

FINAL
ENVIRONMENTAL ASSESSMENT
for the
GRANITE TARGET SITE
WHITE SANDS MISSILE RANGE, NEW MEXICO



Prepared for:
Defense Threat Reduction Agency
U.S. Strategic Command Center for Combating Weapons of Mass
Destruction
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List of Acronyms and Abbreviations

BMPs	Best Management Practices
CTBT	Comprehensive Nuclear Test Ban Treaty
DoD	Department of Defense
DTRA/SCC-WMD	Defense Threat Reduction Agency and U.S. Strategic Command Center for Combating Weapons of Mass Destruction
EA	Environmental Assessment
EIS	Environmental Impact Statement
HE	High Explosive
ICRMP	Integrated Cultural Resource Management Plan
INRMP	Integrated Natural Resource Management Plan
LUASP	Land Use and Airspace Strategy Plan
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMED	New Mexico Environment Department
NMNHP	New Mexico Natural Heritage Program
NMSHPO	New Mexico State Historic Preservation Office
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service, U.S. Department of Agriculture
OSHA	Occupational Safety and Health Administration
PEIS	Programmatic Environmental Impact Statement
POL	Petroleum, oils and lubricants
PPE	Personal protection equipment
SHIST	Seismic Hardrock In Situ Test Site
T&E	Threatened and Endangered species
USACE	U.S. Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UXO	Unexploded ordnance
WMD	Weapons of Mass Destruction
WS-ES	White Sands Missile Range Environmental Stewardship Division
WSMR	White Sands Missile Range

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1. PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1. Introduction

This Environmental Assessment (EA) addresses the potential environmental effects of a proposed new test site at White Sands Missile Range (WSMR). The agency proposing the new test site is the Defense Threat Reduction Agency and U.S. Strategic Command Center for Combating Weapons of Mass Destruction (DTRA/SCC-WMD). Hard granite rock is required to carry out certain testing programs, and existing test sites are running out of suitable granite. The proposed site represents the best available combination of location, geology and access, and would allow continued testing at WSMR.

The Defense Threat Reduction Agency (DTRA) was established in 1998 to assist in safeguarding the United States and its allies from weapons of mass destruction (WMD). DTRA and its predecessor agencies, the Defense Nuclear Agency and the Defense Special Weapons Agency, have operated and maintained testing sites and related infrastructure at WSMR since 1976. DTRA/SCC-WMD maintains a number of test beds and target types at White Sands Missile Range (WSMR), New Mexico, to support Department of Defense (DoD), Federal agencies, and friendly nations' programs to counter proliferation of WMD. DTRA/SCC-WMD facilities are considered to be specialized areas within WSMR and the proposed action would establish a new specialized area.

As part of its mission, DTRA/SCC-WMD evaluates the ability to counter and defeat WMD. The agency maintains a broad spectrum of target types on its test beds (including generic WMD underground and aboveground structures) and directs the development and implementation of new weapons technologies against these targets. DTRA/SCC-WMD conducts tests to evaluate warhead penetration through bedrock against mock enemy target structures. For example, Hard Target Defeat testing analyzes the means to penetrate and destroy targets located in adits or tunnels in rock.

Two important test beds that DTRA/SCC-WMD operates at WSMR are the Seismic Hardrock In Situ Test Site (SHIST) and Alt SHIST sites. These sites have been heavily used since their establishment in 1993 and 1995. There was a small addition made to the SHIST site, but that area has been heavily used since 2007. The granite bedrock at these sites has been fractured and damaged by extensive testing. There are no existing granite areas adjacent to those sites where similar testing can be performed. A replacement site with similar rock is required for continued test operations through the next 20 years.

This draft Environmental Assessment (EA) addresses the environmental effects of establishing a new target site for hard rock penetration, static high explosive, and Advanced Weapon Systems testing and evaluation. The proposed new target is known as the Granite site. The Granite target site would replace the existing SHIST site, where there is no longer a large enough area of intact bedrock to support these types of testing and evaluation activities.

1.2. Purpose and Need of the Proposed Action

The purpose of the proposed action is to continue to provide adequate testing and evaluation areas to evaluate the effectiveness of weapon systems used against simulated enemy military

assets, including hardened and reinforced structures. These enemy military assets can produce, store or control WMD and pose a significant threat to international stability. Continued testing and evaluation is needed to support DoD, Federal agencies, and friendly nations' programs to counter proliferation of WMD. Counter WMD systems tests and counter WMD technology evaluations against simulated enemy ground targets, such as is done at the existing SHIST and Alt SHIST sites, requires a hard rock test site of at least 50 acres of granite that is relatively flat (with slope less than 15 degrees).

1.3. Tiering

Tiering refers to the coverage of general matters in broader environmental impact statements (EIS) (such as a programmatic EIS) with subsequent narrower environmental analyses (such as a site-specific assessment) concentrating solely on the issues specific to the statement subsequently prepared. [40 CFR §1508.28]

This draft Environmental Assessment (EA) is tiered to the Programmatic Environmental Impact Statement (PEIS) for DTRA activities on White Sands Missile Range, New Mexico (DTRA, 2007), referred to in this document as "the PEIS." The PEIS addressed impacts from all types of tests conducted by DTRA at numerous sites in WSMR, and the information and analyses contained therein are incorporated by reference. This draft EA provides **site-specific analysis** of the Expansion of DTRA/SCC-WMD Test Beds action discussed in Section 2.1.8 of the PEIS, in which the potential requirement for additional granite test beds to support future DTRA/SCC-WMD activities on WSMR was recognized.

1.4. Related Environmental Documentation

In addition to the PEIS mentioned above, previous environmental documentation for DTRA/SCC-WMD test sites includes the following National Environmental Policy Act (NEPA) documents:

- The "Environmental Assessment for the Seismic Hardrock In Situ Test (SHIST)" (Defense Nuclear Agency, 1993) established SHIST as a test site for conducting high explosive tests simulating an underground nuclear blast.
- The "Environmental Assessment for the Missile Technology Demonstration Program" (Defense Nuclear Agency, 1995) addressed the environmental effects associated with the Alt SHIST site. . Missile impacts at Alt SHIST began in 1995.
- The "Dipole Samson Environmental Assessment" (Field Command, Defense Special Weapons Agency, 1997) analyzed and approved air-delivered inert warheads and air gun tests at Alt SHIST.
- The "Programmatic Environmental Assessment for the Permanent High Explosive Test Site and Bedrock Penetration Test Sites, White Sands Missile Range, New Mexico" (U.S. Army, 2002) included testing at SHIST and Alt SHIST. Section 2.1.2 of this document addresses current testing as well as predicted future testing.

- The “Final Environmental Impact Statement for Development and Implementation of Range-Wide Mission and Major Capabilities at White Sands Missile Range, New Mexico”, hereafter referred to as the “WSMR EIS” (WSMR, 2009) provides Range-wide information including land use and analysis of current environmental conditions.

Additionally, the White Sands Missile Range Integrated Natural Resource Management Plan (INRMP) completed by the New Mexico Natural Heritage Program (NMNHP) and WSMR in 2001, contains extensive documentation of existing environmental conditions and management objectives.

1.5. Regulatory Compliance

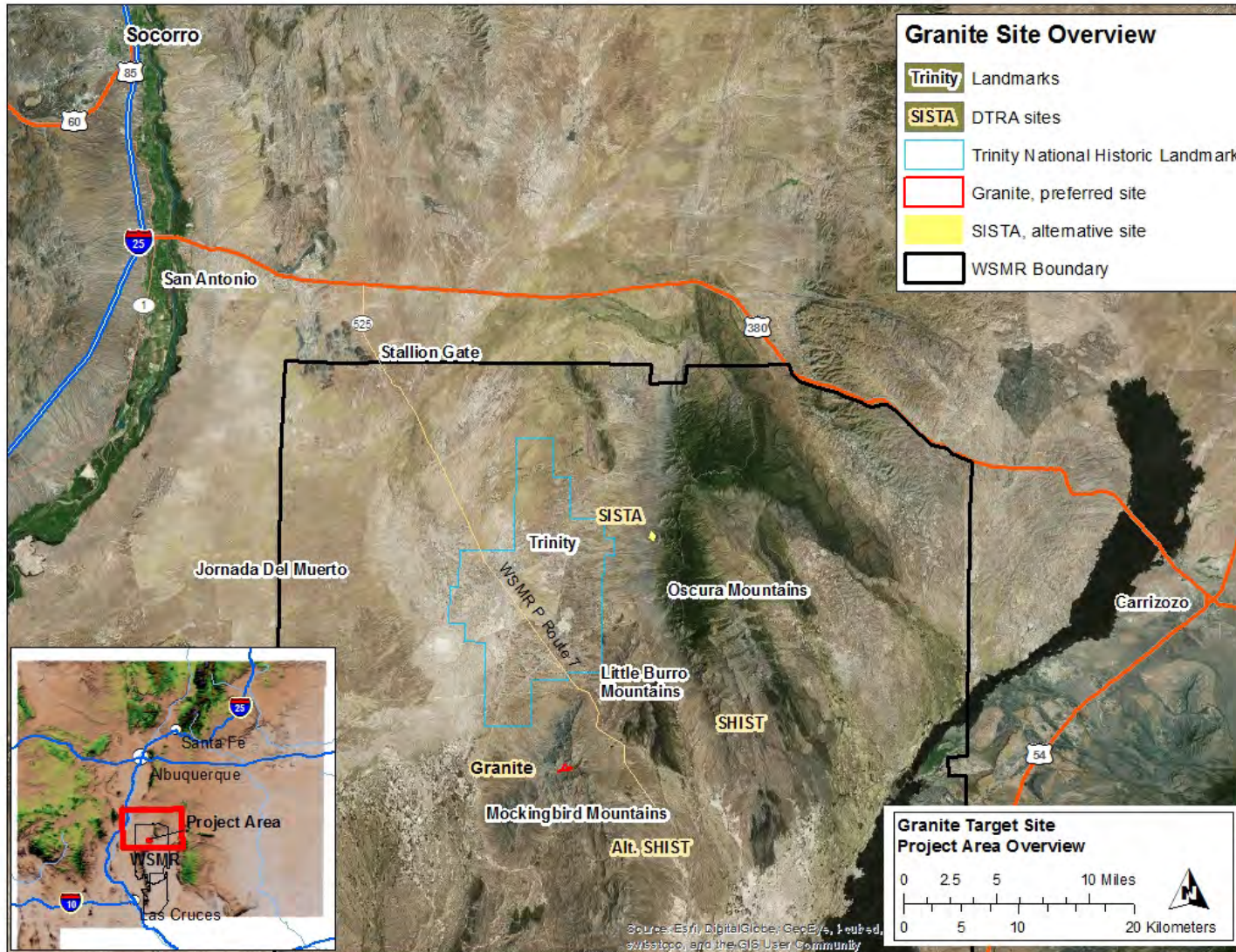
This Environmental Assessment was prepared by the U.S. Army Corps of Engineers (USACE), Albuquerque District, in compliance with all applicable Federal statutes, regulations, and Executive orders, as amended, including the following:

- Environmental Analysis of Army Actions (32 CFR Part 651)
- CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Part 1500 *et seq.*)
- Archaeological Resources Protection Act (16 U.S.C. 4701 *et seq.*)
- Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*)
- Clean Air Act (42 U.S.C. 7401 *et seq.*)
- Clean Water Act (33 U.S.C. 1251 *et seq.*)
- Endangered Species Act (16 U.S.C. 1531 *et seq.*)
- Energy Independence and Security Act of 2007, P.L. 110-140, Section 438
- Federal Noxious Weed Act (7 U.S.C. 2814)
- Fish and Wildlife Coordination Act, 48 Stat. 401; 16 USC 661 *et seq.*
- Migratory Bird Treaty Act, 16 U.S.C. 703, *et seq.*
- National Environmental Policy Act (42 U.S.C. 4321 *et seq.*)
- National Historic Preservation Act, as amended (54 U.S.C. § 300101 *et seq.*)
- Native American Graves Protection and Repatriation Act (25 U.S.C. 3001 *et seq.*)
- Occupational Safety and Health Act (29 USC 651 *et seq.*)
- Pollution Prevention Act (42 U.S.C. 13101 *et seq.*)
- Resource Conservation and Recovery Act (42 U.S.C. 6901 *et seq.*)
- Solid Waste Disposal Act (42 U.S.C. 82)
- Executive Order 11593, Protection and Enhancement of the Cultural Environment
- Executive Order 11988, Floodplain Management
- Executive Order 11990, Protection of Wetlands
- Executive Order 12088, Federal Compliance with Pollution Control Standards
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations

- Executive Order 13112, Invasive Species
- Executive Order 13524, Federal Leadership in Environmental, Energy, and Economic Performance

Additional regulatory requirements applicable to DTRA/SCC-WMD activities are provided in detail in the PEIS, Appendix A.

Figure 1: Overview of Granite site location and related sites



2. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1. Preferred Alternative (Proposed Action)

Under the preferred alternative, DTRA/SCC-WMD would construct a new granite test bed with associated facilities at the Granite site (Figure 1). The new test bed would consist of approximately 50 acres of relatively flat granite, similar in character to the existing SHIST and Alt SHIST test sites. The actual area that was surveyed on site visits and evaluated was 53 acres. The exact boundaries of the site would be determined through the real estate process through which DTRA/SCC-WMD would obtain use of the site. The new test site would be used for approximately 20 years, similar to the length of time that SHIST has been in use.

Selection criteria for the new test bed site include:

- It contains a sufficiently large area of relatively flat granite (slope of less than 15 degrees is required for conducting tests);
- The soil overburden layer is shallow;
- The area is remote enough to allow weapons of up to five tons to be detonated without impact to other activities; and
- The area has no known environmental hazards such as unexploded ordnance or hazardous materials on-site.
- The area has no documented occurrences of Federal or state Threatened or Endangered species or their habitats. However, golden eagles later established a nest near the site. Eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668).

Components of the new test site would include:

- There would be no permanent structures constructed at the site. Trailers would be brought on-site to provide instrumentation, communications, and generator equipment.
- A portable tower for microwave transmission would be brought onto the site. The tower is mounted on a trailer and is raised up prior to a test.
- A dirt berm might be constructed to provide protection to the portable trailers.
- Generators from existing facilities would be brought onto the site and used for power. Generators will be coordinated with WSMR Air quality personnel prior to use.
- A staging or laydown yard for heavy equipment and the trailers would be located on-site due to the remoteness of the site (Figure 2). The laydown yard would be located on a flat area approximately one acre in size and would be bladed, with appropriate erosion and dust controls, to accommodate placement of facilities. It would not be used for equipment maintenance, other than routine oil changes using a portable, self-contained unit.
- The preferred access road (shown in Figure 3) would require minor improvements, including grading and addition of road base or gravel to low spots or installation of drainage features at some arroyo crossings.

