edges, and

along stream banks (WSMR, 2009a). Other moderate invasive potential species include Malta starthistle and saltlover. Malta starthistle can form dense, impenetrable stands and colonize disturbed sites, roadsides, rangelands, and grasslands (U.S. Department of Agriculture [USDA-USFS], 2015). Saltlover also colonize disturbed sites and roadsides and is highly toxic to both sheep and cattle (Tilley et al., 2008). The other five invasive species are not discussed because they have limited distribution on WSMR or occur within riparian habitats and there is no riparian habitat in the action area (WSMR, 2009a).

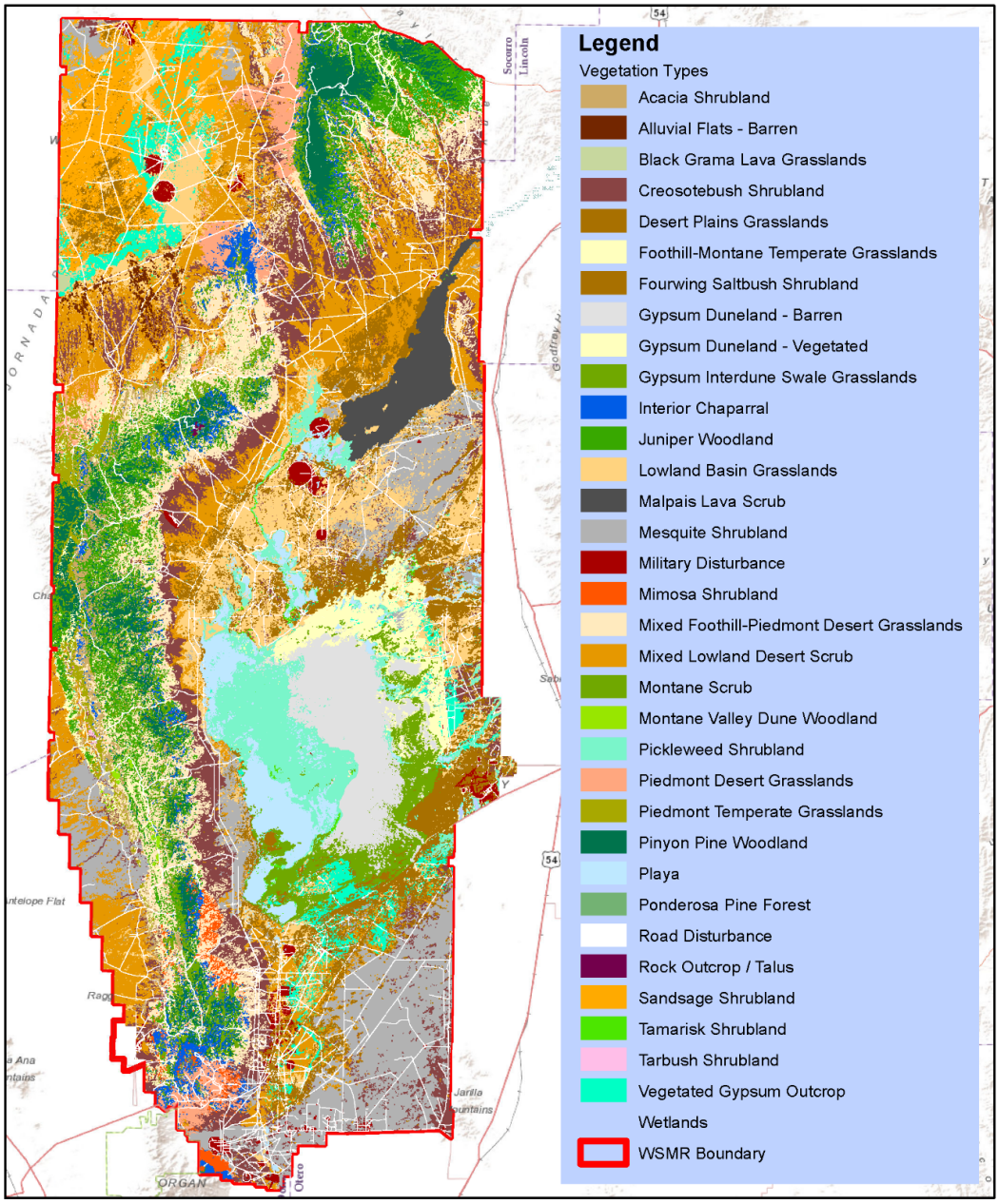

Figure 3.4-1: WSMR Vegetation Types

3.4.1.2 Wildlife

Complete lists of wildlife species present on WSMR can be found in the WSMR INCRMP (2015). Below is a brief description of each animal sub-group excerpted from the WSMR INCRMP (WSMR, 2015).

Invertebrates

While exact species are unknown, common orders that are thought to be present in the action area are Coleoptera (beetles), Diptera (flies), Hemiptera (true bugs), Hymenoptera (ants, bees, and wasps), and Lepidoptera (butterflies and moths) (WSMR, 2015). Not only are invertebrates an important source of food for many birds, mammals, fish, and reptiles, but they also benefit the ecosystem through decomposition, seed dispersal, soil aeration, and pollination (WSMR, 2009a).

Amphibians and Reptiles

WSMR contains habitat that supports diverse herpetofauna (amphibians and reptiles of a certain region) including seven species of amphibians and 47 species of reptiles. There are 6 toad species (3 spadefoot toads and 3 true toads), 1 salamander species, 1 turtle species, 27 snake species, and 19 lizard species (WSMR, 2015). Vegetation is not the only factor that determines herpetofauna habitat but microclimate, soil type, topography, and human disturbance are other factors that determine healthy habitats.

Avifauna

Birds, both migratory and most native-resident bird species, are protected under the MBTA, and their conservation by federal agencies is mandated by Executive Order 13186 (Migratory Bird Conservation). Under the MBTA, it is unlawful by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, [or] possess migratory birds or their nests or eggs at any time, unless permitted by regulation. The 2003 National Defense Authorization Act gave the Secretary of the Interior authority to prescribe regulations to exempt the Armed Forces from the incidental taking of migratory birds during authorized military readiness activities.

Bald (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are protected by the Bald and Golden Eagle Protection Act of 1940. This act prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald eagles, including their parts, nests, or eggs. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb" (16 U.S.C. 668-668c).

WSMR supports a high diversity of avifauna (birds of a particular region). Of the total bird species known to the state of New Mexico, approximately 60 percent have been reliably documented at WSMR (WSMR, 2015). There are many resident populations of raptors, game birds, and songbirds located on WSMR. Of the 290 documented species, 17 orders and 55 families have been reported. The greatest numbers of bird species occur during the spring and fall. There are 158 resident species that are documented during the summer, winter, or year-round. The European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), and rock pigeon (*Columbia livia*) are the only three exotic species documented on WSMR (WSMR, 2009a).

Mammals

There are 73 documented game and non-game mammals on WSMR. Large native herbivores present at the installation are bighorn sheep (*Ovis canadensis*), collard peccary (*Pecari tajacu*), elk (*Cervis canadensis*), mule deer (*Odocoileus hemionus*), and pronghorn antelope (*Antilocapra americana*). Several species of bats are present and fall into two families: Vespertillionidae and Molossidae. Several of these bats roost in caves and buildings but a few roost in trees. American badgers (*Taxidea taxus*), bobcats (*Lynx rufus*), coyotes (*Canis latrans*), and mountain lions (*Puma concolor*) are common predator species found at WSMR (WSMR, 2015).

Nonnative mammals found at WSMR include the barbary sheep or aoudad (*Ammotragus lervia*), feral cat (*Felis catus*), feral horse (*Equus caballus*), house mouse (*Mus musculus*), Norway or brown rat (*Rattus norvegicus*), and oryx or gemsbok (*Oryx gazella*). Two other species are possible: black rat (*Rattus rattus*) and feral goat (*Capra aegagrus hircus*).

Several small mammals make WSMR home. The most diverse order of mammals on the installation is rodents. There have been 5 different families and 31 species of rodents documented at WSMR. Three species of rabbits and one species of shrew are other small mammals that occur on WSMR (WSMR, 2015).

Large Mammal Management

Hunting is used for wildlife population control and recreation for the public (WSMR, 2009a). WSMR and the NMDGF have partnered with hunting on WSMR since the 1950's. Desert bighorn sheep, pronghorn, mountain lion, and oryx are the four big game species available to hunt. Several upland game birds, waterfowl, furbearers, and non-protected species are hunted small game species. There is no fishing or sport trapping allowed at WSMR. Animals that are not allowed to be hunted include black bear (*Ursus americanus*), elk, javelina (*Tayassu tajacu*), mule deer, and wild turkey (*Meleagris gallopavo*). It is prohibited to collect and/or kill reptiles and amphibians (WSMR, 2015).

Other large mammal management practices include thinning and prescribed burning. This mainly occurs in bighorn sheep habitat and is conducted by the USFWS and Bureau of Land Management (BLM).

Livestock

Livestock grazing is prohibited on WSMR lands without authorization, although it still occasionally occurs at low levels from livestock intrusions. Overgrazing by cattle can remove herbaceous cover and result in sand sheets or dunes if not controlled (Milchunas, 2006). Domestic cattle (*Bos taurus*) do not occur on WSMR lands, with the exception of animals in some areas where there is no impediment to intrusion. Barbary sheep (*Aoudad)* are observed primarily in mountainous regions, the same habitat as bighorn sheep. Due to the potential threat the species poses to bighorn sheep, WSMR maintains a year-round kill permit for the species. No domestic or feral goats are known to occur on WSMR, but future immigration of feral goats into the area remains a possibility. Additionally, domestic sheep (*Ovis aries*), "wild-type" mouflon are occasionally raised on game ranches and can become naturalized. Potential intrusions may

occur although there are no known sheep occurrences on the installation. The oryx is a naturalized exotic that is native to the deserts in the Kalahari region of southern Africa. The oryx is considered a game species and is hunted on WSMR (WSMR, 2015).