2.1.1. Description of Testing and Evaluation Sequence

DTRA/SCC-WMD conducts tests an average of four times a year with one or two of these involving multiple weapons. Tests do not occur at regular intervals because different types of

tests require different preparations. Further information on the frequency of test events is provided in Appendix C. A typical testing and evaluation event involves two to three weeks of preparation, testing and follow-up. Two or three vehicles per day may access the site, including pickups, flatbed trucks or lowboys and heavy equipment such as bulldozers, front end loaders and excavators. During final preparation and immediately after a test, 10 or more vehicles may be present to place and recover instrumentation and to document test results. The test bed is cleared of vehicles and personnel 1-3 hours before an air drop is conducted or up to an hour before a static test. For air drops, the aircraft makes a one or more dry runs over the target before the actual test. The testing sequence is as follows:

- A specific target is selected for the test. Targets vary in size and are generally smaller than 1 acre.
- On the ground surveys are done to ensure that the test-specific target is clear of potential hazards and sensitive resources such as bird nests or protected species.
- The target is cleared of vegetation by blading or grading and topsoil is removed.
- Instrumentation is installed and checked.
- Equipment and personnel are cleared from the site approximately 30 minutes to three hours before the test.
- The test is conducted.
- The weapon or debris and instrumentation is recovered.

2.1.2. Types of Testing

Not all types of testing covered under the 2007 PEIS would be used at a new site. The new proposed test bed would be used for the following types of tests:

2.1.2.1. *Hard rock penetration testing*

Rock penetration tests (“Earth penetration tests”) would involve the use of inert full-scale and scale models of penetrator warheads that are fired from specialized guns. Also included in warhead penetration tests are air-delivered and ground-launched live munitions (e.g., missiles and bombs). These tests would be used to evaluate penetration capabilities for various weapons systems into media that include overburden, soil, concrete, bedrock, or a combination of different layered materials.

2.1.2.2. *Static High Explosive Tests*

Static testing includes high explosive (HE) detonations from a source statically placed on a test bed (i.e., these tests do not include a means of delivery). The purpose of these tests would be to collect data on air blast and ground shock stress boundaries, consistent with U.S policies and international obligations.

2.1.2.3. *Advanced Weapon Systems*

Weapons using advanced technologies that are presently in various research and development stages may be tested on DTRA/SCC-WMD test beds in the future. Examples of known systems that would possibly be tested in the near future are described below. It is likely that other

presently unknown systems would be developed to complement the mission of DTRA/SCC-WMD.

- Advanced energetics testing involves adding elements to explosive mixtures to enhance the explosive power of weapons. Aluminum is the element most commonly used for this purpose. In the future, a wider variety of metals and alloys may be tested, including but not limited to magnesium, titanium, zirconium, iron, lithium, boron, nickel, copper, tungsten, and molybdenum.
- Conventional and penetrator bombs designed for timed detonation against multiple tunnels or vents may be tested.

As stated above, the rock penetration tests, static high explosive tests, and advanced weapons systems that would be tested and evaluated at Granite site were covered by and described in the DTRA 2007 PEIS. These are the only types of tests proposed to be conducted at Granite site.

Figure 2: Granite site showing laydown area

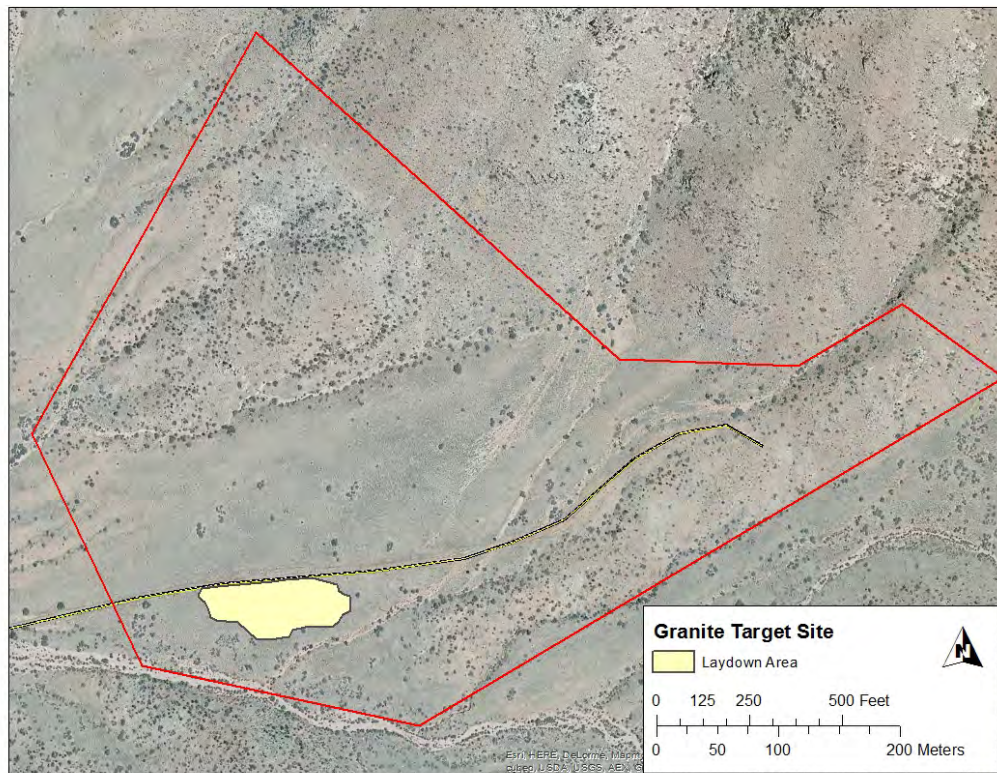
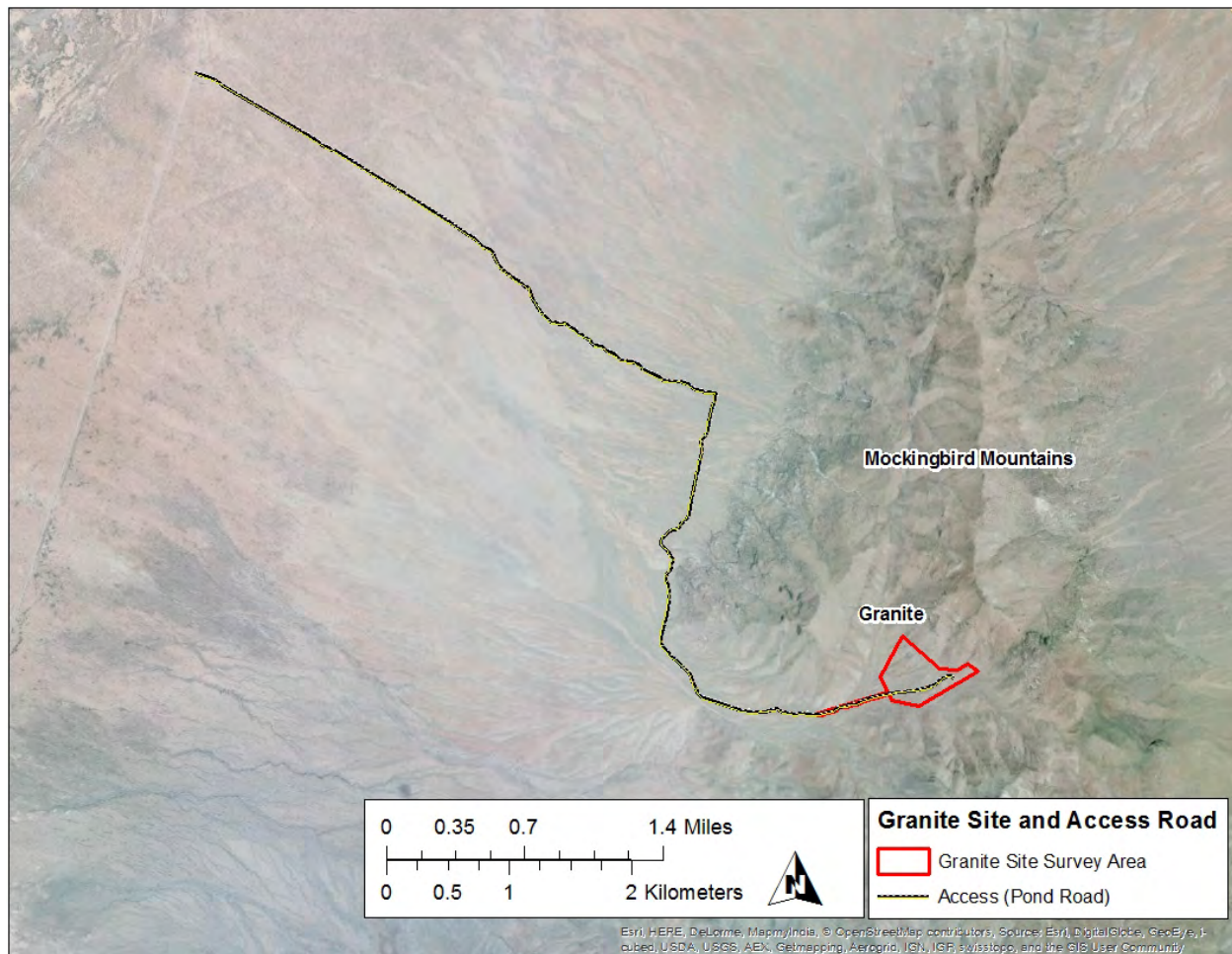


Figure 3: Granite site and preferred access road



2.2. Alternatives Considered

2.2.1. No-Action Alternative

Under the No-Action Alternative, no new test bed would be constructed. The existing SHIST and Alt SHIST sites would continue to be used to conduct limited testing that is possible on granite that is no longer intact. Tests that require undamaged granite would be conducted with progressively more difficulty and environmental impact because excavation and removal of damaged rock would be required to reach intact granite suitable for tests. The No-Action Alternative would not allow for efficient evaluation and development of new weapons technologies in the categories above.

2.2.2. Other Alternative Locations Considered But Not Carried Forward

Alternative sites were considered for establishment of a new test bed. Alternative locations considered initially included sites northwest and southeast of SHIST; Mockingbird South, and Second In-situ Test Area (SISTA). These potential sites were evaluated for their availability and

suitability in having sufficient granite bedrock, slope of less than 15 degrees, and shallow soil overburden. Each of these potential sites failed one or more of these criteria (see Table 1).

The SISTA site (location shown in Figure 1), which also has granite bedrock, was investigated in more depth than the other potential sites because it initially appeared to be suitable. However, upon investigation, the SISTA site was shown to have a deep layer of soil overburden covering the granite. The deeper soil (eight to twenty feet) at the SISTA site makes this site less suitable than the Granite site because:

- There would be a need to clear and dispose of this soil overburden during target preparation, leading to prohibitively higher operating costs for the SISTA site.
- More airborne dust would be produced by target creation and clearing or test impacts. This would potentially cause significant adverse impacts to air quality.
- Removing this large volume of soil for each test would require more trips and work by heavy equipment. Increased equipment use would have greater impacts from emissions, noise, road traffic and disturbance.

For these reasons, the SISTA site was not carried forward for further analysis. No other potential sites on WSMR with suitable characteristics were identified.

Other alternatives considered in the 2007 PEIS but not carried forward for further analysis included:

- The establishment of alternate testing facilities at locations other than WSMR
- The use of computer modeling and simulations exclusively

These alternatives were eliminated from further consideration because they would not be sufficient to accomplish objectives for testing and developing threat reduction technologies, as explained in the 2007 PEIS.

2.2.3. Access Road Alternatives

Alternatives for access to the site were considered and are listed in Table 1 under “Access Road Alternatives”. The preferred access to the Granite site is from Range Road 13 via an unimproved dirt and gravel access road, known as the “Pond road”. The Pond road intersects the “Gus” road, which is maintained by WSMR for access to a power line, approximately 2.75 miles from the Granite site. In addition to the preferred Pond road, access from Range Road 7 via the Gus road only, or from a new road via the Fairview range was considered. The alternative access roads would have required either new road construction (Fairview) or substantial improvements to the existing road (Gus). The Gus road has multiple arroyo crossings, which would lead to increased maintenance requirements and potential impacts to the grasslands along the road.

Table 1: Decision Matrix of Alternatives Considered and Suitability

Test Site Alternatives						
Selection Criteria		No Action (SHIST)	Northwest/Southeast of SHIST (various areas)	Granite Site	SISTA	Mockingbird South
	Mission: allow continued testing and evaluation	No; The majority of testing could not be conducted	Yes	Yes	Yes	Yes
	Availability	Yes	Southeast only	Yes	Yes	No; Part of area closed off when Fairview Range opened
	Granite Bedrock in sufficient quantity and quality	No; granite is too damaged for additional tests	No; very narrow strip with multiple areas of former mining	Yes	Yes	No
	Flat Slope or less than 15 degrees	Yes	varies by site	Yes	Yes	No
	Soil Overburden is shallow (<6 ft.)	Yes	Yes	Yes	No; 8-20 ft of overburden	Yes
	Safety: clear of UXOs and known hazards	Yes	Yes	Yes	Yes	Yes
	Biological Resources: T&E species concerns	None	None	None	Not fully investigated	None
	Biological Resources: other concerns	None	Not fully investigated	Partly within a SNA; golden eagles; kit foxes.	Not fully investigated	None
	Cultural and Historic Resources Concerns	None	Possible issues; not fully investigated	None	Not fully investigated	None

Access Road Alternatives					
Selection Criteria		No-Action	Power line ("Gus") Road	Pond Road (preferred)	Fairview Range (new road)
	Minimize ground disturbance	Yes	No; Requires multiple culverts along initial road sections and widening in some areas	Yes; requires only minor improvements-widening, fixing low areas	No; Requires 3.5 miles of new road.
	Safety: clear of UXOs and known hazards	Yes	Yes	Yes	Unknown
	Biological Resources: T&E species concerns	None	None	None	Not fully investigated
	Biological Resources: other concerns	None	Larger potential effects to grassland SNA, golden eagles.	Potential effects to grassland SNA, golden eagles.	Not fully investigated
	Cultural and Historic Resources Concerns	None	None	Archaeological site LA 181347 located in roadway	Large concentration of artifacts along route