Threatened and Endangered Species

Appendix C lists protected species that have the potential to occur within the action area. Potential occurrence was determined based on past documentation of each species within WSMR and on suitability of habitat and occurrence within the action area.

An in-depth discussion of threatened and endangered species is presented in the INCRMP and is incorporated herein by reference (WSMR, 2015). Across the five counties spanning WSMR (Socorro, Sierra, Dona Ana, Otero, and Lincoln), 12 species are listed as Federally endangered with 2 of the species protected under the ESA as 10(j) non-essential experimental populations and another six species are listed as Federally threatened. Of these species, the following have the potential to occur in the action area: Todsen's pennyroyal (*Hedeoma Todsenii*) and the northern Aplomado falcon (*Falco femaralis septentrionalis*).

Todsen's pennyroyal was listed as Federally endangered in 1981 (Federal Register (FR), 1981). The species is also listed as endangered by the State of New Mexico (New Mexico Rare Plant Technical Council [NMRPTC], 1999). The plant grows in loose, gypseous-limestone soils in pinyon-juniper woodlands of the western foothills of the Sacramento Mountains. Presently, Todsen's pennyroyal is known only from Sierra and Otero counties, New Mexico, where it occurs in the San Andres Mountains and on the western slope of the Sacramento Mountains (NMRPTC, 1999). Figure 3.4-2 depicts the general habitat area for Todsen's pennyroyal. Additional information on this species can be found in the Final Biological Assessment for Development and Implementation of Range-Wide Mission and Major Capabilities at White Sands Missile Range, New Mexico (WSMR, 2009b).

The northern Aplomado falcon has been designated by the USFWS as a nonessential experimental population within the states of New Mexico and Arizona (FR, 2006) and is also listed as a State endangered species. The northern Aplomado falcon is a subspecies of the Aplomado falcon. The species does not build its' own nests but commandeers abandoned nests of crows, kites, ravens, and hawks. The northwest portion of WSMR contains suitable habitat for the species (FR, 2006) within the sandsage shrubland and piedmont desert grasslands. The falcon occurs occasionally as a transient visitor on the Jornada grasslands and the central grasslands east of the San Andres Mountains of WSMR (WSMR, 2015).

Species listed by the state of New Mexico include 4 species listed as State endangered and 12 species as State threatened. Not all of these species occur within the action area; however, several have the potential to occur within or near the action area. These species include (listed in order of status) Todsen's pennyroyal, northern Aplomado falcon, Mexican wolf (*Canis lupus baileyi)*, and gray vireo (*Vireo vicinior*). Species listed as Species of Greatest Conservation Need (SGCN) by the State of New Mexico include the pinyon jay (*Gymnorhinus cyanocephalus*) and burrowing owl (*Athene cunicularia*).

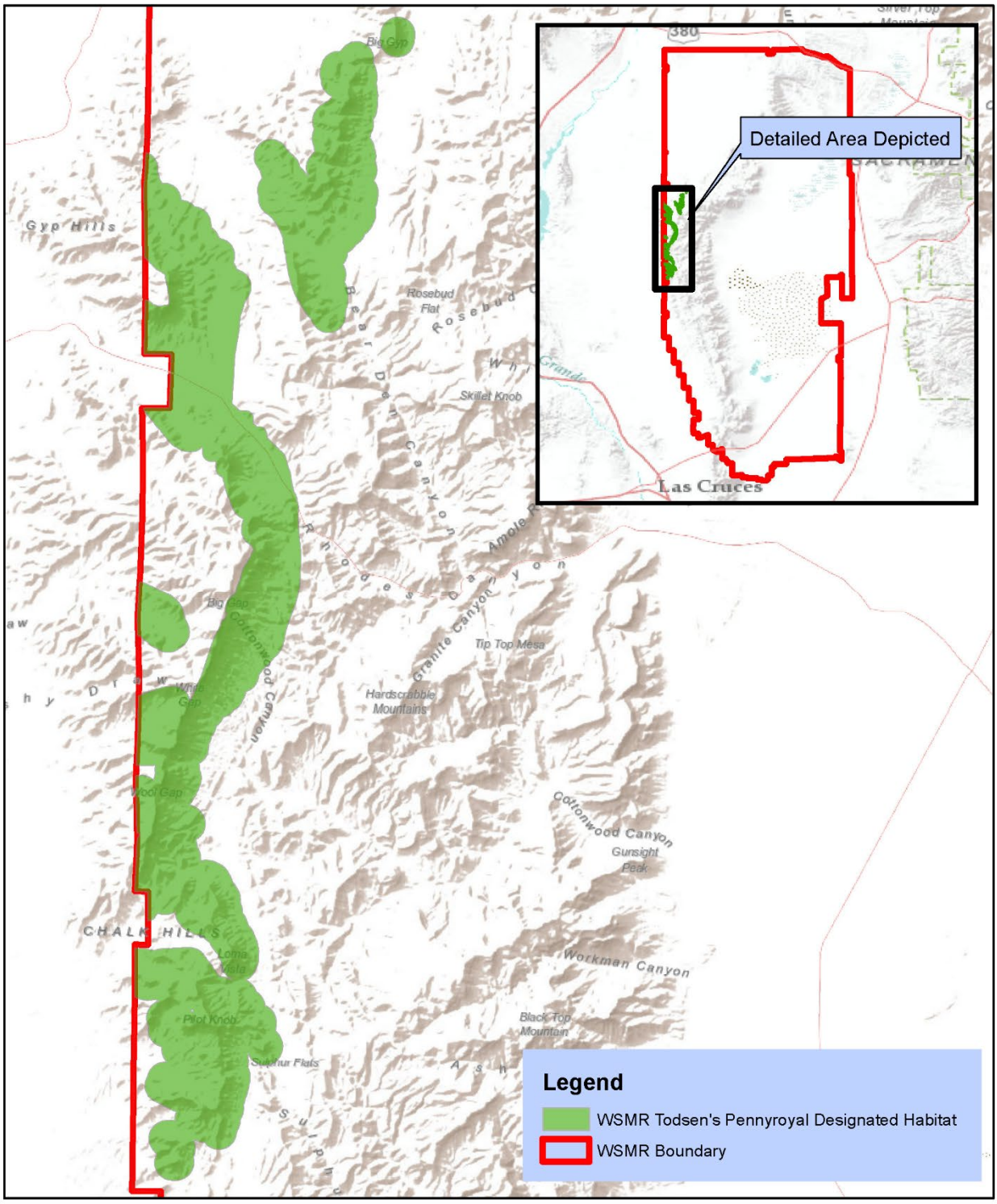

Figure 3.4-2: Todsen's Pennyroyal General Habitat at WSMR

0 4 8 Miles

N W E S

The Mexican wolf is State listed as endangered (Natural Heritage New Mexico [NHNM], 2021) and designated as a federal nonessential experimental population in New Mexico and Arizona (FR, 2015). Transient Mexican wolves have been documented at Bosque Del Apache and Elephant Butte Reservoir, located west of WSMR (U.S. Army, 2021). WSMR is defined in the 1998 Nonessential Experimental Population Final Rule and EIS as the *White Sands Wolf Recovery Area*, which is within the Mexican Wolf Experimental Population Area (FR, 1998). However, the White Sands Wolf Recovery Area is not of sufficient size nor does it have sufficient prey density to function as an independent recovery area (FR, 2007; WSMR, 2015).

Gray vireo is state-listed as threatened (Biota Information System of New Mexico [BISON-M], 2021). Breeding has been documented in the San Andres Mountains on WSMR, and in the Organ Mountains (Williams, 2000). The species is strongly associated with pinyon-juniper and scrub-oak habitats and a lesser extent with savannas (Johnson et al., 2014). Nests are typically placed in small forks in low trees or shrubs, often less than ten feet off the ground (New Mexico Avian Conservation Partners [NMACP], 2016). Hobert et al. (2009) reported detection of 241 gray vireos in 196 territories in the San Andres Mountains. All territories detected were in or adjacent to desert riparian corridors within canyon watersheds (Hobert et al., 2009).

Other Species of Concern

The pinyon jay is a state SGCN (BISON-M, 2021). Pinyon jays are year-round residents in pinyon-juniper (*Pinus edulis, P. monophylla, P.cembroides, Juniperus spp.*) habitats and nest colonially. The species is an omnivore, consuming pine seeds, acorns, juniper berries, invertebrates, and small vertebrates. The pinyon jay occupies the same vegetation habitats as the gray vireo (Johnson et. al, 2014).

Burrowing owls are also a SGCN in the state of New Mexico. The burrowing owl lives in open, treeless areas with low, sparse vegetation, usually on gently sloping terrains. The species is a grassland habitat breeder on WSMR and can be found along the southern boundary and the northwest corner of WSMR. Burrowing owls are often associated with high densities of burrowing mammals and use the abandoned burrows of prairie dogs (*Cynomys spp.*), ground squirrels (*Spermophilus spp.*), American badgers, and foxes (*Vulpes spp*.) for nesting and roosting (BISON-M, 2021). The majority of food items consumed by owls consist of invertebrates but they also consume small vertebrates, including lizards, birds, and mammals.

Detailed descriptions of the WSMR designated species of interest (SOI) plants with potential to occur in the action area are discussed in Appendix C. Even though SOI plants are not subject to federal or state laws, they may be given preferential treatment, such as avoidance, protection, or transplantation when projects that require activities coinciding with SOI locations occur.