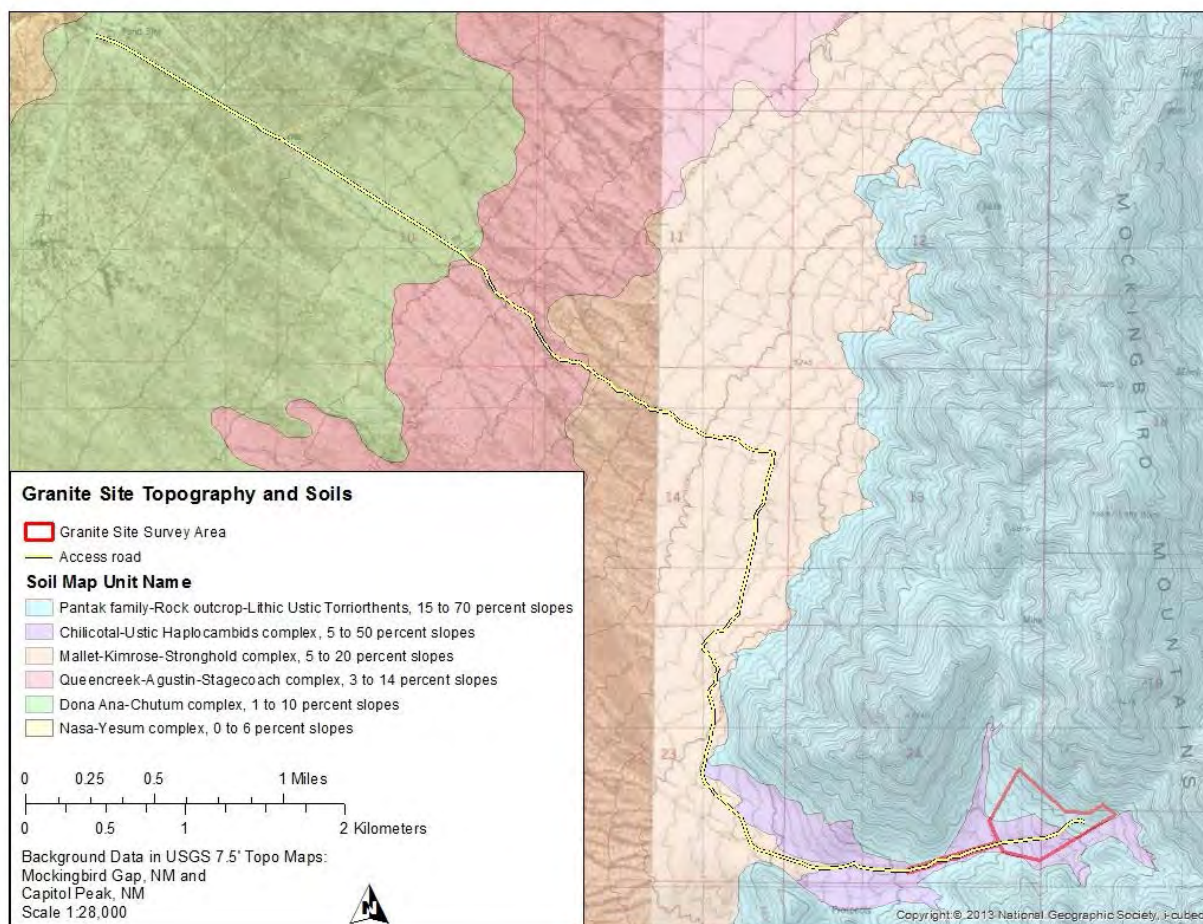
3. AFFECTED ENVIRONMENT

The project area lies within the Basin and Range Section of the Chihuahuan Semi-desert Ecoregion (Bailey et al. 1994). The Chihuahuan Desert landscape is a series of basins and mountain ranges, with a central highland that extends from Socorro, New Mexico, south into Mexico (Dinerstein et al. 2000). The area is characterized by north-south trending, tilted fault-block mountain ranges separated by linear, graben basins. Major physiographic regions within WSMR include the Jornada del Muerto Basin, the Tularosa Basin, the San Andres Mountains, and Oscura Mountains. The project area is located in the Jornada del Muerto Basin, a large, structural graben. The eastern boundary of the basin is defined by the nearly vertical escarpment of the western face of the Oscura, Little Burro and Mockingbird Mountains. The Granite site project area sits along the western and northwestern slopes of the Mockingbird Mountains. These mountains are made up of intrusive granitic rocks.

3.1. Site Location and Topography

The Granite site is located in the northern part of WSMR in the southeast corner of Socorro County, NM (Figure 1). The site lies on the west side of the Mockingbird Mountains, a small range that extends north of the San Andres Mountains. Surface drainage from the site drains to the Jornada del Muerto, a closed basin. Elevation in the project area (including the access road) ranges from 4940-6400 ft above mean sea level. Elevation of the actual target site is 6000-6400 ft. The Granite site lies within a drainage basin that cuts eastward into the mountains and is bordered by mountains on three sides (Figure 4). The isolation afforded by the surrounding mountains, the gentle slopes on site, and the shallow soil overburden make this site suitable for hard rock penetration testing. The site is approximately 60 miles by road or 44 air miles from Socorro, 36 air miles from San Antonio, 30 air miles from the Rio Grande, and 35 air miles from Carrizozo (Figure 1).

Figure 4: Granite site topography and soils



Soil data source: NRCS 2015a.

3.2. Air Quality

The United States Environmental Protection Agency (USEPA) and the New Mexico Environment Department (NMED) regulate air quality in New Mexico to protect public health. The Clean Air Act requires EPA to establish national ambient air quality standards, and also requires states to adopt enforceable plans to achieve the standards. National and state air quality standards have been developed for six common and widespread “criteria pollutants”: particulate matter, ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide, and lead. These standards are listed in the PEIS, Table 3-7. Areas that meet these air quality standards are designated as being in “attainment,” whereas areas designated as “nonattainment” fail to meet standards for one or more pollutants. Socorro County is an attainment area (USEPA 2013).

NMED monitors the pollutants carbon monoxide, ozone, nitrogen dioxide, sulfur dioxide, particulate matter, and lead in locations throughout the state. The monitoring stations closest to WSMR are located in Los Lunas, Valencia County, to the northwest of WSMR, and in Las Cruces, Dona Ana County to the southwest of WSMR (NMED 2014). In 2012 and 2013, Socorro County is not known to have any days when the air quality was unhealthy (USEPA 2014a Aircompare state summaries). Valencia County has, on the average, less than one day per year when the air is considered unhealthy for people who are active outdoors, whereas Dona Ana County has unhealthy air quality on 14 days (USEPA 2014a Aircompare Monthly Averages)

Manmade pollution sources on WSMR are mainly concentrated in the Main Post region where activity levels are highest (PEIS, Section 3.6.2). Sources of pollutants include vehicle emissions, missiles, aircraft, and ground targets. Sources of emissions at WSMR are permitted under Title V Operating Air Permit P085R2 (WSMR EIS, Section 3.4.3.1). DTRA/SCC-WMD’s currently operating concrete batch plant and generators are included in this permit (PEIS, Section 3.6.2).

Long-distance visibility is important to WSMR’s training activities. Additionally, dust can damage electronic equipment. As discussed in Section 3.6.1 of the PEIS, airborne dust is a persistent problem throughout WSMR, including the DTRA/SCC-WMD test beds. Sources of dust include vehicular traffic on dirt and gravel roads, as well as windblown dust. Strong westerly winds that generate blowing dust are typical in the spring (March through early May). Intact soils and vegetation generally promote better air quality, whereas soil disturbance and removal of vegetation often leads to substantial amounts of airborne dust.

3.3. Soils

Soil characteristics and general concerns regarding soils at WSMR in general, and DTRA/SCC-WMD sites in particular, are discussed in the PEIS, Sections 3.1.4 and 4.1.4 and in the WSMR EIS, Section 3.6.5. Wind and water erosion are important concerns affecting soils throughout WSMR. Wind erosion contributes to airborne dust issues, discussed above in the Air Quality section of this EA. Water erosion is especially significant when occasional heavy rains during the summer monsoonal season in July and August produce significant runoff, causing arroyos to become unpredictable and sometimes dangerous (WSMR EIS, Section 4.12.2.2.3). Movement of stormwater can contribute significantly to soil erosion, arroyo side-bank and channel cutting, and downstream sediment loading.

Soil data for the area of WSMR where the Granite site is located was obtained from the soil survey *White Sands Missile Range, New Mexico, Parts of Dona Ana, Lincoln, Otero, Sierra and Socorro Counties* (NRCS 2015a). Based on this survey, soils within the proposed Granite target site fall within the Pantak family- Rock Outcrop-Lithic Ustic Torriorthents complex (27 acres) and the Chilicotal-Ustic Haplocambids complex (26 acres). The access road traverses these two soil complexes and descends through the Mallet-Kimrose-Stronghold complex, Queenecreek-Augustin-Stagecoach complex and Dona Ana-Chutum complex (Figure 4).

Descriptions of the soils found at the Granite site and along the access road are as follows:

3.3.1. Pantak family-Rock outcrop-Lithic Ustic Torriorthents complex

The Pantak family-Rock outcrop-Lithic Ustic Torriorthents complex occurs on the northern part of the site in the higher topographic positions. These soils occur on granitic hills and formed in gravelly residuum weathered from granite. These are somewhat shallow and poorly drained soils. Depth to bedrock is 12 to 15.5 inches for Pantak and 3.5 to 5 inches for Lithic Ustic Torriorthents. Runoff in these soils is high and available water capacity is very low. These soils are in the Gravelly ecological site R042XC001NM (NRCS 2015a), which has a plant community consisting of a grassland/shrub mix historically dominated by black grama (NRCS 2015b).

3.3.2. Chilicotal-Ustic Haplocambids complex, 5 to 50 percent slopes

The Chilicotal-Ustic Haplocambids complex occurs in the central and southern part of the site and along the access road where it enters the site. This map unit occurs on dissected alluvial fans on mountain footslopes. Slopes vary from 5 to 50 percent. The parent material is mixed gravelly alluvium. These soils are excessively to somewhat excessively drained and have low available water capacity, limiting vegetation growth. These soils are also within the Gravelly ecological site (NRCS 2015a).

3.3.3. Mallet-Kimrose-Stronghold complex, 5 to 20 percent slopes

The Mallet-Kimrose-Stronghold complex underlies a major part of the access road as the road travels north across the alluvial fans below the Mockingbird Mountains and turns northwest to descend towards Pond site. Soils in this map unit formed from mixed alluvium and occur on alluvial fan remnants.

- Mallett and Stronghold soils are deeper, gravelly fine sandy loam and loamy coarse sand soils. They are nonsaline, somewhat excessively drained and have low available water storage and runoff. These soils are in the Sandy ecological site (R042XC004NM) (NRCS 2015a). Plant cover includes black grama, blue grama, snakeweed, dropseed, and yucca (NRCS 2015b).
- Kimrose is a shallow soil with a hardpan 9 to 14 inches below the surface. It contains up to 35 percent calcium carbonate and is somewhat excessively drained; runoff is very high and water capacity is very low. Kimrose soil is in the Gravelly ecological site (NRCS 2015a).

3.3.4. Queencreek-Augustin-Stagecoach complex, 3 to 14 percent slopes

The access road traverses the Queencreek-Augustin-Stagecoach complex midway down slope in the area of the Beachhead Target. These soils formed from sandy and gravelly alluvium and occur on fan remnants. Queencreek is in the Draw ecological site (R042XB016NM), whereas Augustin and Stagecoach are in the Gravelly ecological site. These are non-saline to very slightly saline, somewhat excessively drained soils with very low or negligible runoff and very low available water capacity. (NRCS 2015a)

3.3.5. Dona Ana-Chutum complex, 1 to 10 percent slopes

The Dona Ana-Chutum complex is located farthest down-slope at the intersection of the access road and WSMR Route 13. This complex formed from alluvium and occurs on drainage ways and fan piedmonts. Both of these soils are in the Loamy ecological site (R042XB014NM); typical vegetation includes alkali sacaton, cholla, soap tree yucca, threeawn, annual forbs, and Torrey's jointfir (NRCS 2015b). These soils are nonsaline and slightly to moderately alkaline; they have moderate or high available water capacity due to their clay content (NRCS 2015a).

3.3.6. Soil Erodibility

Soil erosion from wind, water, and road use is a concern due to its impacts on the surrounding plant communities and the resulting cost of road maintenance. The NRCS uses several factors to evaluate soil erodibility (NRCS 2015).

- The erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.
- A wind erodibility group (WEG) consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.
- Road and trail erosion hazard ratings are based on soil erosion factor K, slope, and content of rock fragments. A rating of "slight" indicates that little or no erosion is likely; "moderate" indicates that some erosion is likely, that the roads or trails may require occasional maintenance, and that simple erosion-control measures are needed; and "severe" indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.

Table 2. Soil erodibility by soil type

Map unit name	Site area and road length within soil map unit (approx.)	Erosion Hazard (Road, Trail)	Wind Erodibility Group	K Factor, Whole Soil
Pantak-Rock outcrop-Lithic Ustic Torriorthents complex, 15 to 70 percent slopes	27 acres of site Top 600 feet of access road	Severe poorly suited for roads	6	.10
Chilicotal-Ustic Haplocambids complex, 5 to 50 percent slopes	26 acres of site 0.85 mile of access road	Moderate poorly suited for roads	6	.05
Mallet-Kimrose-Stronghold complex, 5 to 20 percent slopes	2.85 miles of access road	Moderate moderately suited for roads	5	.10
Queencreek-Agustin-Stagecoach complex, 0 to 14 percent slopes	0.64 miles of access road	Slight well suited for roads	2	.02
Dona Ana-Chutum complex, 1 to 10 percent slopes	1.67 miles of access road	Slight well suited for roads	3	.15

By using the Pond road instead of Gus road for access, the road crosses less of the Mallet-Kimrose-Stronghold complex and instead crosses the well-suited Queencreek-Agustin-Stagecoach and Dona Ana-Chutum complexes. Nevertheless, the majority of the access road is within Mallett-Kimrose-Stronghold, which is only moderately suited for roads. Road maintenance and improvements would be attentive to drainage and avoid creating situations where water will run down the road creating ruts. Techniques such as those described in Zeedyk (2006) would be used to ensure proper road drainage and minimize erosion associated with the road.

3.4. Geology

The geologic history of WSMR is described in detail in the INRMP, Section 6.3 and in the WSMR EIS, Section 3.6. The Granite target site and most of the Mockingbird Mountains falls within geologic unit Yg, Mesoproterozoic granitic plutonic rocks, from the 2003 Geologic Map of New Mexico (New Mexico Bureau of Geology and Mineral Resources 2003). This geologic unit is made up of intrusive Mesoproterozoic granitic plutonic rocks ranging in age from 1.45-1.35 billion years. The access road falls within geologic unit Qp, which is made up of much younger piedmont alluvium ranging in age from the Lower Pleistocene (2.6 million years ago) to the Holocene (which began 11,700 years ago).

There are no stratigraphic type localities, known mineral resources, or other valuable or geologic resources on site (NMNHP and WSMR 2001). The geologic unit Yg covers approximately

327,580 surface acres in New Mexico (New Mexico Bureau of Geology and Mineral Resources 2003).

3.5. Climate and Climate Change

Extensive information about the climate of New Mexico and WSMR is provided in the PEIS, Sections 3.1.3 and 4.1.3 and the WSMR EIS, Sections 3.4.4 and 4.19.2.3.2.

The general climate of WSMR is typical of the northern Chihuahuan Desert, with hot summers and mild fall, winter, and spring seasons. Nevertheless, elevation gradients and the influences of the mountain ranges within WSMR create varied site-specific climates. The climate at the Granite site is expected to be typical of the northern Jornada del Muerto: an arid to semi-arid climate with a strong summer monsoonal precipitation pattern.

Data from the nearest weather station with complete data (Bingham 2 NE, NM 290983; approx. 30 miles north of the Granite site) records an average annual precipitation of 10.65 inches. Although rainfall is highly variable, the majority of rainfall (5.85 inches) occurs during the monsoon in July through September. Annual snowfall averages 7.4 inches. Summers are very warm; July maximum temperature averages 90.5° F and minimum is 60.8° F. Winter is cool with a mean January minimum temperature of 21.6° F and maximum of 50.8° F (Western Regional Climate Center, 2014).

3.6. Water Resources

Waters of the United States, including wetlands, are protected under the Clean Water Act (33 U.S.C 1251 *et seq.*). New Mexico Water Quality Regulations (20 NMAC 6.2) protect water resources of the state. The EPA issues permits under the National Pollutant Discharge Elimination System (NPDES) governing storm water discharges related to construction activities.