3.4.2 Environmental Consequences

For the purposes of this Programmatic EA, the proposed significance criteria for biological resources include the following:

- The permanent loss or degradation of designated rare/sensitive plant species or introduction or increased prevalence of undesirable non-native species;

- Long-term loss or impairment of a substantial portion of local habitat (species dependent);
- Significant decline in MBTA populations or direct mortality or take;
- Direct mortality or other unpermitted take of threatened and endangered species;
- Jeopardize the continued existence of a species or result in an overall decrease in population diversity, abundance, or fitness; or
- Degradation of habitat quality or diminish species health.

To avoid and minimize a trend towards exceeding the significance criteria listed above, applicable BMPs listed in Chapter 4, Table 4-1 would be implemented under the Proposed Action. In addition, WSMR would minimize potential impacts by assessing each potential fence/gate project action area for sensitive biological resources through application of the WSMR environmental review process as explained in Section 2.1.2. In the event, WSMR observes a shift towards species or ecosystem decline resulting from the Proposed Action, WSMR will reevaluate the BMPs listed in Table 4-1. Additionally, to address uncertainties surrounding a potential shift, an adaptive monitoring/management process would be implemented to integrate planning with additional monitoring/investigations to ensure that the most current information is available and used in the decision-making process (Mazur et al, 2013).

3.4.2.1 Alternative 1 (Preferred Alternative)

WSMR would assess each potential fence/gate project action area for sensitive biological resources through application of the WSMR environmental review process as explained in Section 2.1.2. Under Alternative 1, 50 miles of new fencing would be installed along with up to 8 unmanned access gates and 4 one-way livestock gates.

Vegetation Communities

Access to the action area would be limited to existing roads and pullouts. No new ingress or egress routes or staging areas would be created. If needed, temporary trails may be generated by transiting ATVs/UTVs. In some areas, the terrain may be inaccessible by vehicles and fence or materials may need to be hauled in on foot. The boundary markings and gates would be sited to avoid or reduce direct impacts to the greatest extent feasible. For example, signs would be used instead of a fence in areas of sensitive habitat.

Construction activities would result in approximately 60 acres of short-term disturbance to vegetation. Permanent impacts of less than one acre would result from fence posts and gates. Vegetation that is tall enough to impede construction of fences would be sheared off near ground-level with a brush-beater or with hand labor in isolated locations. The soil surface and root systems would be left intact, when feasible.

Vegetation would be removed where holes for fence posts are dug by hand or with a truck-mounted auger. The overall effect on species composition and forage production would be negligible. The actual amount of vegetation impacted would be minimal.

To reduce the chance of invasive plants affecting the action area, the project proponent would coordinate with the WSMR Integrated Pest Management Coordinator regarding invasive weed management. Preventative and control measures would include, but are not limited to, an Employee Environmental Awareness Program; vehicle and equipment entry cleaning; and treatment methods including manual, mechanical, and herbicidal. These measures would limit the infestation of invasive plant species from altering the ecological function of the action area.

Long-term impacts would include reduced vegetative cover where animal trails are created along the fence or where vegetation height must be reduced to assure proper function of unmanned control gates and livestock gates. Beneficial impacts from the installation of new fence and maintenance/repair of existing fence would exclude livestock from the WSMR. This would reduce the impact of trampling vegetation and the spread and introduction of invasive species, resulting in beneficial impacts to habitat.

Wildlife

Mobile wildlife would be temporarily displaced during construction and maintenance activities. Long-term effects on wildlife would relate primarily to how the new fence may influence seasonal movements. No matter how well designed, standard fence designs could still result in increased animal stress and energy loss, and occasionally mortality should animals become entangled in them or become separated from their herd and become more prone to predation. For example, a two-year study in Montana determined that approximately one ungulate per year was found tangled in every 2.5 miles of fence (Paige, 2012).

The study also identified wildlife-friendly fence designs that effectively exclude livestock and reduce intrusions while minimizing the impact to daily wildlife movements, seasonal migrations, and access to forage and water. Thus, the fence location, type, and wire spacing would be designed for each project area to minimize impacts to wildlife while maximizing effectiveness for livestock exclusion and trespassing notification. While the new range fence would have the potential to result in wildlife entanglements, the incorporation of wildlife-friendly fence designs and overall low density of entanglement per mile would not contribute to any substantial decline in healthy wildlife populations.

Although the fence could preclude transboundary migration patterns of animals, especially larger mammals (*e.g.,* mule deer), and thus fragment habitat within the action area, these impacts would be considered minimal. Habitat fragmentation typically affects species with small population sizes or those that are dependent upon migration to obtain spatially or temporally limited resources (Gilpin and Hanski, 1991). Prior to construction, WSMR would undergo an environmental review process to evaluate fence design alternatives.

Ultimately, the type of range fence would be selected based on a site-specific design and would be consistent with the following resources for wildlife and livestock fencing:

- The Bureau of Land Management Fencing Manual (BLM, 1989);
- A Landowner's Guide to Wildlife Friendly Fences (Paige, 2012); and
- NMDGF Recommendations for Constructing Wire Fences for Livestock in Big Game Habitats ("Fencing Guidelines with Diagram") (NMDGF, 2003).

Properly designed and maintained fences would result in improved livestock management while having minimal detrimental effects on wildlife. Additional benefits include reductions in competition between intruding livestock and native wildlife for food and cover, disease transmission, and wildlife displacement (USFWS, 2009). Furthermore, the placement of one-way livestock gates would allow intruding livestock to leave the WSMR and prevent reentry.

Threatened and Endangered Species

Short-term, negligible, adverse impacts on threatened and endangered species, SGCN and SOI could occur with the construction of new boundary markings, installation of gates, and maintenance of the existing and new fence.

Potential impacts to the endangered Todsen's pennyroyal would be avoided because project-specific fence projects would undergo an environmental review, screening and decision process prior to implementation. As a result, avoidance and minimization measures include species-specific surveys prior to construction activities within potential habitat to ensure avoidance. Additionally, a qualified biological monitor (approved by the WSMR Environmental Division) would be onsite during construction activities within potential habitat to ensure no direct impact to the species.

There is approximately 200,000 acres of suitable breeding and foraging habitat on WSMR for the northern Aplomado falcon within the northwest corner of the installation (FR, 2006). The permanent disturbance of less than an acre of foraging habitat would amount to the loss of less than 0.0005 percent of foraging habitat, a negligible loss of habitat. Additionally, construction activities would occur outside of the migratory bird nesting season (March through August), which coincides with the species breeding season.

Gray vireo suitable foraging habitat exists within and adjacent to the Proposed Action; however, suitable nesting habitat is likely more limited within these areas according to previous documented territories (Hobert et. al., 2009; and Johnson et. al., 2014). Regardless, construction activities and vegetation removal would occur outside of the migratory bird nesting season from March through August, which coincides with the gray vireo's breeding season.

Other Protected Species

Suitable nesting and foraging habitat for SGCN species occurs within the action area. Short-term disturbance may displace the birds temporarily.

Of note, the burrowing owls' use of burrows makes them susceptible to impacts from ground disturbing activities. Construction activities may temporarily displace wintering owls but breeding owls would not be impacted because the Proposed Action would not occur during the nesting season (March through August) and burrows would be avoided.

Various SOI plant species have the potential to occur within the action area (Appendix C). Thus, the WSMR Environmental Division would perform an environmental review of the proposed fence projects prior to implementation. Potential habitat for any SOI species identified during the review process would require presence and absence surveys to be performed by an approved

qualified botanist. Avoidance of SOI species would occur to the maximum extent possible and BMPs in Chapter 4 would be implemented.

Summary

Implementation of Alternative 1 would result in negligible direct impacts to vegetation types and some wildlife. Indirect impacts to vegetation and wildlife would also occur. With the implementation of BMPs (see Chapter 4), impacts to biological resources, including listed species, would be avoided or reduced. The new boundary markings would reduce livestock intrusions and persons trespassing, which in turn would reduce trampling impacts and invasive species transmission, resulting in a beneficial impact to vegetation and habitat. Therefore, implementation of Alternative 1 would not result in significant impacts to biological resources.

3.4.2.2 Alternative 2

Implementation of Alternative 2 would include construction of up to 25 miles of boundary markings and up to 4 unmanned vehicle control gates and 4 one-way livestock gates using the same methods as described for Alternative 1. Overall, the potential impacts to biological resources presented for Alternative 1 would apply to Alternative 2; however, temporary impacts to soils would be limited to approximately 30 acres. Permanent disturbance from fence and gate post installation would be minimal (less than half an acre) and would result in minor habitat alteration to the vegetation communities within the action area.

There is no habitat or species occurrence for Todsen's pennyroyal within the action area for Alternative 2. Suitable habitat for the northern Aplomado falcon does not occur either. Potential nesting habitat for the gray vireo and pinyon jay is also lacking along the southern boundary. The burrowing owl is found within the Alternative 2 action area; however, the same measures identified for Alternative 1 would be implemented under Alternative 2.

3.4.2.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to existing conditions. People and livestock would continue to damage biological resources. WSMR would continue to manage natural resources in accordance with the INCRMP (WSMR, 2015). Therefore, implementation of the No Action Alternative would not result in significant impacts to biological resources.

3.5 Facilities and Traffic/Transportation

This section focuses on fences and gates and the WSMR traffic/transportation network of roads.

3.5.1 Affected Environment

The affected environment for facilities and traffic/transportation includes WSMR, adjacent properties, and adjacent transportation routes.