There are no perennial sources of water in the project area. The nearest water source for wildlife is a spring located in a drainage to the north, over a mile from the site. Surface water in the project area occurs as overland flow from occasional intense thunderstorms during summer. The Granite site contains an arroyo that, like most surface waters on WSMR, is ephemeral; its flows are dependent on runoff from infrequent precipitation events. The arroyo drains to the Jornada del Muerto, which is a closed basin and therefore is not jurisdictional. There are no Waters of the United States, including wetlands, on the project site. As discussed in the Soils section above, stormwater runoff is a concern at the Granite site.

Ground water is very limited at the Granite site because the soils are shallow, well-drained, and generally low in available water capacity. Runoff from the site likely contributes to recharge in the more permeable basin deposits lower in the watershed. As stated in the PEIS, Section 3.1.6.3, runoff resulting from snowmelt or rainfall on relatively impermeable mountainous watersheds infiltrates the relatively permeable alluvial basin-fill deposits and recharges the ground water system. The quality of ground water in the Jornada del Muerto is generally poor due to high concentrations of dissolved solids (PEIS, Section 3.1.6.3).

3.7. Vegetation Communities

WSMR contains many diverse habitats that support a variety of plant and wildlife species, as discussed in the PEIS, Section 3.2, and the INRMP, Chapter 6. The biodiversity of these areas reflects their diversity of elevation, landforms, and variations in vegetation association types.

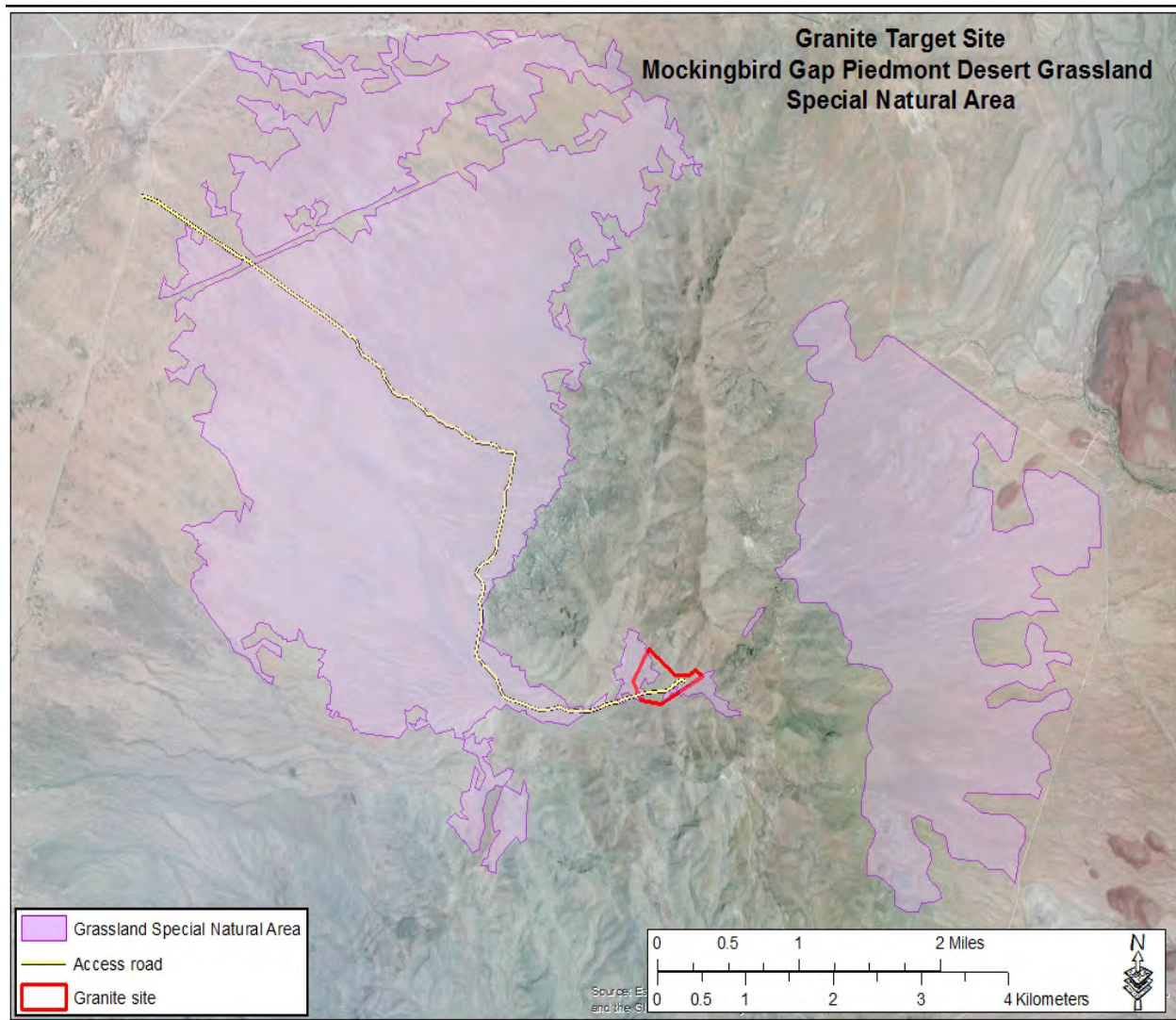
The New Mexico Natural Heritage Program completed an extensive vegetation mapping project at WSMR with accompanying plant community classifications (Muldavin et al. 2000a, b). They note that the majority of the imperiled (Natural Heritage conservation rank G2) and vulnerable (G3) plant associations on WSMR are Chihuahuan Desert grasslands. Large stands of these grasslands have persisted on WSMR and are considered some of the highest quality occurrences remaining in the Southwest (Dinerstein et al. 2000). Grasslands of the northern Jornada basin, including black, blue, and hairy grama grasslands on the alluvial fan piedmonts and foothills of the Oscura, Mockingbird, and San Andres Mountains, are of particular conservation importance (Muldavin et al., 2000a).

Plant communities previously mapped within the Granite site include Mixed Foothill-Piedmont Desert Grasslands, Piedmont Desert Grasslands, and Interior Chaparral (Muldavin et al., 2000b; WSMR GIS data). The Mixed Foothill-Piedmont Desert Grassland is one of the most abundant vegetation types on WSMR (WSMR EIS, Section 3.7.3).

In order to effectively protect locally or regionally important resources, WSMR has designated Special Natural Areas (SNAs). These areas have been acknowledged by WSMR as requiring special management in order to protect sensitive biological communities or cultural and geologic resources (WSMR EIS, Section 3.7.5.1). The Granite site lies partly within the Mockingbird Gap Piedmont Desert Grassland Special Natural Area (abbreviated here as “Grassland SNA”) (Figure 5). Also, the access road bisects the SNA. The grassland SNA is 9,162 acres in area. The Granite site overlaps with 18 acres of the SNA as mapped. However, field observations suggest that the large scale of mapping is not accurate at the site level. Piedmont Desert Grassland within the Granite site is actually in the central part of the site and is approximately 19 acres in extent (Figure 6). Another 2.5 acre of grassland is located on the southern edge of the site and is connected to a swath of grassland that runs along a low terrace above the arroyo. The remaining area (about 31.5 acres) of the 53-acre site consists of a grass-shrub mix, corresponding to Mixed Foothill-Piedmont Desert Grassland transitioning into Montane Chaparral at the upper elevation, and arroyo riparian shrub vegetation along the site’s southeastern boundary.

Recent surveys, such as those conducted for the Thurgood West Maneuver area (HDR 2014), have found that vegetation states are deviating from the Muldavin et al. (2000a, b) survey. This apparent deterioration in the environment is thought to be due to a combination of land management practices and the effects of climate change and drought affecting grass viability. However, the large scale of the Muldavin et al. mapping work, which precluded accurately ground-truthing each area, makes it difficult to determine how much change has actually occurred.

Figure 5: Mockingbird Gap Piedmont Desert Grassland Special Natural Area



A visit to the Granite site was conducted on November 3, 2013 by USACE personnel including a botanist, archaeologists, and an environmental scientist. Biological resources were surveyed with a walk around the site noting plant species, habitat characteristics and other biota. Due to the recent fall rains, grasses were flowering and readily identifiable. Many late summer and fall-flowering plants were also identified (see Appendix E for complete list). Prior to the site visit, a list of rare plants with potential to occur in the area along with their botanical descriptions and habitat characteristics was compiled from the NM Rare Plant website, the WSMR EIS and the PEIS. Many of these rare plant species occur on special substrates such as gypsum or limestone that do not occur at Granite site. The rare species that grow on granite substrates are found near springs, outcrops, or at higher elevations. No rare plant species were encountered during this visit or on a follow-up visit conducted by USACE with WSMR personnel, including a botanist, ecologist and wildlife biologist, on March 4, 2015.

Vegetation observed at the Granite site was predominantly grassland with scattered shrubs grading into a shrub community on higher slopes at the site. The arroyo on the southern boundary of the site supports a Southwest Arroyo Riparian Shrubland community dominated by Apache plume (*Fallugia paradoxa*). Upland shrubs include shrub live oak (*Quercus turbinella*), soaptree and banana yucca (*Yucca elata* and *Y. baccata*), three-leaf and littleleaf sumac (*Rhus trilobata* and *R. microphylla*), and mountain mahogany (*Cercocarpus montanus*). Grasses were very diverse and included sideoats, blue, black, and hairy gramas (*Bouteloua curtipendula*, *B. gracilis*, *B. eriopoda*, and *B. hirsuta*); three-awns (*Aristida* spp.); silver beardgrass and cane bluestem (*Bothriochloa laguroides* and *B. barbinodis*), and bush muhly (*Muhlenbergia porteri*). Forbs were fairly diverse and several species were still blooming despite the lateness of the season. Plant growth appeared to reflect the year's ample September rains. A complete list of plants observed is provided in Appendix E.

Additional visits were made to the area on November 4 and 13, 2014 for the purpose of setting up monitoring plots, and on March 4, 2015 to survey the Pond road and search for additional species at Granite site. Monitoring Plot 1 was established southeast of the Granite site boundary on the arroyo terrace in mixed grass-shrub vegetation. This plot had an abundance of black grama and the vegetation is structurally similar to much of the Granite site, although shrub density appears higher in the monitoring plot. Plot 2 was established along the access road near the intersection of the Pond and Gus roads. This plot was dominated by annual vegetation with a small component of black grama, and had more bare ground. Data from the monitoring plots is provided in Appendix E.

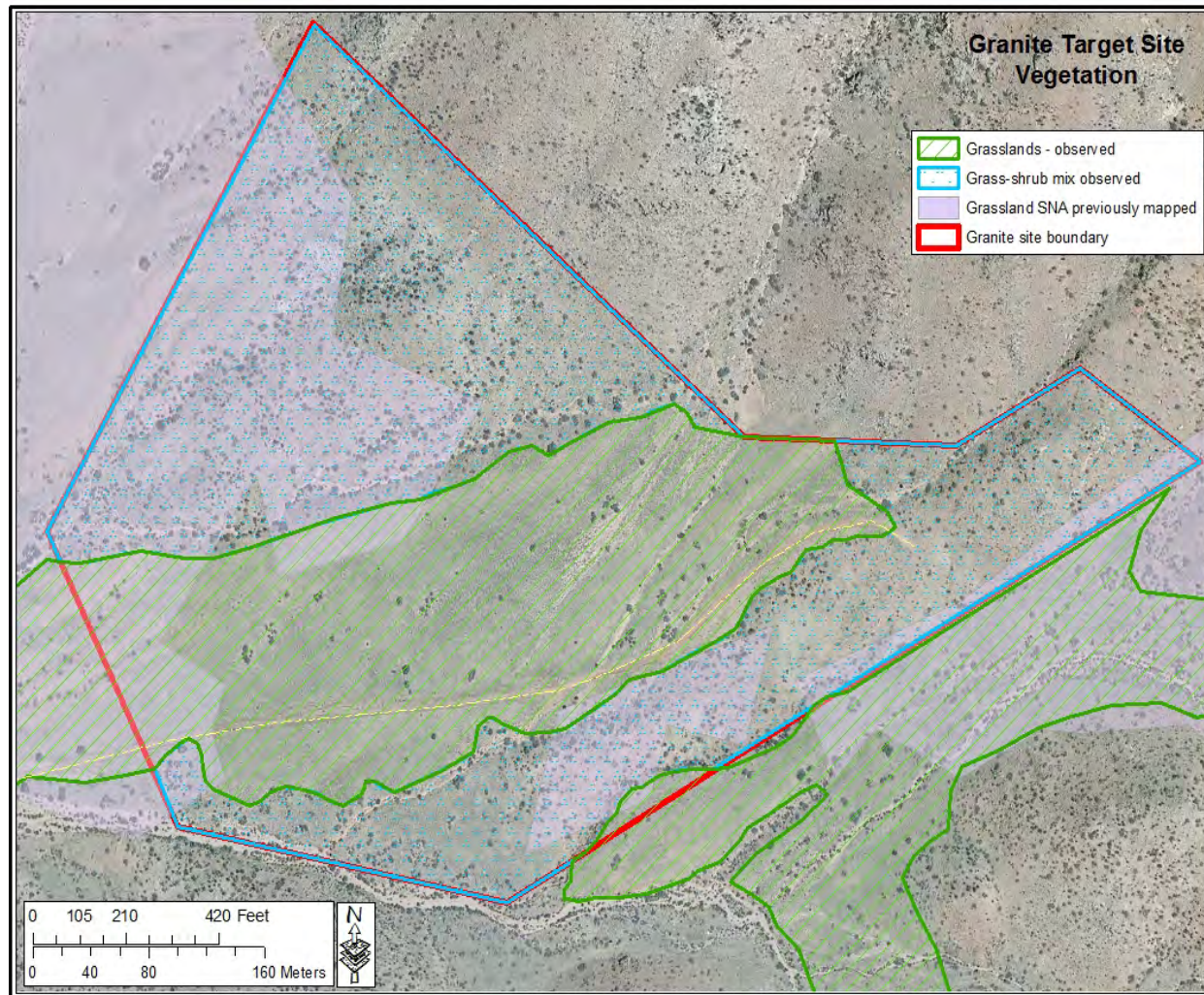
Upon comparing field observations with the Vegetation of WSMR map (Muldavin et al. 2000b), the plant community in the northern and higher part of the Granite site most resembles the Shrub Live Oak/Sideoats Grama Plant Association (PA). This association grades into Mixed Foothill-Piedmont Desert Grasslands and Piedmont Desert Grasslands, which comprise the vegetation on the central part of the site. The grassland subunit is Black Grama-Blue Grama, Sideoats Grama or Hairy Grama Foothill Grasslands. This type is restricted to lower granitic slopes in the Mockingbird and Fairview Mountains. The community also resembles the Black Grama and Blue Grama/Soaptree Yucca Piedmont Desert Grassland, which occurs on the granitic alluvial fans that extend out from the Mockingbird Mountains. The map units and plant associations as described by Muldavin et al. (2000a, b) follow.