Major highways serving WSMR include U.S. 380, U.S. 70, and U.S. 54 (Figure 3.5.1). There are 6 primary access gates onto WSMR (which are part of the 122 total known locked gates). Throughout WSMR there is a network of county- and WSMR-maintained unpaved roads, which

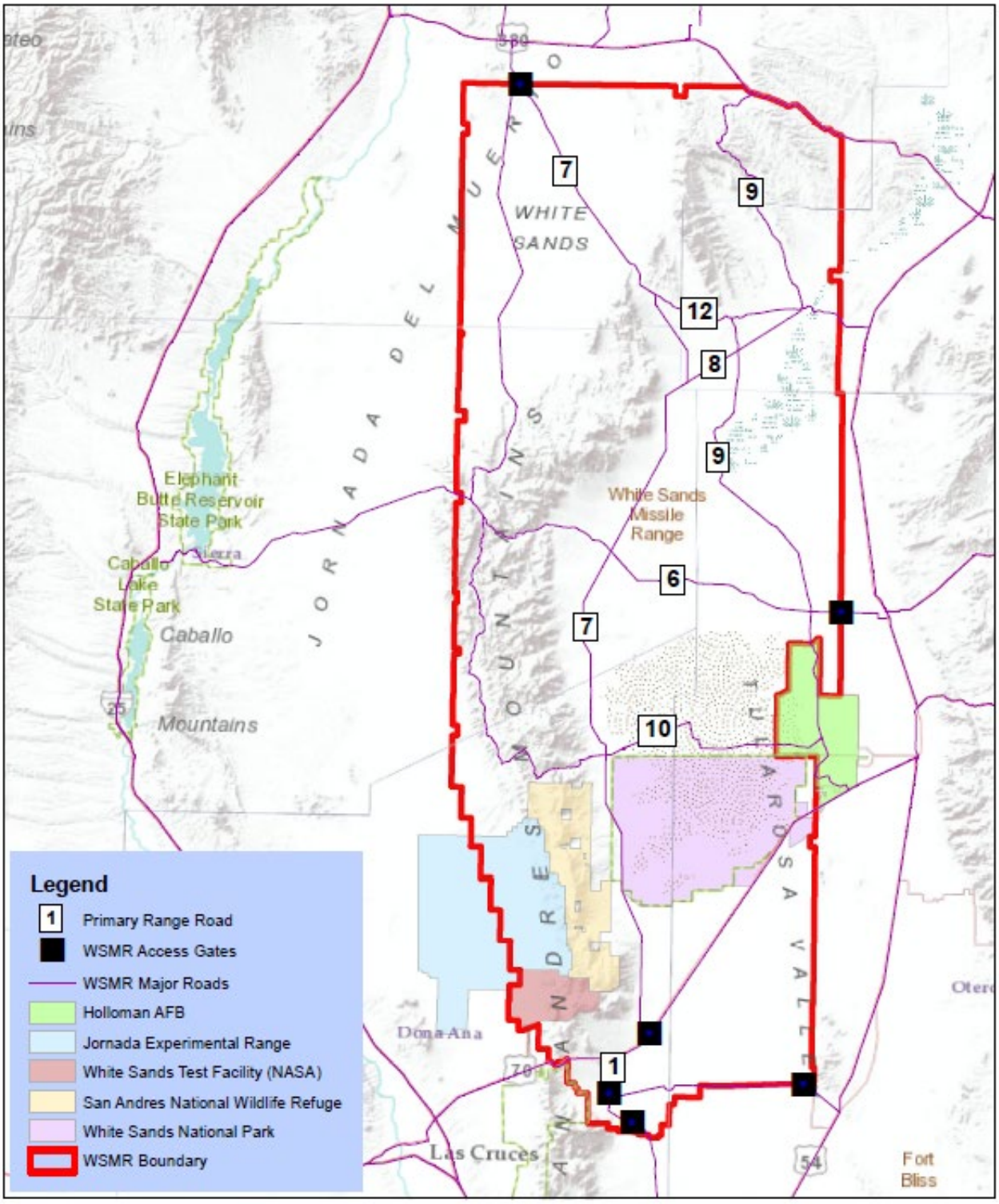

Figure 3.5-1: Roadway Network Surrounding WSMR

can be accessed from U.S. 380 and U.S. 60. Private roads branch off county and WSMR roads to provide access to other remote locations.

WSMR maintains access via a widespread network of primary and secondary range roads. Most areas within WSMR are connected via an extensive road network, with the exception of less accessible areas in the San Andres and Oscura mountains. Livestock intrusions into the WSMR create potential hazards to vehicles transiting on the roads/trails and thus WSMR operations.

3.5.2 Environmental Consequences

3.5.2.1 Alternative 1 (Preferred Alternative)

Under Alternative 1, up to 50 miles of new boundary markings would be constructed and up to 12 new gates installed. The fence and signs would notify the public of the WSMR boundary and the illegality and hazards posed by trespassing, resulting in a beneficial impact to facilities. Alternative 1 would also support WSMR's compliance with Army regulations and help prevent crimes against applicable statutes. Additionally, the boundary markings would temper WSMR's potential need to develop agreements with adjacent landowners addressing right of way access.

The new range fence and maintenance/repair of the existing fence would also inhibit livestock from entering the WSMR, resulting in a beneficial impact to WSMR operations as there would be a reduced potential for livestock to disrupt WSMR activities.

The new gates would also support continued efficient transportation and security in support of military operations. The addition of a small number of vehicles (less than five) to the roadway network during construction and maintenance activities would have no noticeable impact on area transportation routes. Therefore, implementation of Alternative 1 would result in beneficial impacts to facilities and traffic/transportation.

3.5.2.2 Alternative 2

Under Alternative 2, impacts would be the same as described for Alternative 1; however, only up to 25 miles of boundary markings and up to 8 gates would be constructed. While the area of impact would be smaller, beneficial impacts to facilities and negligible impacts to traffic/transportation would also result. Therefore, implementation of Alternative 2 would result in beneficial impacts to facilities and traffic/transportation.

3.5.2.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to existing conditions. People and livestock would continue to violate the WSMR boundary and present a hazard to operations and facilities. This impact, while a detriment to operations and facilities would continue to be managed through the application of range operation procedures and statute enforcement. Therefore, implementation of the No Action Alternative would not result in significant impacts to facilities and traffic/transportation.

4 SUMMARY OF POTENTIAL IMPACTS AND MEASURES TO AVOID, MINIMIZE, OR MITIGATE IMPACTS

This chapter summarizes the potential impacts for the resource areas analyzed in detail. For each resource area, Table 4-1 identifies applicable BMPs that WSMR would implement to avoid or minimize impacts of the Proposed Action.

BMPs are standard practices that are implemented as part of the Proposed Action to minimize or avoid adverse impacts. Mitigation measures are specific actions that would rectify or compensate for unavoidable adverse environmental effects that could be significant without mitigation. No mitigation measures have been currently identified.

The No Action Alternative would represent no change in the current operational environment of WSMR. Therefore, no impacts to the resource areas analyzed would be expected.

Table 4-1: Summary of Impacts and BMPs Under the Proposed Action

Impact Summary	BMP
Cultural Resources	
No adverse effect	• Following the WSMR environmental review process and site evaluation, use cultural resource monitors approved by the WSMR Environmental Division, as appropriate. • Any activities that would occur in areas where cultural resource surveys have not been completed or where surveys have been conducted but NHPA Section 106 consultation is not complete would be subject to site-specific cultural resource survey and/or evaluation as needed. • Following evaluation, areas containing sensitive cultural resources would be avoided through site selection during the planning process. • Construction would adhere to the WSMR inadvertent discovery policy and process specified in the INCRMP. • The projects would implement standard operating procedures and BMPs identified in the INCRMP and Programmatic Memorandum of Agreement. • Vehicles would use existing roads whenever possible and off-road travel by ATV/UTV would be limited to hauling of fence materials, construction, and maintenance of new and existing fence line, using a single path for ingress and egress to generate the least amount of disturbance possible. • WSMR will coordinate with other federal agencies whose boundaries neighbor the WSMR proposed action area, to ensure any environmental review requirements or data needs/requests are addressed (e.g., coordinate with the federal agency real property, environmental offices; coordinate staging areas, as appropriate; share survey and GIS data, as appropriate).

Soil Erosion	
No significant impact	• Avoid unnecessary disturbance of soil by limiting support vehicles to existing roads where possible. • Limit off-road travel to fence line to minimize soil disturbance. • Consider using signs as boundary markings in lieu of fencing for areas of high erosion potential.
Biological Resources	
No significant impact	• Project-specific phases would undergo an environmental review, screening and decision process to determine whether the activity falls within the scope of existing NEPA. o If needed, surveys would be conducted prior to construction to identify any natural resource restrictions (i.e., terrain considerations, special status species, nesting migratory birds, wildlife usage, etc.). o Use approved (by the WSMR Environmental Division) biological resource monitors (i.e., during breeding season, clearance surveys) to minimize impacts to natural resources as needed. • Access routes and staging: o Vehicles would use existing roads whenever possible. o Off-road travel by ATV/UTV would be limited to hauling of boundary marking and fence materials, construction, and maintenance of new and existing fence line, using a single path for ingress and egress to generate the least amount of disturbance possible. o Existing access roads would be maintained that run parallel to existing fence line. • Construction activities: o Staging limited to existing disturbed areas, roads, and pull outs. No new staging areas would be established. o Specific fence designs would be evaluated to determine suitability for wildlife movement. o Fence construction activities would be limited to the bladed disturbed areas closest to the existing fence. Construction activities for the new boundary markings would disturb no more than five feet on either side of the marking. o The least amount of vegetation would be removed to include avoidance of tree removal. o If vegetation has to be removed, it would be removed outside of the migratory bird nesting season (March through August). o If a nest were identified, a qualified biological monitor approved by WSMR Environmental Division would determine occupancy. If active, delay activities until fledging have occurred or establish a nesting buffer zone after concurrence with WSMR Environmental Division. A qualified biological monitor may be onsite during activities near a nest. o Ground burrows would be avoided, especially along the Southern portion of the boundary to minimize impacts to burrowing owls. o Vegetation that impedes construction of boundary markings and fences would be sheared off near ground-level with a brush-beater or

	with hand labor, as necessary. The soil surface and root systems would be left intact, where feasible. ○ Removed vegetation would be scattered or disposed of in a manner to prevent erosion and not be piled up. ○ All waste products (includes old fence posts, wire, signs, etc.) would be hauled out and not left on site. ○ If appropriate (e.g., where spare fuel or gas-powered hole auger would be used), follow the respective installation Spill Prevention Plan, including secondary containment (and cleanup). ○ WSMR will coordinate with other federal agencies whose boundaries neighbor the WSMR proposed action area, to ensure any environmental review requirements or data needs/requests are addressed (e.g., coordinate with the federal agency real property, environmental offices; coordinate staging areas, as appropriate; share survey and GIS data, as appropriate).
Facilities and Traffic/Transportation	
Beneficial impact	• None identified.

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6 LIST OF PREPARERS

Chloeta and Scout Environmental prepared this Programmatic EA under the direction of the U.S. Army Corps of Engineers Tulsa District and in partnership with White Sands Missile Range. The following contractor staff contributed to the preparation of this document:

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APPENDIX A – PUBLIC PARTICIPATION

This appendix provides a summary of the public participation activities associated with this EA.

The Draft EA and Draft FONSI were made available online to federal, state, and local agencies, Native American tribes, and the public for review and comment for 30 days at https://home.army.mil/wsmr/index.php/about/garrison/directorate-public-works-dpw/enivronmental. WSMR also published a Notice of Availability with the entirety of the Draft FONSI in the Alamogordo Daily News and the Las Cruces Sun-News newspapers on June 24, 2021 and June 26, 2021.

WSMR made the Draft EA available for online viewing at https://home.army.mil/wsmr/index.php/about/garrison/directorate-public-works-dpw/enivronmental and at the following libraries:

- Thomas Branigan Memorial Library, 200 E. Picacho Avenue, Las Cruces, New Mexico 88001; and
- White Sands Missile Range Post Library, Building 465, White Sands Missile Range, New Mexico 88002.

Following the 30-day review of the Draft EA and FONSI, the Army incorporated relevant substantive public comments received.

The following pages include 1. Distribution list of agencies that were e-mailed the Notice of Availability (due to COVID-19 limitations); 2. Affidavits of publication for the public notice that was published in local newspapers; and 3. Public comments.

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Abe Franklin Surface Water Quality Bureau, Watershed Protection Section **New Mexico Environment Department** P.O. Box 5469 Santa Fe, NM 87502-5469 abraham.franklin@state.nm.us	Blake Roxlau Environmental Design Section Manager Environmental Design Division **New Mexico Department of Transportation** P.O. Box 1149 Santa Fe, NM 87504 blake.roxlau@state.nm.us
Mark Watson **New Mexico Dept. of Game & Fish** P.O. Box 25112 Santa Fe, NM 87504 mark.watson@state.nm.us	Stephanie Garcia Richard Land Commissioner **The New Mexico State Land Office** P.O. Box 1148 Santa Fe NM 87504 sgarciarichard@slo.state.nm.us (505) 827-5760

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AFFIDAVITS OF PUBLICATIONS

Alamogordo Daily News

AFFIDAVIT OF PUBLICATION

Ad No.
0004768660

CHLOETA FIRE, LLC
2501 LIBERTY PKWY STE 176
MIDWEST CITY, OK 73110

I, being duly sworn, on my oath say that I am the Legal Coordinator of the **Alamogordo Daily News,** a newspaper of daily circulation, published and printed in the English language at the City of Alamogordo, Otero County, and State of New Mexico. That the Alamogordo Daily News has been regularly published and issued for more than nine months prior to the date of the first publication hereinafter mentioned.

6/24/2021, 6/26/2021

Legal Clerk

Subscribed and sworn before me this
3rd of August 2021

State of WI, County of Brown
NOTARY PUBLIC

1-7-25
My Commission Expires

KATHLEEN ALLEN
Notary Public
State of Wisconsin

Ad#: 0004768660
P O :
# of Affidavits :0.00

The White Sands Missile Range (WSMR) Garrison Directorate of Emergency Services has prepared a Programmatic Environmental Assessment (PEA) to install new boundary markings along portions of the WSMR boundary. Under the Proposed Action, WSMR would construct new range fences, signs, and gates. The Proposed Action would also include regular maintenance/repair of the new and existing range fence. Alternative 1 would construct up to 50 miles of fencing, up to 8 unmanned vehicle control gates, and 4 one-way livestock gates. Alternative 2 would include up to 25 miles of fencing, up to 4 unmanned vehicle control gates, and up to 4 one-way livestock gates. The PEA also analyzes the No Action Alternative. WSMR has identified Alternative 1 as the preferred alternative. The purpose of the Proposed Action is to clearly delineate the boundary of WSMR. The Proposed Action is needed to meet requirements and statutes pertaining to physical security, and to protect WSMR resources. WSMR prepared a Programmatic EA because the proposed activities would occur multiple times over several years and be constructed in a similar way.

The Draft PEA assessed potential environmental impacts. Through implementation of best management practices (BMPs) there would be no significant impacts on the environment if either Alternative 1 or 2 were implemented. Example BMPs include avoidance of known sensitive cultural resources during the planning process or through a cultural resources monitor directing placement of fence posts to avoid damage to a site; unnecessary disturbance of soil by limiting support vehicles to existing roads where possible; implementation of various biological resource BMPs to include conducting site-specific surveys prior to construction to identify restrictions, using biological monitors during the breeding season, limiting vegetation removal, and removing all waste products; or limiting the types of vehicles such as all-terrain vehicles/all-terrain utility vehicles to be used in areas of limited or no access to the existing fence line.

Per 40 Code of Federal Regulations (CFR) 1506.27 and Army guidelines under 32 CFR 651, the WSMR Garrison Directorate of Emergency Services invites members of the public to comment on the Draft PEA prior to document finalization. Hardcopies of the Draft PEA are available to the public at the following information repositories: Thomas Branigan Memorial Library (Las Cruces, NM) and White Sands Missile Range Post Library (White Sands Missile Range, NM). The document is available electronically on the White Sands Garrison website, https://home.army.mil/wsmr/index.php/about/garrison/directorate-public-works-dpw/enivronmental.

Written comments concerning the Draft PEA should be directed to the White Sands Missile Range Garrison Environmental Division. The publication of this notice serves as the start of the 30-day comment period. All comments must be received no later than 30-days after the newspaper publication date to the following address, e-mail or fax:

Department of Army-
U.S. Garrison White Sands
Environmental Division
Attn: Customer Support Branch
Boundary Markings PEA Comments
BLDG 163/DPW
White Sands Missile Range, New Mexico 88002
Email: usarmy.wsmr.imcom-central.mbx.dpw-nepa-support@mail.mil
Fax: (575) 678-2048

LAS CRUCES SUN-NEWS

AFFIDAVIT OF PUBLICATION

Ad No.
0004769212

CHLOETA FIRE, LLC
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MIDWEST CITY, OK 73110

I, a legal clerk of the Las Cruces Sun-News, a newspaper published daily at the county of Dona Ana, state of New Mexico and of general paid circulation in said county; that the same is a duly qualified newspaper under the laws of the State wherein legal notices and advertisements may be published; that the printed notice attached hereto was published in the regular and entire edition of said newspaper and not in supplement thereof on the date as follows, to wit:

6/24/2021, 6/26/2021

Despondent further states this newspaper is duly qualified to publish legal notice or advertisements within the meaning of Sec. Chapter 167, Laws of 1937.

Legal Clerk

STATE OF WISCONSIN SS.
County of Brown

Subscribed and sworn before me this
8/3/2021

NOTARY PUBLIC in and for
Brown County, Wisconsin

1-7-25
My Commission Expires

Ad#: 0004769212
P O :
# of Affidavits :1.00

KATHLEEN ALLEN
Notary Public
State of Wisconsin

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Per 40 Code of Federal Regulations (CFR) 1506.27 and Army guidelines under 32 CFR 651, the WSMR Garrison Directorate of Emergency Services invites members of the public to comment on the Draft PEA prior to document finalization. Hardcopies of the Draft PEA are available to the public at the following information repositories: Thomas Branigan Memorial Library (Las Cruces, NM) and White Sands Missile Range Post Library (White Sands Missile Range, NM). The document is available electronically on the White Sands Garrison website, https://home.army.mil/wsmr/index.php/about/garrison/directorate-public-works-dpw/enivronmental.

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Department of Army-
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White Sands Missile Range, New Mexico 88002
Email: usarmy.wsmr.imcom-central.mbx.dpw-nepa-support@mail.mil
Fax: (575) 678-2048

PUBLIC/AGENCY COMMENTS

The following comments were received from Fort Bliss (personally identifiable information was removed from the comments). No other substantive public or agency comments were received.