- The Shrub Live Oak/Sideoats Grama PA is a component of Interior Chaparral (Map Unit 5; 8,639 ha). This unit is dominated by shrub live oak types and typically occurs on mid to low elevation slopes throughout the San Andres, San Augustine, Organ, Mockingbird, and Oscura Mountains. This map unit is primarily associated with granite or intrusive igneous rock. Soils are coarse textured and usually well drained, and scattered boulders and rocks characterize the landscape. Within this map unit, the Shrub Live Oak/Sideoats Grama, Hairy Grama or Black Grama Montane Shrubland alliance (7,756 ha) is dominated by shrub live oak communities with grassy understories. Grasses are diverse, with black grama, hairy grama, and blue grama predominating. Forbs are high in species diversity (Muldavin et al., 2000a).
- The Mixed Foothill-Piedmont Desert Grasslands (Map Unit 12, Muldavin et. al., 2000b) is an extensive (75,207 ha) complex of Plains-Mesa-Foothill Grasslands and Chihuahuan

Desert Grasslands that occurs on mid to low elevation mountain slopes, foothills, and upper alluvial fan piedmonts. A major plant community association in this map unit (2,168 ha) is the Black Grama-Blue Grama, Sideoats Grama or Hairy Grama Foothill Grasslands sub-unit.

- The Piedmont Desert Grasslands (Map Unit 16, 15,599 ha; Muldavin et. al., 200b) is a Chihuahuan Desert Grassland unit dominated by black grama types that occurs on alluvial fan piedmonts of the Mockingbird, San Augustine, San Andres, Big Gyp, and Oscura Mountains. A sub-unit, the Black Grama and Blue Grama/Soaptree Yucca Piedmont Grasslands (2,159 ha), occurs along the upper slopes of the granitic alluvial fans that extend out from the sides of the Mockingbird Mountains. These are highly diverse Chihuahuan Desert grassland community types characterized by abundant, codominant black and blue grama with a conspicuous soaptree yucca shrub layer.
- The Mockingbird Gap grassland SNA map layer provided by WSMR is 3,708 hectares (9,162 acres). This is a subset of the Piedmont Desert Grasslands described above. Granite site overlaps with 18 acres of the SNA as mapped.

Figure 6: Observed vegetation at the Granite site



3.8. Invasive Species and Noxious Weeds

Invasive weeds may have numerous deleterious effects on natural ecosystems including decreasing recreational opportunities, damaging watersheds, increasing soil erosion, displacing native vegetation and wildlife, and increasing the need for management practices, such as the use of herbicides. Soil- and vegetation-disturbing activities greatly increase invasion by these undesirable plants (NMNHP and WSMR 2001, Chapter 7.2.7).

The following noxious or potentially noxious invasive plant species are known to occur at WSMR and have been identified in the INRMP and in the WSMR EIS as species which could threaten the integrity of habitats on the Range: African rue (*Peganum harmala*), broadleaved pepperweed (*Lepidium latifolium*), Johnsongrass (*Sorghum halepense*), Lehmann lovegrass (*Eragrostis lehmanniana*), Maltese star-thistle (*Centaurea melitensis*), Russian olive (*Elaeagnus angustifolia*) and saltcedar (*Tamarix ramosissima*). Russian olive and saltcedar are both typically found near perennial waterways and playas (WSMR EIS, Section 3.7.3.1 and Table 3.7-2). None of these species were identified on the site visit.

Lehmann lovegrass presents the greatest risk of invasion into grassland at the Granite site. This species currently occurs in the southern part of WSMR, north of Highway 70 and east of the Main Gate entrance, in graded areas on either side of the road (NMNHP and WSMR 2001, Chapter 7.2.7). Lehmann lovegrass is very competitive and is known to displace native grasses in the Southwestern US (Texas Invasives 2014; Anable et al. 1992). Lehmann lovegrass was observed along the access road within Granite site.

3.9. Fish and Wildlife

The WSMR EIS and INRMP summarize terrestrial and aquatic habitat and wildlife which occur within the Range. Seventy-three mammal species 291 bird species, seven species of amphibians and 47 species of reptiles occur on WSMR (WSMR EIS, Section 3.7.4). The INRMP discusses the variety of species and habitats within WSMR and management strategies (NMNHP and WSMR, 2001).

Wildlife at the Granite site is expected to be typical of northern Chihuahuan Desert uplands, grasslands and shrublands. Large mammals commonly found on WSMR are likely to travel across or forage within the Granite site, and include mule deer (*Odocoileus hemionus*), pronghorn (*Antilocapra americana*), and the nonnative oryx (*Oryx gazella*), as well as predators such as coyotes (*Canis latrans*), kit foxes (*Vulpes macrotis*), bobcats (*Lynx rufus*), mountain lions (*Puma concolor*) and badgers (*Taxidea taxus*). Black bears (*Ursus americanus*) are rare at WSMR and more likely found in montane habitats, but may travel across the Granite site. Small mammals occurring on WSMR include black-tailed jackrabbits (*Lepus californicus*), desert cottontails (*Sylvilagus auduboni*), desert shrews (*Notiosorex crawfordi*), and numerous species of rodents (NMNHP and WSMR, 2001). There are 17 species of bats on WSMR; most roost in caves or buildings, with a few tree-roosting species.

Although the Granite site was not specifically surveyed for small mammals, rodent burrows were observed during the site visit. Most burrows were located in deeper, loose soils near the arroyo on the southern end of the site. Numerous burrows were also observed along the access road.

Kit foxes have been photographed visiting a camera trap line on the western edge of the Granite site as part of a mesocarnivore (medium-sized carnivore) study being conducted by WSMR biologists (Figure 7; Rodden, personal communication 2014). The kit fox is a protected furbearer (regulated harvest) in New Mexico. The species is listed as endangered by the state of Colorado and is in need of conservation over much of its range (Meaney et al. 2006). Since very little is known of the kit fox's presence and distribution on the range, WSMR biologists are conducting a long-term mesocarnivore study with an emphasis on this species. More detailed studies are proposed to help evaluate and avoid impacts to kit fox, as described below in Section 4.8.

Figure 7. Kit fox pair (*Vulpes macrotis*) photographed west of Granite site



Photo courtesy of WSMR

The status and protection of migratory birds on WSMR are discussed in the WSMR EIS, Section 3.7.4.5 and the PEIS, Section 3.2.3. Of particular interest for the Granite site, Chihuahuan Desert grasslands are used during migration and in winter by large numbers of birds, particularly sparrows, meadowlarks, mourning doves, and raptors. Desert grasslands in the Jornada Plain

support breeding birds and provide important wintering habitat for several Partners in Flight (PIF) high-priority species and USFWS Birds of Conservation Concern (BCCs), such as Baird's Sparrow (*Ammodramus bairdii*), Sprague's Pipit (*Anthus spragueii*), McCown's Longspur (*Rhynchophanes mccownii*), and Chestnut-collared Longspur (*Calcarius ornatus*) (NMNHP and WSMR, 2001; Pashley et al. 2000; Rich et al. 2004). A complete list of BCCs appears in Appendix A.

The Granite site lies in a transition between grasslands and montane scrub, and provides good quality habitat for grassland/shrubland birds. During the November 2013 site visit, songbirds were heard, but most flushed and left the site before they could be identified. A scaled quail covey (*Callipepla squamata*) flushed when observers entered the site and could be heard calling from the higher slopes during the survey. A Spotted Towhee (*Pipilo maculatus*) was heard foraging and vocalizing. Formal bird surveys were not conducted; it is assumed that any species for which the habitat is suitable and within range may occur at the site. Because of its diversity of grasses and shrubs, the Granite site likely supports migrant, overwintering and breeding songbirds that utilize grassland and shrubland habitat.

Raptor species common on WSMR and likely to hunt over the Granite site include red-tailed hawks (*Buteo jamaicensis*), Swainson's hawks (*Buteo swainsoni*), northern harriers (*Circus cyaneus*), and prairie falcons (*Falco mexicanus*). Because of the site's proximity to rocky outcrops and cliffs of the Mockingbird Mountains, there is potential for raptors and other resident birds to nest nearby, including red-tailed hawks, prairie falcons, golden eagles (*Aquila chrysaetos*), ravens and turkey vultures (NMNHP and WSMR 2001, Chapter 6.9.4).

3.9.1. Golden Eagles

Golden eagles are protected by the Migratory Bird Treaty Act (16 U.S.C. 703 *et seq.*) and the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), both of which prohibit take. Take means "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb".

Information on the population of golden eagles at WSMR is summarized here; more detail is provided in Appendix C. WSMR has a resident population of about 32 breeding pairs of golden eagles (P. Juergens, 2015). The large number of adult breeding pairs occupying territories at WSMR indicates a healthy golden eagle population (Hunt, personal communication, 2015). Territory size for a breeding pair on WSMR is approximately 76 square miles (D. Driscoll, unpublished data 2013).

Four golden eagle nests were found in the Mockingbird Mountains within 1.5 miles of the Granite site during general Range-wide (throughout WSMR) surveys conducted by WSMR biologists in 2013-2014. A nest located on the west-facing ridge approximately 0.65 mile (1,050 meters) from the northwestern side of the Granite site was active in 2014 (Cutler, personal communication, 2014a), although it is unknown whether any young were produced. In February 2015, WSMR biologists identified a new active nest approximately 0.37 mile or 1,950 feet (595 meters) from the northwestern side of the Granite site (Cutler, personal communication, 2015). The female was observed incubating eggs on March 17, 2015 and a nestling was present 15 May (P. Cutler, personal communication, 2015b). The new nest is within the same breeding territory

as the nest that was active in 2014. The previously known nests are separated from the Granite site by ridge lines, whereas the new nest is directly overlooking the site.

3.10. Threatened, Endangered and Rare Species

The following sources of information for threatened and endangered (T&E) species were consulted:

- U.S. Fish and Wildlife Service Information, Planning and Conservation System
- Biota Information System of New Mexico (BISON-M)
- New Mexico Rare Plant Website (New Mexico Rare Plant Technical Council 1999)
- Protected floral species on WSMR (PEIS, Appendix C)
- Protected faunal species on WSMR (PEIS, Appendix D)
- INRMP list of threatened and endangered species for the Jornada Plain and San Andres Mountains Ecosystem Management Units (NMNHP and WSMR 2001, Chapter 7)
- USFWS List of Birds of Conservation Concern, BCR 35 (Chihuahuan Desert U.S. portion only) (USFWS 2008)

The Granite site falls within the Jornada Ecosystem Management Unit as defined in the INRMP. Therefore, particular attention was given to the federally- and state-listed species that were reported in the INRMP as having potential to occur in the Jornada Plain. Only species with suitable habitat or potential to occur at the Granite site are discussed here. Complete lists of Threatened and Endangered species for Socorro County and for the Jornada Plain are provided in Appendix A.

3.10.1. Northern Aplomado Falcon

Northern aplomado falcon (*Falco femoralis septentrionalis*), a State- and Federally-listed endangered species, is designated as an experimental, non-essential population in New Mexico and Arizona. The Biological Opinion for the WSMR EIS (WSMR 2009, Appendix E) provides a detailed account of aplomado falcon biology in the Southwestern US, species presence on the Range, and conservation measures implemented by WSMR.

WSMR represents the northern boundary of the historical range of the aplomado falcon. Sightings of transient aplomado falcons were documented on WSMR and in the Jornada Plain prior to the Section 10(j) reintroductions, with sightings in 1991-92 and 2005 (WSMR EIS, Appendix E). In the summer of 2007, WSMR reintroduced 23 captive-bred northern aplomado falcons to the range. Since reintroductions began, there have been three sightings in 2008, one in 2009, two in 2010 and one each in 2011 and 2013 (Cutler, personal communication 2014b). The 2008 sightings were closest to the Granite site and were 2-3 miles west of the site at lower elevations in the Jornada Plain. WSMR conducts Range-wide surveys for the falcon three times each year and submits an annual report to the U.S. Fish and Wildlife Service (USFWS). In addition, WSMR has an Endangered Species Management Plan for the aplomado falcon which established objectives to support recovery of the species, including WSMR's participation in the reintroduction program and conservation of desert grasslands (WSMR EIS, Section 3.7.5.1).

Aplomado falcons in New Mexico have been associated with yucca grasslands and adjacent shrubby habitats at lower elevations (2800-5500 ft) (Hubbard 1978). These falcons require open terrain, low ground cover, and scattered trees or yuccas for nesting. They nest in tall yuccas or trees such as mesquite, but use nests of other raptors or ravens rather than building their own nests. Habitat at the Granite site is transitional between open grassland and shrubland, but lacks tall yuccas or trees suitable for nesting. The site is partly surrounded by mountainous terrain and lies at slightly higher elevation than the identified suitable habitat of the Jornada Plain and the Stallion Range Station. Also, the Mockingbird Mountains are just outside the areas mapped as potential habitat for the aplomado falcon (PEIS, Fig. 3-8). Therefore, aplomado falcons are unlikely to nest or to occur regularly at the site, but may forage at or near the site due to its proximity to these areas of suitable habitat.

3.10.2. Sprague's Pipit

Sprague's pipit (*Anthus spragueii*) is a federal candidate species. This species breeds in the northern prairies; it does not breed in New Mexico, but winters in grassland habitats including Chihuahuan Desert grasslands. The pipit inhabits grasslands at lower elevations (2800-5500 ft); it requires large areas of native prairie. The Granite site lies at higher elevation, and because the site grades into shrubland it is only moderately likely to provide habitat for wintering pipits.

3.10.3. White Sands Pupfish

The White Sands pupfish (*Cyprinodon tularosa*) (State threatened) is endemic to the Tularosa Basin and is not found at the Granite site or in the same watershed. The species is currently under review by the USFWS. Essential pupfish habitat is located approximately 10 miles east of the Granite site in a different hydrologic basin (WSMR Directorate of Public Works Environmental Division, no date.) The Granite site is located approximately 1/3 mile outside the White Sands Pupfish Area of Concern and is separated from the area of concern by the watershed divide of the Mockingbird Mountains.

3.10.4. Baird's Sparrow

Baird's sparrow (*Ammodramus bairdii*) (State threatened) is a grassland species that breeds in the northern Great Plains. It is a migrant in New Mexico, occurring primarily in the eastern plains and southern lowlands (NMNHP and WSMR 2001). Baird's sparrow has been documented to occur on WSMR in the Jornada Plain (NMNHP and WSMR 2001) in open yucca grasslands. Generally, the species winters in areas of dense and expansive grasslands, with only a minor shrub component (New Mexico Avian Conservation Partners 2014). It is considered a rare winter resident in grasslands at White Sands National Monument (PEIS, Section 3.2.4). Due to the bird's rarity and the higher elevations and substantial cover of shrubs at the Granite site, Baird's sparrow is unlikely to occur regularly at the site.

3.10.5. American Peregrine Falcon

The American peregrine falcon (*Falco peregrinus anatum*) (State threatened and a USFWS Bird of Conservation Concern) occurs on WSMR, mainly in the breeding months (March-August). Peregrine falcons likely nest on WSMR in the San Andres and Oscura Mountains (Montoya,

pers. comm.). There is potential for peregrine falcons to fly or forage over the Granite site and to nest on cliffs in the Mockingbird Mountains.