Boundary Markings Draft PEA & FONSI June2021
Comment Matrix

Comment Number	Organization	Type [C, S, A, G]	Page	Paragraph or Table #	Comment
1	Fort Bliss	G	None		Building a contiguous fence around the property of WSMR has little to no potential of creating Hazardous waste; however, in the event that an unmarked drum or other container, spill, or unidentified substance is discovered on Fort Bliss land, remediation/removal shall be coordinated with the Fort Bliss environmental team
2	Fort Bliss	S	3-3	Table 3-1	There was discussion that petroleum products such as fuel, oil and lubricants if used will be collected and returned. However, there was no mention of spill prevention of such materials, and if spilt the impact and mitigation/clean up will need to follow the respective installtion Spill Prevention Plan. Spill prevention containments (secondary) and spill kits to collect the contaminated soil, vegetation, etc. for disposal
3	Fort Bliss	S	None	None (General comment)	Would the method to dig the holes be of importance: hand auger vs. gas powered hole auger that would generate emission and leak lubricants? Considering the distance being travel to erect the fenceline, spare fuel would be needed so the previous comment would be applicable.
4	Fort Bliss	S	3-3		There is at least one sensitive/eligible site that straddles the boundary of both our installations, I would like to know how these areas will be handled? There are also survey gaps within our boundaries that would need to be surveyed in order to proceed with this action. I would also like to see any WSMR surveys that have been conducted along their southern boundary (Ft. Bliss boundary). We are concerened with the (GIS) accuracy of our respective installation boundaries.
5	Fort Bliss	G	None	None (General comment)	WSMR will need to coordinate with Fort Bliss' Real Property Office to confirm fence boundary that will be shared.
6	Fort Bliss	G	None	None (General comment)	Any ground disturbance within the Fort Bliss Boundary will require the submittal and approval of a Work Order together with a Site Clearance and Line Marking Request (SCLMR)
7	Fort Bliss	G	None	None (General comment)	Any Boring surveys on Fort Bliss land will require the submittal of a Work Order Da 4283
8	Fort Bliss	G	None	None (General comment)	Staging or laydown areas being requested on Fort Bliss will require the approval of a Siting Action Memo from the GC. Contact MPD for details
9	Fort Bliss	G	None	None (General comment)	For any work to be performed within the Fort Bliss boundary WSMR must coordinate with the Ft Bliss NEPA Office and will require a Record of Environmental Consideration (REC).

APPENDIX B – VEGETATION COMMUNITY

Table B-1 provides vegetation community descriptions for each of the 31 vegetation types present within the action area for biological resources.

Table B-1: Vegetation Community Descriptions within the Action Area

Vegetation Community Type	Vegetation Community Descriptions
Acacia Shrubland	Acacia Shrublands are limited to central and southern San Andres Mountains, Chalk Hills, and the San Augustin Mountains and occur on foothill slopes and upper alluvial fans at mid elevations of 4,900-6,400 feet. Slopes tend to be gentle to moderately steep and face south and southwest. Soils are commonly derived from red sandstone (Permian Abo Formation) and tend to be thin, rocky, and nutrient poor.
Alluvial Flats – Barren	Open, non-vegetated alluvial fan flats within the Tularosa and northern Jornada basin that are inundated with runoff during the summer. Serve as travel corridors for wildlife and stopover points for birds.
Black Grama Lava Grasslands	The unit occurs in the northern Jornada Basin and supports desert grasslands dominated by black grama (*Bouteloua eripoda)* with a shrub layer. Soils are derived from wind-blown accumulations and tend to be deep, allowing for vegetation that is more diverse. Birds, bats, reptiles, and invertebrates utilize the habitat more extensively over other fauna.
Creosotebush Shrubland	Creosotebush Shrublands are the most widespread vegetation community on WSMR. The community extends from basin bottoms up piedmont bajadas and into the foothills. Many fauna species use the habitat except where there are large, monotypic stands, which are low in forb and grass production.
Desert Plains Grasslands	The Chihuahuan Desert grassland unit occurs on rolling sandy plains in the northern Jornada Basin with small occurrences in the Tularosa Basin. Soils are sandy and moderately deep dominated by black grama. Soaptree yucca (*Yucca elata*) is a conspicuous and indicative shrub element.
Foothill-Montane Temperate Grasslands	These grasslands are in mountain valleys and on slopes at mid-upper elevations with deep, clay loams of valley bottoms to shallow and rocky soils on steep slopes. The unit is dominated by blue grama (*Bouteloua gracilis*) in cooler sites and New Mexico needlegrass (*Achnatherum perplexum*) occupy warmer sites with moderate to high shrub, grass, and forb diversity interspersed among Pinyon Pine/Juniper Woodlands, Montane Scrub, and Interior Chaparral. Fire may be key to maintaining the diverse landscape pattern within the unit.
Fourwing Saltbush Shrubland	Fourwing Saltbush Shrubland unit is found on wet, clayey, often alkaline soils of alluvial flats and playas in the Tularosa and northern Jornada del Muerto basins. Fourwing saltbush (*Atriplex canescens*) is the dominant shrub and forms open-canopied stands with understories

Vegetation Community Type	Vegetation Community Descriptions
	that vary from very sparse to dense grasses, dominated by either alkali sacaton or mesa dropseed (on sandier soils).
Gypsum Duneland – Barren	The unit is in the heart of dunelands of the central Tularosa Basin. This globally unique system is highlighted in White Sands National Park, but it occurs primarily on WSMR. Gypsum dunes and associated interdune swales are actively shifted by wind. During summer, very hot surface temperatures prevail across this exposed environment. Water rapidly infiltrates dunes but can accumulate in interdune swales. Where winds are less intense, dunes become more stable and vegetated. Fauna use is limited due to harsh conditions but increases along the margins of this habitat.
Gypsum Duneland – Vegetated	The community is in the eastern portion of the Tularosa Basin and along margins of the dunefield. The hot, windy environment of shifting sands makes vegetation establishment difficult, yet shrubs, such as hoary rosemary mint (*Poliomintha incana*) and broom dalea (*Psorothamnus scoparius)* can become established, as can various sand-tolerant grass species. These vegetated dunelands are found in close association with grasslands that occur in interdune swales. As wind increases in the western portion of the dunefield, vegetation declines, leading to barren dunelands. The leeward side of the dunefield gives way to basin bottom grasslands and shrublands.
Gypsum Interdune Swale Grasslands	The community is found in the gypsum dunefield of the central Tularosa Basin. Grassy vegetation, when stabilized, develops in swales and is dominated by gypsophilous species, such as gypsum grama (*Bouteloua breviseta*), New Mexico bluestem (*Schizachyrium neomexicanum*), and sandhill muhly (*Muhlenbergia pungens*); scattered shrubs also occur, such as James's seaheath (*Frankenia jamesii*) hairy coldenia (*Tiquilia hispidissima*). The dune-swale complex contains a moderate degree of structural diversity and unique plant species richness, which add to the potential for faunal habitat.
Interior Chaparral	The unit is found on warmer slopes at lower elevations (4,600-7,200 feet). It is dominated by scrub live oak (*Quercus turbinella*) communities. Scrub live oak is a drought- and fire-tolerant species that may also be associated with fire among Pinyon Pine Woodlands and juniper savannas. At lower elevations, chaparral often grades into foothill grasslands.
Juniper Woodland	Juniper Woodlands are widespread in the Oscura and San Andres mountains and in the Chupadera Mesa area. They occur in foothills and lower slopes at elevations of 4,800-7,500 feet. They typically lie between Pinyon Pine Woodlands at higher elevations and foothill grasslands below, and they are often considered an ecotonal type between dense woodlands and true grasslands (Dick-Peddie, 1993). The topographic diversity offers many forage and cover opportunities for fauna.

Vegetation Community Type	Vegetation Community Descriptions
Lowland Basin Grasslands	Lowland Basin Grasslands are widespread in bottoms of Tularosa and Jornada basins occurring on heavy clay soils of alluvial flats, swales, and drainages between alluvial fans. These are the lowest-elevation grasslands on WSMR, occurring at 3,800-5,800 feet. Climate conditions are generally arid, and precipitation is low, though during the summer rainy season, runoff from storms can inundate these poorly drained lowlands for days to several weeks.
Malpais Lava Scrub	Malpais Lava Scrub unit is a heterogeneous shrubland found on the Carrizozo lava flow in the northern Tularosa Basin. It is a mixture of Chihuahuan Desert scrub species, including creosotebush (*Larrea tridentata*), acacia (*Acacia neomexicana*), catclaw mimosa (*Mimosa aculeaticarpa* var. *biuncifera*), tarbush (*Flourensia cernua*), fourwing saltbush, and honey mesquite (*Prosopis glandulosa*), as well as a wide variety of grasses and dwarf shrubs. The lava surface is rough, and soil development is minimal; vegetation establishes on material blown into lava crevices. Large mammal usage is limited.
Mesquite Shrubland	Mesquite Shrubland unit occurs primarily on expansive dunefields of the Tularosa and southern Jornada del Muerto basins. Honey mesquite stems trap blowing sand (blow sand) to form and occupy coppice dunes. Other vegetation is sparse or absent, with exception of broom snakeweed (*Gutierrezia sarothrae*), fourwing saltbush, and mesa dropseed (*Sporobolus flexuosus*). Large monotypic stands have little structural diversity and low herbaceous productivity and production resulting in less faunal use.
Military Disturbance	This unit represents military development including Weapons Impact Targets, airstrips, range camps, the Main Post, and other extensive development.
Mimosa Shrubland	The Shrublands have abundant grass cover dominated by black, blue, and hairy gramas (*Bouteloua hirsute*). Catclaw mimosa forms open, sprawling canopies. Mimosa Shrublands are often considered desert grasslands rather than shrubland because of the very open canopy and grassy understory. They occur on alluvial fans, primarily in the southern San Andres Mountains and Organ Mountains. They are bounded by warmer grasslands and shrublands below and montane grasslands and shrublands above.
Mixed Foothill-Piedmont Desert Grasslands	The community occurs on mountain slopes, foothills, and upper alluvial fan piedmonts at mid to lower elevations (typically 4,000-6,500 feet) within the Chupadera Mesa, the Chalk Hills, and in Oscura, San Andres, San Augustin, and Big Gyp mountains. Slopes are moderate to very steep, and soils are usually thin and moderately to very rocky. Overall grass and forb diversity can be exceptional but there is great variability between stands. These mid- to low-elevation grasslands provide excellent habitat for fauna that are less heat tolerant and are highly associated with herbaceous species.

Vegetation Community Type	Vegetation Community Descriptions
Mixed Lowland Desert Scrub	The unit occupies a large part of the lowland basin landscape as a complex mixture of creosotebush, tarbush, and fourwing saltbush shrublands. It generally occupies low-elevation alluvial flats and playa bottoms of the northern Tularosa and Jornada basins at elevations of 3,800-5,600 feet with very little slope. Soils are typically composed of fine-textured clays with little rock content and consequently, poor drainage. Within this complex are communities dominated or co-dominated by creosotebush, tarbush, or fourwing saltbush. The herbaceous layer ranges from very sparse to dense grasses. There is very limited structural and plant species diversity; consequently, overall faunal diversity is low.
Montane Scrub	Montane Scrub occurs in mid to upper elevations (5,000- 8,700 feet). It is dominated by deciduous mountain mahogany (Cercocarpus spp.) and Gambel's oak (*Quercus gambelii*). Gambel's oak communities occur at the highest elevations of the northern mountains (8,300-8,700 feet), either in deeply shaded canyons or on unstable scree slopes. Mountain mahogany communities are intermixed among pinyon pine and juniper woodlands and may be associated with a history of fires.
Montane Valley Dune Woodland	These woodlands are a limited but unique vegetation community in inner valleys of the southern San Andres Mountains. Apart from their sandy substrate, these woodlands have similar ecological characteristics and management options as Juniper Woodlands.
Pickleweed Shrubland	The Shrublands occur in the Tularosa Basin bottom in the Lake Lucero-Gypsum Duneland area and along Salt Creek, at elevations of 3,800-4,150 feet on alkaline soils and along saline seeps. Due to soils in high salt content, the unit has low structural and species diversity, which limits use by fauna.
Piedmont Desert Grasslands	Piedmont Desert Grasslands occupy alluvial fans adjacent to the Mockingbird, San Augustin, San Andres, Big Gyp, and Oscura mountains at elevations of 4,500-6,500 feet. Sites are typically cool to moderately warm and have gentle slopes with well-developed soils. Black grama is usually abundant and co-dominant with stands of blue and hairy grama. Yuccas and jointfir are conspicuous shrub elements, indicative of Chihuahuan Desert grassland affinities of these grasslands.
Piedmont Temperate Grasslands	Piedmont Temperate Grasslands occur in valley bottoms and on alluvial fans in the interior of the San Andres Mountains at elevations of 4,500-6,500 feet. They are found in areas with temperatures ranging from cool to moderate. Grass cover, dominated by black, blue, and hairy grama grasses, is moderate to luxuriant. Shrubs are typically scattered and can include soaptree yucca or winterfat (*Krascheninnikovia lanata*). Forb diversity is moderate to high. Adjacent habitats include a variety of montane types, such as juniper savannas; shrublands of live oak, acacia, and mountain mahogany; and grasslands, such as grama and needlegrass.

Vegetation Community Type	Vegetation Community Descriptions
Pinyon Pine Woodland	The community occurs throughout WSMR mountain areas at mid to high elevations (5,800-8,500 feet) where annual precipitation can exceed 18 inches. Sites are relatively cool to moderate in temperature, and topography typically ranges from gently dipping mountain slopes to deep canyons and mountain escarpments. Fire plays a role in shaping the structure and composition of the unit.
Playa	Lowland playas are found in the Tularosa and northern Jornada basins. These sites are inundated with runoff from surrounding uplands during heavy summer rains. Soils are poorly drained clays and are often very alkaline within the Tularosa and northern Jornada basin that are inundated with runoff during the summer. Serve as travel corridors for wildlife and stopover points for birds.
Road Disturbance	Network of paved and unpaved access throughout the installation.
Sandsage Shrubland	These shrublands occur on rolling sandy plains and lower alluvial fan piedmonts of the northern Jornada Basin on sandy to silty loam soils that often form dunes. They occur in a mosaic with desert grasslands and combined provide moderate forage and structural diversity for fauna especially pronghorn and oryx which are common visitors.
Tamarisk Shrubland	Tamarisk Shrublands occur over a very limited area of the Tularosa Basin bottom. Stands are found along Salt Creek, in the Lake Lucero area, and on alkaline flats at edges of playas. Strongly alkaline soils and arid conditions result in a harsh environment that limits biodiversity.
Tarbush Shrubland	The unit occurs at elevations of 3,800-6,700 feet on alluvial flats, in isolated swales and drainages on piedmont bajadas, and occasionally on rocky slopes. Tarbush cannot establish except in bare soil patches created by grazing or drought (Montana *et al*. 1995).
Vegetated Gypsum Outcrop	Vegetated Gypsum Outcrops (95,000 acres) are a unique and extensive habitat on basin floors that extends into foothills at elevations of 3,800-6,100 feet. These outcrops are most commonly low-lying mounds with crusty, hard surfaces that support a unique, site-specific flora dominated by gypsophilous species. These outcrops are found in a mosaic with Mixed Lowland Desert Scrub, Lowland Basin Grasslands, and occasionally Mixed Foothill–Piedmont Desert Grasslands. Although habitat conditions are harsh, there is potential habitat for fauna tolerant of or adapted to gypsum environments. The dune-swale complex contains a moderate degree of structural diversity and unique plant species richness, which add to the potential for faunal habitat.

Source: Descriptions excerpted from the WSMR INCRMP, Appendix 3.8 (WSMR, 2015), Montana *et. al*., 1995, and Dick-Peddie, 1993.

APPENDIX C – PROTECTED SPECIES

Table C-1 lists protected species, including transient individuals that occur or have the potential to occur within the action area for biological resources. Potential occurrence was determined based on past documentation of each species within WSMR and on suitability of habitat and occurrence within the action area. Species are listed in order of status. Table C-2 lists WSMR species of interest (SOI) with a potential to occur in the action area.

Table C-1: Protected Species Potentially Occurring at WSMR and within the Action Area

Species	Status Federal[1]	Status State[2]	Installation Presence[3, 4]	Potential to Occur[3, 4]
Plants				
Sacramento Prickly Poppy *(Argemone pleiacantha ssp. Pinnatisecta)*	**E**	**E**	No; does not occur on WSMR	No
Sneed Pincushion Cactus *(Coryphantha sneedii* var. *sneedii)*	**E**	**E**	No; does not occur on WSMR	No
Todsen's Pennyroyal *(Hedeoma Todsenii)*	**E**	**E**	Yes; San Andres Mountains	Yes; occurs along western boundary
Kuenzler Hedgehog Cactus (*Echinocereus fendleri* var. *kuenzleri)*	**T**	**E**	No; does not occur on WSMR	No
Pecos (=puzzle, =paradox) Sunflower (*Helianthus paradoxus)*	**T**	**E**	No; does not occur on WSMR	No
Sacramento Mountains Thistle *(Cirsium vinaceum)*	**T**	**E**	No; does not occur on WSMR	No
Mescalero milkwort (*Polygala rimulicola* var. *mescalerorum)*	**-**	**E**	Yes; Two isolated populations on north face of Black Mountain	No; Proposed Action and existing fence avoid populations
Night-blooming cereus *(Peniocereus greggii* var. *greggi)*	**-**	**E**	Yes; San Andres Mountains, south of Sulfur Canyon	No; Proposed Action and existing fence avoid populations
Organ Mountains pincushion cactus *(Escobaria organensis)*	**-**	**E**	No; does not occur on WSMR	No

Species	Status Federal[1]	Status State[2]	Installation Presence[3, 4]	Potential to Occur[3, 4]
Invertebrates				
Alamosa Springsnail (*Tryonia alamosae)*	**E**	**E**	No; does not occur on WSMR	No
Chupadera Springsnail *(Pyrgulopsis chupaderae)*	**E**	**E**	No; does not occur on WSMR	No
Socorro Isopod *(Thermosphaeroma thermophilum*)	**E**	**E**	No; does not occur on WSMR	No
Socorro Springsnail *(Pyrgulopsis neomexicana)*	**E**	**E**	No; does not occur on WSMR	No
Herpetofauna				
Narrow-headed Gartersnake *(Thamnophis rufipunctatu)*	**-**	**T**	No; does not occur on WSMR	No
Avifauna				
Least Tern (Interior population) *(Sterna antillarum athalassos)*	**E**	**E**	Transient	No; lack of breeding habitat
Northern Aplomado Falcon *(Falco femaralis septentrionalis)*	**E-EXPN**	**E**	Savannas and grasslands, northwest portion of WSMR	Possible; along northwest boundary portion of WSMR
Southwestern Willow Flycatcher *(Empidonax trailii extimus)*	**E**	**E**	One individual observed; potentially on migration; riparian obligate	No, riparian areas not in affected environment
Mexican Spotted Owl *(Strix occidentalis lucida)*	**T**	**-**	No; species or critical habitat does not occur on WSMR	No
Piping Plover *(Charadrius melodus)*	**T**	**T**	Rare migrant	No; lack of breeding habitat
Yellow-billed Cuckoo *(Coccyzus americanus)*	**T**	**-**	Limited desert riparian woodland areas consisting of willow, cottonwood, and dense mesquite.	Foraging habitat; no nesting habitat in affected environment
Brown Pelican *(Pelecanus occidentalis)*	**-**	**E**	Migrant; stopover	No; lack of breeding habitat