3.10.6. Bats

Spotted bats (*Euderma maculatum*) (State threatened) are frequently reported near cliffs over perennial water. Spotted bats are cliff dwellers whose diurnal roosts are the cracks and crevices of canyons and cliffs. They appear to occupy ponderosa pine woodlands in the reproductive season and lower elevations at other times of the year. Rocky cliffs are necessary to provide suitable cracks and crevices for roosting, as is access to water. Spotted bats have been recorded three times on WSMR, most recently in 2014, and they likely roost in the San Andres and Oscura Mountains (Cutler, personal communication, 2014c).

Two additional bat species, Townsend's big-eared bat (*Corynorhinus townsendii*) and fringed myotis (*Myotis thysanodes*), are State species of concern. These species are not afforded legal protection. Although they may forage in the area, these bats use caves, abandoned mines, old buildings, and crevices in rock cliffs as day roosts for refuge (BISON-M, 2014). There are no caves or cliffs on the Granite site, although these may exist in the nearby area. The absence of water makes the Granite site unlikely to support bats except for occasional foraging.

3.10.7. Flora (Listed and Rare Plants)

Rare plants located on WSMR that require environmental coordination are listed in the WSMR EIS, Volume 2, Table 4-5. Rare plants in Socorro County are listed by the New Mexico Rare Plant Technical Council (NMRPTC). These lists are provided in Appendix A with comments on each species' potential occurrence at the Granite site.

Prior to the site visit, the distribution and habitat requirements of each species on both lists were reviewed. Species known to occur in Socorro County or the Mockingbird Mountains, on granite substrate, and in the appropriate elevation range were targeted for search. The species with the most potential to occur nearby, *Silene plankii* (Plank's campion), grows on granite cliffs and rocky outcrops. This species was not observed on the site visit and is not expected to occur in the piedmont grassland/shrubland habitat on site. The other listed species are unlikely to occur at or near the Granite site because they do not occur in Socorro County or occur on substrates other than granite or at higher or lower elevations than the proposed project site.

The only Federally-listed plant species known to occur at WSMR is Todsen's pennyroyal (*Hedeoma todsenii*). Habitat for Todsen's pennyroyal does not exist at or near the Granite site.

3.11. Wildland Fire

Wildland fire management, fire ecology and history on WSMR are summarized in the WSMR EIS, Chapter 3.18. WSMR has a wildland fire management program guided by an Integrated Wildland Fire Management Plan (WSMR, 2004) and a Strategic Wildland Fire Planning Guide (WSMR, 2002). WSMR utilizes a variety of tools for managing wildland fire on the installation.

Historically, fire has been a natural part of the Chihuahuan Desert ecosystems. In the past, fires were suppressed. WSMR currently adheres to DOD policies on fire management as well as working with fire as an ecological process for those fires that pose no threat to public safety or

the mission, and are not harming any resources. WSMR has also used prescribed burning in certain situations to restore ecosystem integrity and reduce the risk of catastrophic wildfire (WSMR EIS, Chapter 3.18).

3.12. Land Use and Aesthetics

Present land use at WSMR is primarily military testing and training. There is limited public use, including recreation activities such as hunting and biannual trips to Trinity National Historic Landmark.

WSMR has developed a Land Use Classification system to assist in planning range use, as described in the WSMR EIS, Section S.3, Table S-1. The proposed Granite site is within an area designated as an “augmented test zone” in the WSMR EIS. This land use classification includes land used to support a variety of test and management activities. It is approved for lightweight or heavier off-road vehicle use, weapons impact, and airborne weapons release subject to archaeological survey and environmental approval. Hazardous activities may be included in this land use class. Portions of the zone may be excluded from use based on environmental conditions. Specifically, Special Natural Areas (SNAs) are areas that possess biological and/or physical elements considered important on local or regional scales. The WSMR EIS stated that sensitive areas would be avoided when siting new ground disturbing activities. Specifically, “New facilities should be located within or adjacent to existing disturbed areas”; “New roads should avoid habitat disturbance and fragmentation; Facilities and operations should avoid sensitive habitat areas, including ... Special Natural Areas.”

There are currently 19 SNAs (16 established and three candidate) covering a total of 80,663 acres on WSMR. SNAs are areas that are in relatively pristine ecological condition or have special or unique features worth protecting. Management of each SNA contributes directly to rangewide goals of preserving and restoring biodiversity and ecological integrity and processes (INRMP, p. 264) with management focusing primarily on protection. Few mission –related activities currently occur within SNAs.

DTRA/SCC-WMD activities at the Granite site would be consistent with the WSMR Land Use and Airspace Strategy Plan (WSMR EIS, Appendix A) and would follow all WSMR Standard Procedures and Requirements for Range Users. This Environmental Assessment supports the siting approval and environmental coordination aspects of the mission scheduling and approval process (LUSAP, Figure 1-5).

3.13. Facilities and Infrastructure

3.13.1. Transportation

U.S. Highway 380 runs along the northern boundary of WSMR and provides access to the northern part of the Range. An agreement with the State of New Mexico allows WSMR to establish off-range roadblocks on U.S. Highway 380 as a safety precaution during missile tests. Under the agreement, roadblocks may last up to two hours. U.S. Highway 380 experiences approximately one roadblock per month (PEIS, Section 3.11; WSMR EIS, Section 3.13.4). DTRA/SCC-WMD testing and evaluation activities at the Granite site would not require roadblocks to U.S. Highway 380 or major range roads such as Range Roads 7 and 13.

As discussed in Section 2.2.3, access to the Granite site is from Range Road 13 via an unimproved dirt and gravel access road, the “Pond” road. The Pond road intersects the “Gus” road, which is maintained by WSMR for access to a power line on the southern edge of the Granite site. The access road would require minor improvements within its current footprint, such as re-grading, addition of road base or gravel, and installation of culverts or other drainage features at arroyo crossings (Figure 3).

3.13.2. Communication and Radio Frequencies

Cellular phones and/or radios are required for personnel traveling north of U.S. Highway 70 on WSMR. Section 3.17 of the WSMR EIS (2010) discusses the coordination and assignment of radio frequencies. No new frequency bands would be required for the proposed action. Any change in frequency uses would be coordinated with the WSMR frequency manager.

3.13.3. Utilities and energy

Electrical service to the northern part of WSMR and the Stallion Range Center is provided by Socorro Electric Cooperative. The first seven miles of lines south of Stallion are maintained by the White Sands Directorate of Installation Support, Operations Division (WSMR EIS, Section 3.16) and beyond this point maintenance is provided by the Cooperative. Due to the remoteness of the Granite site, there are no on-site utilities. A power line runs along the southern side of the site. Up to three power poles may be relocated outside the site to prevent impacts to the power line from test activities. Power for test activities at the site may be provided in part by power from this line, and would also be supplied by one of DTRA/SCC-WMD’s existing portable generators that would be brought in from another site. Generators will be coordinated with WSMR Air quality personnel prior to use.

3.13.4. Airspace

The PEIS, Section 3.5, describes control and management of airspace at WSMR. The Federal Aviation Administration (FAA) and WSMR have a share-use agreement for control and management of the airspace. WSMR’s Cox Range Control Center (CRCC) is delegated control over airspace in the region of WSMR. Airspace use for DTRA/SCC-WMD-related tests must be coordinated through CRCC.

3.14. Cultural Resources

A detailed culture history and discussion of cultural resources management on WSMR is available in Section 3.5 of the 2009 EIS for the Development and Implementation of Range-Wide Mission and Major Capabilities at WSMR (WSMR 2009). An online records check of the New Mexico Cultural Resources Information System (NMCRIS) database was conducted by USACE in October of 2013 before the survey of the proposed target site, again in January of 2014 prior to surveying road repair locations along the proposed power line access road, and again in February of 2015 prior to surveying the proposed Pond access road. According to the NMCRIS database, very little survey has occurred in the Mockingbird Mountains. No previous surveys have been conducted, and no previously recorded archaeological sites are located within one mile of the proposed target site. For the power line and Pond access road survey areas, five previous surveys and five previously recorded archaeological sites are located within one mile of

the project areas; none of which fall within the proposed access roads. The western half of the Pond Road survey area is located within a National Register Historic District (listed on the NRHP October 15, 1966; State Register No. 30) called the Trinity Site National Historic Landmark (NHL); however, none of the character-defining features of the NHL are located within the proposed project area.

The goal of cultural resource management at WSMR is to protect and manage the installation's cultural resources in compliance with various Federal Laws and Regulations in addition to supporting the ongoing mission activities at WSMR. Management of WSMR cultural resources are required by the National Historic Preservation Act (NHPA) of 1966 (as amended) and is governed by the Programmatic Memorandum of Agreement (PMOA) executed in 1985 between WSMR, the Advisory Council on Historic Preservation (ACHP) and the New Mexico Historic Preservation Division.

Cultural resources surveys were conducted on November 4, 2013 at the proposed Granite site, February 20, 2014 along the proposed power line access road, and March 4, 2015 along the proposed Pond access road. The total survey acreage for the Granite Site and power line road surveys was 80.31 acres, and the survey recorded one new archaeological site, LA 177505, and 73 isolated occurrences (Decker 2014). LA 177505 is a prehistoric campsite of unknown age containing 30 lithic artifacts and no features. Given the site's small, non-diagnostic assemblage and the lack of any potential for significant buried deposits or datable materials, LA 177505 is recommended ineligible for nomination to the National Register of Historic Places (NRHP). Following survey of the target site and the power line access road, WSMR requested that an additional access road to the target be considered. The Corps surveyed the Pond access road on March 4, 2015. The total acreage for the survey is 50.0 acres along a 6.28 mile stretch of the Pond Road (Decker 2015). The survey recorded one new archaeological site, LA 181347, and 28 isolated occurrences. LA 181347 is a prehistoric lithic scatter of unknown age containing 14 lithic artifacts, four pieces of fire-cracked rock and no features. The site has a small assemblage, but also has excellent potential for buried deposits, as artifacts were observed eroding from the road cut. Because much of the site appears to be buried, it is difficult to determine the nature and extent of the scatter and to gather the information necessary to make an eligibility determination. LA 181347's eligibility for nomination to the NRHP, therefore, is considered undetermined until such time that additional testing occurs. The Corps is currently working with WSMR and DTRA/SCC-WMD to develop a testing plan for site LA 181347. Testing will include investigating the nature and extent of the buried site to determine its eligibility for inclusion in the NRHP, as well as testing the surrounding area to determine potential routes to relocate the road if such an action is necessary. Until testing is complete, the site will be treated as eligible for the purposes of this project. The information potential of all 101 isolated occurrences from the two surveys is considered exhausted by recording and documentation, and all isolated occurrences are therefore considered ineligible for listing in the NRHP. Consultation with the New Mexico State Historic Preservation Officer (SHPO) will take place once testing of LA 181347 is complete with a request for concurrence with these eligibility determinations, and to determine methods to avoid or minimize impacts to archaeological site LA 181347. The SHPO consultation letter and concurrence will be included in Appendix D.

3.15. Native American Consultation

WSMR consultation with tribes is ongoing. Responses from the consultations will be included in Appendix D.

3.16. Noise and Airblast

Section 3.7 of the PEIS describes sources of noise at WSMR. The isolation of the Granite site contributes to its relative quiet, although it is currently subject to noise from overflights. Noise levels that are currently generated by construction and testing at the SHIST site are typical of what would be expected at the Granite site. Loud intermittent noise and airblast would occur when HE and inert air-delivered weapons are tested. Other sources of noise at SHIST are equipment used for recovery of inert earth-penetrating warheads, and from vehicles and on-site generators.

3.17. Hazardous Materials and Hazardous Wastes

A hazardous material is any substance or chemical that exhibits either a physical or health hazard (29 CFR 1910.1200). Hazardous waste is any material listed in 40 CFR 261 Subpart D, or any material possessing any of the hazardous characteristics of toxicity, corrosivity, ignitability, and/or reactivity as defined in 40 CFR 261 Subpart C.

Section 3.9 of the PEIS describes types of hazardous materials that may be used or generated by DTRA/SCC-WMD activities. Materials that would be used or generated at the Granite site are similar to those currently used at SHIST and Alt SHIST. No hazardous or toxic materials are stored at SHIST or Alt SHIST, and none would be stored at Granite. Wastes potentially occurring at these sites include petroleum, oils and lubricants (POL) products from vehicles and equipment.

Materials generated from tests would include primarily carbon compounds (carbon monoxide and dioxide, graphite), water, nitrogen, and aluminum oxide; none of these are hazardous. DTRA/SCC-WMD has not used perchlorate based fuel or explosives (Fraher, personal communication 2013). Detailed characteristics and properties of DTRA/SCC-WMD test materials are provided in the PEIS, Appendix F.

The Granite site is currently believed to be free of hazardous materials or wastes.

At the request of the USACE Environmental Engineering Section, a records search for existing environmental documentation was completed to support a Phase I Environmental Site Assessment. Search of the WSMR Environment Library failed to find any records of potential interest, such as existing cleanup sites, water wells, or land uses, located in the vicinity of the proposed Granite Site.

A USACE Environmental Scientist visited the site on November 2, 2013. Several objects thought to be potentially hazardous were located during the site visit, including spent bullets, an actuator, missile fragments, and an unidentified metal “tank”. The WSMR safety office investigated and determined that the objects were neither hazardous nor UXOs.

Radiation safety is addressed in the PEIS, Section 3.8. Sources of ionizing radiation previously used in program activities include instrumentation fielded for large-scale explosive testing. Sources of non-ionizing radiation previously used by DTRA/SCC-WMD activities include laser guidance and tracking systems, radar guidance and tracking systems, site illumination, communication, and electro-optical countermeasures.

3.18. Human Health and Safety

Health and safety protocols for DTRA/SCC-WMD areas and facilities are discussed in the PEIS, Section 3.10. Detailed standard operating procedures (SOPs) have been established to fulfill health and safety requirements at WSMR. Additionally, safety procedures and training are available on the WSMR Safety Office web page (WSMR 2014a).

Safety includes airspace management to ensure that there are adequate safety buffer zones for hazardous activities involved with military testing and training, such as missile and rocket firings.

Safety hazards for DTRA/SCC-WMD personnel may include vehicle accidents during travel to sites, work-related risks from the use of heavy equipment and machinery, and exposure to noise. Personnel would be exposed to hazards from the use of explosives and post-test evaluations of potentially unstable areas. Personal protection equipment will be used in these situations in accordance with safety regulations. Personnel involved in field work in support of DTRA/SCC-WMD activities at the Granite site, such as pre-clearance of targets, would potentially be exposed to venomous animals and spiny plants while working at the DTRA/SCC-WMD test beds.

Additional potential health and safety concerns for workers on WSMR and in the DTRA/SCC-WMD areas include exposure to hazardous materials, exposure to explosive devices, and unexploded ordnance (UXO). All personnel involved in testing activities are required by WSMR to receive UXO training. As stated above (Section 3.17, hazardous materials), the site visit revealed no surface UXO. Additionally, all target sites would undergo UXO clearance prior to use.

Safety risks for members of the public who may participate in hunting in the area surrounding the Granite site may include vehicle accidents, vehicle-wildlife collisions, exposure to venomous animals and spiny plants. There would be no public access to the test site or the surrounding surface danger zone and the public would not be exposed to explosives.