Species	Status Federal[1]	Status State[2]	Installation Presence[3, 4]	Potential to Occur[3, 4]
Bairds Sparrow *(Centronyx bairdii)*	-	**T**	Grassland, Jornada Plain	Migrant, stopover
Bald Eagle *(Haliaeetus leucocephalus)*	-	**T**	Rarely observed in winter	No
Bell's Vireo *(Vireo bellii)*	-	**T**	Early successional riparian thickets; San Andres Mountains; possible Tularosa Basin	No; lack of breeding habitat
Broad-billed hummingbird (*Cyanthus latirostris)*	-	**T**	Higher desert canyons and washes, riparian woodlands and foothill woodlands (3,000 to 5,000 feet).	Possible
Common Black Hawk *(Buteogallus anthracinus)*	-	**T**	Yes; summer and breeding habitat at White Sands National Park	No; lack of breeding habitat within affected environment
Costa's hummingbird (*Calypte costae bourcier)*	-	**T**	Nesting habitat in shrublands within dry washes and canyons with southern exposure.	Foraging habitat; no nesting habitat in affected environment
Gray Vireo *(Vireo vicinior)*	-	**T**	Juniper and foothill Woodlands	Yes; San Andres Mountains along western boundary (Johnson *et al.* 2012)
Neotropic Cormorant *(Phalacrocorax basilianus)*	-	**T**	Migrant; stopover	No; lack of breeding habitat
Peregrine Falcon *(Falco Peregrinus)*	-	**T**	Suspected breeding in Oscura and San Andres Mountains	Foraging habitat; no nesting habitat in affected environment
Varied Bunting *(Passerina versicolor)*	-	**T**	Dense thorny scrub in canyons, San Andres Mountains	No; lack of breeding habitat
Violet Crowned Hummingbird *(Amazila violiceps)*	-	**T**	No; does not occur on WSMR	No
Pinyon Jay (*Gymnorhinus cyanocephalus*)	-	**SGCN**	Relatively common in juniper and pinyon/juniper habitats	Yes; pinyon/juniper woodlands
Western Burrowing Owl *(Athene cunicularia hypugaea)*		**SGCN**	Grassland; breeding habitat	Yes; southern boundary

Species	Status Federal[1]	Status State[2]	Installation Presence[3, 4]	Potential to Occur[3, 4]
Mammals				
Mexican Wolf *(Canis lupus baileyi)*	**E-EXPN**	**E**	Possible	Possible but unlikely
New Mexico Meadow Jumping Mouse *(Zapus hudsonius luteus)*	**E**	**E**	No; does not occur on WSMR	No
Organ Mountain Colorado chipmunk (*Neotamias quadrivittatus australis)*	**-**	**T**	Texas Canyon, Organ Mountains (4,219 to 7,464 feet).	No; Proposed Action and existing fence avoid habitat
Oscura Mountains Colorado Chipmunk *(Neotamis quadrivittatus oscuraensis)*	**-**	**T**	Oscura Mountains pinyon-juniper associations	No; Proposed Action and existing fence avoid habitat
Spotted bat *(Euderma maculatum)*	**-**	**T**	Foraging habitat extends from Chihuahuan Desert to tree line; roost in small cracks in cliffs and stony outcrops	Foraging habitat; no roosting habitat in affected environment

Acronym definitions: E = Endangered, T = Threatened, EXPN = Experimental population, Non-essential, SGCN = Species of Greatest Conservation Need.
1 Federal status derived from USFWS IPaC (2020).
2 State status derived from NMRPTC (1999).
3 Plant species occurrence derived from Natural Heritage New Mexico (NHNM, 2021).
4 Wildlife species habitat and potential for occurrence derived from IPaC (2020), New Mexico Department of Game & Fish (NMDGF, 2021), Biota Information System of New Mexico (BISON-M, 2021), and INCRMP (WSMR, 2015).

Table C-2: White Sands Missile Range Species of Interest

Species	Installation Presence	Potential to Occur
Bigelow tansyaster, (*Dieteria bigelovii)*	Shaded areas of pinyon-juniper woodlands; Oscura Mountains	No
Bigtooth maple, (*Acer grandidentatum)*	Steep north facing mountain slopes; San Augustine Peak and Little San Nicolas Canyon	No
Button cactus, (*Epithelantha micromeris)*	Limestone cracks; Big Gyp Hills and San Andres	Possible
Candelilla or Wax plant, (*Euphorbia antisyphyllitica)*	East facing slope; Bennett Mountain	No
Chihuahuan fishhook cactus, (*Glandulicactus uncinatus* var. *wrightii*)	More common on west and south facing slopes; Southern San Andres and San Augustine mountains	No
Claret cup cactus, (*Echinocereus triglochidiatus* var. *triglochidiatus)*	Lower bajadas and plains and interconnected gaps; Tularosa and Trinity basins, Oscura and Mockingbird gaps	Yes
Club cholla, (*Grusonia clavate)*	Desert scrub on gypsum substrate; Jornada del Muerto Basin and Northern Tularosa Basin	Yes
Cooper zephyr lilly, (*Zephyranthes longiflora)*	East facing bajadas; Organ and San Andres Mountains	No
Desert rose, (*Rosa stellate* var. *mirifica)*	Higher elevations; San Andres and Oscura mountains	Yes
Desert serviceberry, (*Amelanchier utahensis*)	Riparian; Ropes Spring, west of San Andres Peak	No
Dotted gayfeather, (*Liatris punctata)*	One site on a knoll overlooking Pronghron Valley	No
Fendler's rockcress, (*arabis fendleri)*	Limestone substrate in riparian zones in the mouth of the canyon; Mid-San Andres Mountains	No
Littleleaf ayenia, (*Ayenia microphylla)*	Desert scrub on east facing slopes; Lost Man Canyon drainage of the mid-San Andres Mountains	No
Gyp daisy, (*Xanthisma gypsophlium)*	Deep shade in narrow canyons; Eastern Oscura Mountains	No
Gypsum blazing star, (*Mentzelia perennis)*	Gypsum substrate; San Andres Mountains	No

Species	Installation Presence	Potential to Occur
Gypsumwort, (*Pseudoclappia arenaria)*	Gypsum soils and along edges of alkali flats; Mound and Malpias Springs	No
Hot Springs globemallow, (*Sphaeralcea polychrome)*	Sandy substrate; Northern Stallion area and Northern Tularosa Basin	Possible
Long-flowered amsonia, *Amsonia (longiflora)*	Limestone substrate; San Andres Mountains and Chupadera Mesa	Possible
Longstem flame flower, (*Phemeranthus longpipes)*	Limestone bedrock; Oscura, Little Burro, and Mockingbird mountains	No
Mustardwort, (*Thelypodiopsis purpusii)*	Shade of pinyon-juniper, large boulders, and north facing cliffs; San Andres NWR	No
New Mexico agave, (*Agave parryi var. neomexicana)*	Upper bajadas; San Andres Mountains and less so in the Organ Mountains	No
New Mexico hedgehog cactus, (*Echinocereus coccineus)*	Alluvial fans and rocky outcrops; San Andres and San Augustine mountains	Yes
New Mexico scorpionweed, (*Phacelia neomexicana)*	Gypsic substrate; Tularosa Basin	Yes
Pancake prickly pear, (*Opuntia chlorotica)*	Granite hills; Antelope Hill	No
Payson's hiddenflower, (*Cryptantha paysonii)*	Limestone substrate; Oscura Mountains, Red Rio Bombing Range, and Chupadera Mesa	Possible
Pineapple cactus, (*Coryphantha sulcata)*	Rocky exposed mid to upper bajadas; San Augustine to the Oscura Mountains	Possible
Tall prairie gentian, (*Eustoma exaltatum)*	Gypsic wetlands; Mound Springs, Malpias Spring, and Tularosa Creek drainage	No
Threadleaf horsebrush, (*Tetradymia filifolius)*	Mountainous terrain; Northern San Andres Mountains and Oscura Mountains	Yes
Threadleaf Indian parsley, (A*letes filifolius)*	Canyons and open slopes, pinyon-juniper level; Salinas Peak	No
Trans-Pecos sea lavender, (*Limonium limbatum)*	Gypsic wetlands	No

Species	Installation Presence	Potential to Occur
Sand bluestar, (*Amsonia tomentosa var. stenophylla*)	Quartzite sandy areas; North of Orogrande Range Camp and along Range Road 7 between Connie and Rad	No
Scarlet hedgenettle, *(Stachys coccinea)*	Montane scrub; Texas and Ash Canyons in the Organ Mountains	No
Scheer's pincushion cactus, (*Coryphantha robustispina)*	Low to mid bajadas; Southern San Andres Mountains, Mineral and Antelope hills, Little Goat Mountain, and Organ Mountains	Possible
Shrubby honeysweet, (*Tidestromia suffrutescens)*	Only on a south facing hillside; San Nicolas Spring	No
Spoonleaf rabbitbrush, (*Lorandersonia spathulate)*	Montane grasslands; San Andres and Oscura mountains	No
Southwestern barrel cactus, (*Ferocactus wislizeni)*	Bajadas; Organ, San Andres, San Augustine, and Mineral mountains; and Parker and Antelope hills	Possible
Torrey yucca, (*Yucca treculeana)*	12 populations; Southern San Andres Mountains and Eastern bajadas of the Organ Mountains	No
Wright spiderwort, (*Tradescantia wrightii)*	Grassland or riparian areas; Oscura and San Andres mountains	Yes
Yellow columbine, (*Aquilegia chrysantha)*	Obligate of wetlands, seeps, and springs; Southern San Andres Mountains	No

SOI potential occurrence derived from the INCRMP (Table 3.8.4b) (WSMR, 2015).