DTRA/SCC-WMD activities pose little hazard to humans living in areas adjacent to WSMR. Airborne dust has the potential to be generated off-range from high explosive tests. However, the site's location within a basin surrounded by mountains will capture most dust locally. Additionally, high explosive by-products may be lofted into the atmosphere; however, 97% (by weight) of these by-products consist of water, nitrogen, and carbon dioxide. The remaining 3% of compounds would occur in small, insignificant quantities (PEIS Section 4.6, p. 207).

3.19. Socioeconomics

Socioeconomic data for the region influenced by DTRA/SCC-WMD activities is provided in the PEIS, Section 11. Updated demographic and socioeconomic data are provided below in Table 3 for the counties with DTRA/SCC-WMD test beds: Socorro, Sierra, and Lincoln counties.

Staffing of DTRA/SCC-WMD facilities would remain similar to levels described in the PEIS under either the proposed alternative or the non-action alternative. DTRA/SCC-WMD staff members are no longer permanently stationed on-site; instead, they travel to WSMR as needed. Employment of civilian and contractor personnel would not change significantly under either alternative.

3.20. Environmental Justice

EO 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations (59 Federal Register 7629), was issued to ensure Federal agencies identify and address any disproportionately high and adverse human health and environmental effects on minority and low-income populations. Socorro and Sierra Counties both have low median household incomes and a high percent of the population below the poverty level compared to New Mexico as a whole (Table 3). The proportions of Hispanic or Latino and Native American people in Socorro County are slightly higher than New Mexico as a whole; these two “minority” groups comprise 61% of the county’s population. Sierra and Lincoln counties have smaller proportions of Hispanics and Native Americans than New Mexico in general, but all three counties have a higher proportion of these groups than does the U.S. as a whole. Additionally, as reported in the PEIS, the cities and towns that are closest to the proposed action area have disproportionately high percentages of minorities and people in poverty. Therefore, this EA will analyze potential disproportionate impacts on minority and low-income populations.

EO 13045, Protection of Children from Environmental Health Risks and Safety Risks (62 Federal Register 19883) states that each Federal agency shall identify and assess environmental health risks and safety risks that may disproportionately affect children. Examples of disproportionate effects on children include: substances that children are likely to come in contact with in air, water, soil, or food; noise, especially around schools; and effects of climate change (USEPA 2014b “Climate Change and the Health of Children.”)

Table 3: Socioeconomic and Demographic Data for New Mexico Counties with DTRA/SCC-WMD Test Beds

	Population in 2013, est. (change, April 2010 to July 2013)	Persons per square mile in 2010	Housing units in 2012	Median value of owner occupied housing units, 2008-12	Median household income, 2008-12	Persons below poverty level, percent, 2008-12	White alone, percent, 2012	White alone, not Hispanic or Latino, percent, 2012	Hispanic or Latino, percent, 2012	American Indian and Alaska Native alone, percent, 2012	Black or African American alone, percent, 2012
Lincoln County	20,105 (-1.9%)	4.2	17,610	\$162,100	\$44,149	14.7%	94.0%	64.9%	31.0%	3.2%	0.8%
Sierra County	11,572 (-3.5%)	2.9	8,327	\$114,600	\$29,185	25.3%	93.7%	67.2%	28.9%	2.4%	0.7%
Socorro County	17,584 (-1.6%)	2.7	8,036	\$114,000	\$34,337	25.0%	82.9%	37.1%	48.9%	12.4%	1.2%
New Mexico	2,085,287 (+1.3%)	17.0	906,802	\$161,500	\$44,886	19.5%	83.2%	39.8%	47.0%	10.2%	2.4%
U.S.A.	316,128,839 (+2.4%)	87.4	132,452,405	\$181,400	\$53,046	14.9%	77.9%	63.0%	16.9%	1.2%	13.1%

Source: <http://quickfacts.census.gov/qfd/states/35000.html>

4. ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION AND NO-ACTION ALTERNATIVE

This section analyzes the effects of the proposed action and the no-action alternative on the environmental resources that have been discussed in Section 3. Environmental effects and proposed mitigation measures and Best Management Practices (BMPs) to avoid or minimize environmental harm are summarized below in Table 4. BMPs are standard practices that are implemented as part of the proposed action to minimize or avoid adverse impacts. Additional mitigation commitments are proposed to minimize, rectify or compensate for unavoidable adverse environmental effects that could be significant without mitigation.

Table 4: Granite Target Site Environmental Effects Summary

Resource	Impacts of the Proposed Action	Impacts of the No-Action Alternative	Proposed Best Management Practices and Mitigation Measures
Air Quality	No effect to minor adverse effect • Release of explosive by- products and dust from test activities would continue at present levels • Dust and vehicular emissions would be generated by construction activities • The area of soil disturbance would increase over present levels by several acres each year.	No effect to minor adverse effect • Testing that does not require solid bedrock would continue at existing sites. • Tests requiring solid granite would result in increased excavation and removal of damaged rock at existing test sites and potentially more dust.	BMPs • Support vehicles would be limited to existing roads and test bed boundaries. Off-road travel would be limited to placement of testing infrastructure, cameras and recovery activities using a single path in and out. • Dust abatement measures would include use of water spray or dust suppressants to minimize excessive vehicle-generated dust levels • Vegetation cover would be retained on site wherever possible until clearing is required for targets. • Prediction models would be used before tests, including monitoring wind speed and direction, to develop “go” – “no go” criteria for tests • Equipment that meets air quality standards would be used. • If any emission sources are to be added, DTRA/SCC-WMD would coordinate with the WSMR Environmental Division Air Quality Manager to ensure compliance with WSMR’s permit under Title V of the Clean Air Act. • Monitor sources of regulated pollutants and amount of pollutants being emitted as required.

Geology and Soils	Minor adverse effect • Disturbance of bedrock, topography and soils at the Granite test site. • Increased erosion, soil compaction, and surface water runoff	Minor adverse effect • Increased excavation and removal of damaged rock at existing test sites would be required to reach solid rock suitable for penetration tests	BMPs • Support vehicles would be limited to existing roads and test bed boundaries. Off-road travel would be limited to placement of testing infrastructure, cameras and recovery activities using a single path in and out. • Appropriate surface water and erosion control measures would be implemented. • Dust abatement would be implemented as specified above for Air Quality. Mitigation Commitments • Impact craters and depressions caused by explosions or recovery activities would be filled in and returned to approximate original contours following testing and recovery activities. • Following the end of the site's usefulness as a test bed, all remaining disturbed areas would be returned to their approximate original contours to the extent feasible, according to a closure plan submitted to WSMR.
Climate and Climate Change	No effect • Emissions of greenhouse gases (GHG) would remain essentially the same as baseline conditions.	No effect • Emissions of greenhouse gases (GHG) would remain essentially the same as baseline conditions	BMPs • As equipment such as vehicles and generators reaches the end of its serviceable life, it would be replaced with improved technology such as more energy-efficient, lower emissions equipment or alternative energy sources. • Per NMED Air Quality Bureau and WSMR Title V Air permit requirements Greenhouse gases must be reported on a semi-annual and annual basis.

Water Resources	No effect • Potential for increased runoff from test site and access road would be minimized and mitigated by use of appropriate stormwater controls and drainage features. • Spills and waste water would be managed to avoid contaminating surface or ground water.	No effect • No change from existing conditions and mitigation measures at existing sites	BMPs • Appropriate surface water and erosion control measures would be implemented. The road would be monitored for erosion. • Vehicles, construction equipment, generators, and fuel storage units would employ a spill containment system in accordance with the WSMR Spill Prevention Plan. • Waste water from construction activities, such as onsite material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, etc. shall not be allowed to enter water ways or to be discharged prior to being treated to remove pollutants. • All equipment that will be used at the site shall be inspected prior to being mobilized to the site to ensure that there are no leaks or drips. The equipment operator shall keep a spill kit on board. Any equipment in disrepair shall be repaired or removed from the site immediately. • If any disturbance is greater than one acre in size, a Storm Water Pollution Prevention Plan is required under the NPDES Construction General Permit and a Notice of Intent shall be filed with the USEPA. • Road maintenance and improvements would be designed to prevent erosion caused by water running down or across the road. Runoff would be managed by use of techniques such as those described in Zeedyk (2006) to minimize erosion.
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Vegetation communities	Minor to moderate adverse effect - A small amount of vegetation (generally less than one acre) would be disturbed or destroyed with each test. - Over the lifetime of the target site, up to 53 acres of vegetation could be disturbed or destroyed. - Approximately 18 acres (0.3%) of the Mockingbird Gap Grassland SNA would be lost.	No effect No change in vegetation at existing sites. Existing target sites (SHIST, ALT SHIST) have already had most of their vegetation disturbed.	BMPs - Support vehicles would be limited to existing roads and test bed boundaries. Off-road travel would be limited to placement of testing infrastructure, cameras and recovery activities using a single path in and out. - Vegetation cover would be retained on site wherever possible until clearing is required for targets. - Equipment would be inspected and cleaned when entering and after leaving the site to prevent spread of non-native species. Mitigation - Following the end of their usefulness as test beds, disturbed areas would be restored to the extent feasible and native vegetation would be allowed to reseed naturally, according to closure plan submitted to WSMR. - DTRA/SCC-WMD would provide funding for WSMR to monitor plots that have been established close to the site and the access road. Monitoring will allow WSMR Land Management personnel to track effects over time.
Invasive Species and Noxious Weeds	Minor to moderate adverse effect Lehmann lovegrass currently exists along access road at the proposed site	No effect	BMPs - To prevent the introduction of exotic plants, vehicles and equipment would be inspected and cleaned as appropriate to remove plant parts or contaminated soils prior to arrival at the test site. - Any equipment that has been used in an area with known invasive species would be cleaned before mobilizing to the Granite site. - Equipment leaving Granite site would be visually inspected and any plant parts attached to equipment would be removed to prevent spreading Lehmann lovegrass to other areas. Mitigation - DTRA/SCC-WMD would provide funding for annual monitoring of invasive species in and around disturbed areas of the site.

Wildlife	Minor adverse effect • Fauna could be injured or killed during test and construction activities • Potential trapping hazard from impact craters • Noise from construction and test activities would temporarily disturb fauna. • Impulse noise (blast) could impair hearing of fauna near test site. • Golden eagles nesting within direct line-of-sight of the Granite site could be disturbed by testing. Disturbance could cause breeding failure or abandonment of the territory.	No effect • Effects to wildlife would be insignificant at existing sites (SHIST, Alt SHIST) because ongoing testing activity has caused wildlife to move out of the areas.	BMPs • During static high explosive testing the fire department would be on call to prevent the spread of wildfires. • Surveys for migratory birds would take place before targets are put in place or vegetation is cleared. • Vegetation would be cleared prior to conducting tests to minimize the presence of wildlife within the target during tests. • To limit disturbance to fauna and habitat, support vehicles would use existing roads whenever possible. Off-road travel will be limited to placement of testing infrastructure, cameras and recovery activities using a single path in and out. • Surveys for raptors, particularly golden eagles, and their nests would continue to take place in the area. • The WSMR Garrison Environmental Division shall be contacted regarding any issues related to raptors, migratory birds, potential kit fox dens, bat roosts or snake dens. Mitigation commitments • If bird nests are found during surveys, WSMR Garrison Environmental Division shall be consulted to determine how to best address. The Division would consult with the USFWS if needed to avoid MBTA violations. Target locations may be adjusted to avoid active nests. • WSMR will continue monitoring the eagle pair that has a nest close to Granite site to identify which nest it is using each year and to track occupancy of the nest and territory and the pair's reproductive success. • WSMR is working with the USFWS to obtain the appropriate permit(s), which may include the following mitigation: - o Remote cameras may be placed to monitor eagle behavior during testing. - o Testing may be precluded, unless essential, during the most critical 6-8 weeks of nesting season - o DTRA/SCC-WMD would retrofit power poles as determined by the USFWS to prevent raptors from being electrocuted when landing on poles. - o Other mitigation as required by the permit(s)
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Threatened and Endangered Species	No effect - No critical habitats present at or near site - No resident T&E species present at or near site	No effect	BMPs - Surveys would be conducted for T&E species prior to clearing vegetation - WSMR is required to report all aplomado falcon sightings to the USFWS within 24 hours. - If a Baird's sparrow is sighted in an area where DTRA/SCC-WMD testing activities are planned, WSMR's Environmental Stewardship Division (WS-ES) will be consulted. - If a northern aplomado falcon or Sprague's pipit is sighted in the area, WS-ES would be contacted to ensure compliance with the Endangered Species Act.
Wildland Fire	No effect There is minimal potential for fires to start as a result of some tests	No effect	BMPs - Vegetation would be cleared prior to conducting tests, limiting the amount of fuel present on site. - During static high explosive testing the fire department would be on call to prevent the spread of any wildfires that may result. - All fires would be managed in accordance with the WSMR Fire Management Plan
Land Use and Aesthetics	Minor adverse effect - A site in relatively natural condition would be disturbed. - The proposed Granite site is not readily visible from any area that is commonly used by WSMR personnel or public visitors.	No effect	BMPs - To limit disturbance, support vehicles would use existing roads whenever possible. Off-road travel will be limited to placement of testing infrastructure, cameras and recovery activities using a single path in and out. - All activities will be consistent with WSMR's Land Use and Airspace Strategy Plan Mitigation commitments - Impact craters and depressions caused by explosions or recovery activities would normally be filled in and returned to approximate original contours following testing. - Following the end of the site's usefulness as a test bed, all remaining disturbed areas would be returned to their approximate original contours, according to a closure plan submitted to WSMR.

Facilities and Infrastructure	No effect - Existing infrastructure can accommodate DTRA/SCC-WMD traffic with minor improvements to access road - A remote powerline might be moved to protect the line from explosive debris	No effect No change in use of infrastructure at existing sites	BMPs - All construction and testing activities would be consistent with WSMR's Land Use and Airspace Strategy Plan. Mitigation commitments - Movement of 2 or 3 power poles might be required to protect the power lines. The power line provides power to a single remote site servicing DTRA/SCC-WMD equipment. Any power pole replacement would be coordinated with the owner and the Garrison Environmental Division, and would be consistent with the WSMR Avian Protection Plan.
Airspace	No effect WSMR airspace use would remain at approximately current levels	No effect No change in WSMR airspace use	BMPs None required.

Cultural Resources	No effect/minor effect - No historic properties have been identified within the Granite site. - The Pond access road passes through the Trinity Site National Historic Landmark (NHL); however, none of the character-defining features of the NHL are located within the proposed project area. - An archaeological site exists along the access road.	No effect	BMPs - Vehicle travel to the site shall be restricted to the existing access road Mitigation commitments - Mitigations determined in consultation with the SHPO (SHPO Letter, 16 November 2015, Appendix D) include: - Siebert stakes will be placed either around the site or along the road to warn against inadvertent encroachments. - Permanent signage will be installed to indicate “no grading, or widening”. - WSMR will conduct periodic monitoring of the road, as convenient, for the duration of the undertaking, and consult with the SHPO if there are any post-review effects. - Measures implemented to reduce erosion to the site such as water bars or drainage ditches shall be placed beyond the 30 m buffer. - All staging areas for erosion control work will be beyond the 30 meter buffer. - No road widening or alteration will occur within 30 meters of the boundary of LA 181347 - Any staging areas unidentified during this consultation shall be surveyed prior to this work - A post construction report will be submitted to SHPO for review
Indian Trust Assets	No effect No Indian Trust Assets have been identified in the area	No effect	None

Noise and Blast	Minor adverse effect - Noise impacts from DTRA/SCC-WMD tests would remain approximately the same, but would shift from SHIST to the Granite site. - Fauna could be disturbed temporarily or change behavior - Hearing could be impaired - Blast pressure from HE tests could cause minor structural damage	No effect Noise impacts from DTRA/SCC-WMD tests would remain approximately the same	BMPs - WSMR activities require adherence to the Occupational Safety and Health Administration (OSHA) Hearing Conservation Standard (29 CFR 1910.95), which protects workers from potentially hazardous occupational noise exposures. - DTRA/SCC-WMD calculates expected blast pressures and ensures people and equipment are properly protected for every test activity. - Employees would be enrolled in a hearing conservation program if noise exceeds 85 dBa expressed as an 8-hour time-weighted average and would be required to wear hearing protection. - Personnel would be evacuated to a safe distance prior to explosive tests.
Hazardous Materials and Hazardous Wastes	No effect - Petroleum, oils, and lubricants (POL) waste may be generated from test and construction activities - Low potential for hazardous debris	No effect Amount of POL may increase from equipment used to remove damaged rock from existing test sites.	BMPs - Vehicles, construction equipment, generators, and fuel storage units would employ a spill containment system in accordance with the WSMR Spill Prevention Plan. - All equipment used at the site shall be inspected prior to being mobilized to the site to ensure that there are no leaks or drips. The equipment operator shall keep a spill kit on board. Any equipment in disrepair shall be repaired or removed from the site immediately. - Prior to construction or clearing of vegetation from targets, surveys would be conducted to ensure no hazardous materials are present. - In the case that any discolored soil, soil with an odor, or any debris are discovered during excavation or clearing, work would be stopped. The WSMR Environmental Division would be notified and appropriate action would be taken before work proceeds.

Human Health and Safety	No effect Health and safety concerns would not differ from current DTRA/SCC-WMD testing	No effect Same as the proposed action	BMPs - All personnel shall receive unexploded ordnance (UXO) training. - Prior to construction or clearing of targets, pre-clearance surveys would be conducted to ensure no UXO is present. - Personnel will use personal protection equipment (PPE) in accordance with MSDS recommendation for all potentially hazardous or toxic materials. - Personnel would be trained on safe operation of heavy equipment and wear hardhats and other appropriate PPE. - Measures to reduce hazards concerning engine exhaust emissions include monitoring for CO, proper ventilation of work areas, and the use of proper PPE. - Personnel would be evacuated to a safe distance prior to explosive tests. - Hearing protection would be provided as stated above (Noise).
Socioeconomics	No effect No change in economic activity in the surrounding area	No effect Same as the proposed action.	None
Environmental Justice	No effect - No adverse impacts to minority populations located in the region of influence - Would not disproportionately affect minority and low-income populations compared to the general population.	No effect Same as the proposed action	None

4.1. Air Quality

DTRA/SCC-WMD mission activities release dust and airborne pollutants and thus have the potential to affect air quality locally and regionally, as described in the PEIS, Section 4.6. Airborne dust and combustion products (primarily water, nitrogen, and carbon dioxide) would be generated from detonations and impacts related to earth penetration tests, advanced weapon system tests, and static explosive tests. Construction of targets would generate airborne dust from the use of heavy equipment. Ground vehicles used for transportation to test sites produce engine exhaust that contains nitrogen oxides, carbon monoxide, hydrocarbons, sulfur oxides, and particulate matter.

Under the proposed action, the release of explosive by-products and dust from test activities would continue at present levels. As stated in the PEIS, rock penetration and other tests would affect air quality primarily from dust generation locally on the test bed. Sources of airborne dust would not be persistent or long-term. Because the area of targets would increase slightly, there would potentially be a small increase in dust. However, mitigation measures and BMPs would minimize dust generated from construction and test activities. Furthermore, any dust generated on site would be unlikely to be transported off-range. The proposed site's location within a drainage basin and the prevailing SW winds (upslope at this site) would tend to trap dust within the local basin.

High explosive by-products could be lofted into the atmosphere; however, 97% (by weight) of these by-products consist of water, nitrogen, and carbon monoxide or dioxide. The remaining 3% of compounds would occur in small, insignificant quantities (DTRA 2007). Air quality impacts of current levels of DTRA/SCC-WMD testing do not exceed State and Federal air quality standards, and the proposed action would not cause a significant change in the level of testing or in the amount of pollutants and dust generated. The proposed action would meet all applicable air quality regulations. Therefore, emissions of criteria pollutants would not increase from the proposed action. Impacts to air quality from the proposed action would not be significant.

If a new target site is not approved (no-action alternative), testing would continue at existing sites. Tests requiring solid granite would result in increased excavation and removal of damaged rock at existing test sites and would potentially cause more dust to be generated. Mitigation measures and BMPs would minimize dust generated from construction activities and vehicles. Therefore, the no-action alternative would have no significant adverse effect on air quality.

BMPs for air quality would include:

- Support vehicles would be limited to existing roads and test bed boundaries. Off-road travel would be limited to placement of testing infrastructure, cameras and recovery activities using a single path in and out.
- Dust abatement measures would include use of water spray or dust suppressants to minimize excessive vehicle-generated dust levels
- Vegetation cover would be retained on site wherever possible until clearing is required for targets.

- Prediction models would be used before tests, including monitoring wind speed and direction, to develop “go” – “no go” criteria for tests
- Equipment that meets air quality standards would be used.
- If any emission sources are to be added, DTRA/SCC-WMD would coordinate with the WSMR Environmental Division Air Quality Manager to ensure compliance with WSMR’s permit under Title V of the Clean Air Act.
- Sources of regulated pollutants and amount of pollutants being emitted would be monitored as required.

4.2. Soils

Under the proposed action, there would be a minor adverse effect to soils. Small areas of soils (generally up to one acre) would be disturbed each time a target for testing is prepared. Soil overburden would be removed from the granite that is needed for each test. There would be a potential for increased erosion, soil compaction, and surface water runoff adjacent to cleared areas. Mitigation measures and BMPs would minimize the amount of soil disturbance. Over the lifetime of the target site, up to 50 acres of soils would be disturbed. Once the site is past its useful lifetime as a test site, a closure plan would be submitted to WSMR, as stated in the PEIS, Section 2.1.3 (page 2-13). At the request of White Sands Environment and Safety Directorate (WS-ES), restoration of the target site may include restoring original site contours to the extent feasible, allowing native plants to re-seed, or other environmental mitigations.

Under the no-action alternative, minor adverse effects to soils at the existing test sites would continue. The surface area of soil disturbance would be less than under the proposed alternative.

Proposed mitigation measures and BMPs would ensure that adverse effects to soils are minimized. Effects to soils would not be significant under either the proposed alternative or the no-action alternative.

BMPs for soils would include:

- Support vehicles would be limited to existing roads and test bed boundaries. Off-road travel would be limited to placement of testing infrastructure, cameras, and recovery activities using a single path in and out.
- Appropriate surface water and erosion control measures would be implemented.
- Dust abatement would be implemented as specified above for Air Quality.
- The access road would be monitored for erosion and maintained or improved as needed. Road maintenance and improvements would be designed to prevent water from running down or off the road in a concentrated flow that would create ruts and erosion. Runoff would be managed using techniques such as those described in Zeedyk (2006), or other methods to minimize erosion by properly directing, slowing and infiltrating water.

Mitigation measures would include:

- Impact craters and depressions caused by explosions or recovery activities would be filled in and returned to approximate original contours following testing and recovery activities.

- Following the end of the site's usefulness as a test bed, all remaining disturbed areas would be returned to their approximate original contours to the extent feasible according to a closure plan submitted to WSMR.

4.3. Geology

The proposed action would have a minor adverse effect on local geology. Surface granite at the target site would be fractured and damaged by bedrock penetration tests. This would be an unavoidable impact to up to 50 acres of granite bedrock. The area of Yg plutonic granite surface geology in the Mockingbird Mountains is 7134 acres. The area potentially damaged by DTRA/SCC-WMD testing would be less than one percent of the surface granite in the Mockingbird Mountains and less than 0.01% of the surface granite within WSMR. Therefore, the effect to geology would not be significant.

Under the no-action alternative, the surface area of granite disturbed would be less. However, DTRA/SCC-WMD would need to remove damaged rock from existing sites in order to reach solid rock suitable for conducting penetration tests. Increased excavation and removal of damaged rock at existing test sites would also constitute a minor adverse effect to geology.

Mitigation measures for geology would be similar to those outlined for soils.

- Impact craters and depressions caused by explosions or recovery activities would be filled in and returned to approximate original contours following testing and recovery activities.
- Following the end of the site's usefulness as a test bed, all remaining disturbed areas would be returned to their approximate original contours to the extent feasible according to a closure plan submitted to WSMR.

4.4. Climate and Climate Change

Detailed information about global climate change and analysis of WSMR activities that may contribute to climate change is presented in the WSMR EIS, Section 4.19.2.3.2. There is broad scientific consensus that human activities including fossil fuel combustion and changes in land use are resulting in the accumulation of greenhouse gases (GHGs), such as carbon dioxide (CO₂), in our atmosphere. An increase in GHG emissions is correlated with an increase in the Earth's average surface temperature, commonly referred to as global warming. Global warming is expected to affect weather patterns, average sea level, precipitation rates, and other parameters of global climate.

Executive Order (E.O.) 13524, Federal Leadership in Environmental, Energy, and Economic Performance (signed October 2009) sets a policy for federal agencies to increase energy efficiency and to measure, report, and reduce their greenhouse gas emissions from direct and indirect activities. WSMR also participates in implementing energy efficiency measures through E.O. 13423, "Strengthening Federal Environmental, Energy, and Transportation Management". Implementing these measures is expected to reduce the overall contribution of federal agencies' actions to GHG emissions and climate change (WSMR 2009 EIS, Section 4.19.2.3.2).

The PEIS, Section 4.1.3, discusses the potential effect of DTRA/SCC-WMD activities on climate. The small amounts of GHG emissions from DTRA/SCC-WMD activities would not

significantly affect climate. Under both the proposed action and the no-action alternative, emissions of greenhouse gases (GHG) would remain essentially the same as baseline conditions discussed in the PEIS. DTRA/SCC-WMD would continue to conduct testing at approximately the same frequency. Personnel would travel to reach testing sites, and use of equipment for testing and recovery would continue.

Because there would be no measurable change in the small amount of GHG produced by DTRA/SCC-WMD test activities, the effect on climate of either the proposed action or the no-action alternative would not be significant. No mitigation measures are proposed.

4.5. Water Resources

Under the proposed action, there would be a potential for increased stormwater runoff from development of a new test site because the area of disturbed or bare ground and exposed rock would increase. Stormwater runoff would potentially affect the arroyo that drains the site and flows into the closed Jornada Basin. There would also be potential for spills from construction and service vehicles and equipment or waste water to contaminate surface or ground water.

Effects to surface and ground water from DTRA/SCC-WMD activities were analyzed in the PEIS. Both modeling and observations of existing test sites indicate that, given implementation of appropriate mitigation and BMPs, effects to water resources would be minimal (PEIS, Section 4.1.6).

Under the no-action alternative, there would be no increase in bare ground or exposed rock. Existing test sites would continue to be used and would continue to use appropriate mitigation and BMPs. Therefore, the no-action alternative would result in no effect to water resources.

BMPs for water resources would include:

- Appropriate surface water and erosion control measures would be implemented.
- Vehicles, construction equipment, generators, and fuel storage units would employ a spill containment system in accordance with the WSMR Spill Prevention Plan.
- Waste water from construction activities, such as onsite material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, etc. shall not be allowed to enter water ways or to be discharged prior to being treated to remove pollutants.
- All equipment that will be used at the site shall be inspected prior to being mobilized to the site to ensure that there are no leaks or drips. The equipment operator shall keep a spill kit on board. Any equipment in disrepair shall be repaired or removed from the site immediately.
- If any disturbance is greater than one acre in size, a Storm Water Pollution Prevention Plan is required under the NPDES Construction General Permit and a Notice of Intent would be filed with the USEPA.
- Road maintenance and improvements would be designed to prevent water from running down or off the road in a concentrated flow that would create ruts and erosion. Runoff would be managed using techniques such as those described in Zeedyk (2006), or other methods to minimize erosion by properly directing, slowing and infiltrating water.

4.6. Vegetation Communities

Under the proposed action, use of the Granite site for testing would have a minor to moderate adverse effect on vegetation communities. A small amount of vegetation would be disturbed or destroyed with each test. Over the lifetime of the target site, up to 50 acres of vegetation could be disturbed or destroyed. This is an unavoidable impact due to the nature of the proposed project.

The no-action alternative would result in no change in vegetation at either the existing sites or the Granite site. Existing target sites have already had most of their vegetation disturbed. The Granite site would remain undisturbed. Therefore, the no-action alternative would have no effect on vegetation.

Each of the vegetation types present on site exists at WSMR on the scale of a few thousand to several thousand acres. Acreage for the plant communities found at Granite site and the percentage of loss once the Granite site is fully used and cleared are as follows:

- Shrub Live Oak/Sideoats Grama, Hairy Grama or Black Grama: 7, 756 ha (19,166 acres) of this vegetation alliance, which is a component of Interior Chaparral, exists at WSMR. If the 32-acre area of mixed grass and shrubs at the Granite site consisted of this vegetation type, the loss would be 0.17%.
- Black Grama-Blue Grama, Sideoats Grama or Hairy Grama Foothill Grasslands: 2, 168 ha (5357 acres) of this plant association, which is a component of the Mixed Foothill-Piedmont Desert Grasslands, exists at WSMR. If the 21.5-acre area of grassland within the Granite site consisted of this vegetation type, the loss would be 0.4%.
- Black Grama and Blue Grama/Soaptree Yucca Piedmont Grasslands: 2,168 ha (5335 acres) of this plant association, which is a component of the Piedmont Desert Grasslands, exists at WSMR. If the 21.5-acre area of grassland within the Granite site consisted of this vegetation type, the loss would be 0.4%.
- The Mockingbird Gap Piedmont Desert Grasslands SNA is 3,708 ha (9,162 acres) in extent. When the Granite site is completely used and cleared, the 18 acres of the SNA that overlap with the Granite site, or 0.36% of the SNA, would be lost. This loss would occur in a peripheral part of the grasslands that extends into the Mockingbird Mountains.
- Additionally, approximately 8 acres or 0.15% of the SNA has been directly impacted, and would continue to be affected by the access road. This impact would also occur under the no-action alternative, and has been minimized to the extent possible by using the Pond road instead of Gus road for access.

These acreages and percentages of loss due to direct effects of the project are small. Less than one-half percent of each plant community would be directly affected by the proposed project. Nevertheless, the loss of this small area of Chihuahuan Desert grassland is a concern because it is partly within the SNA that WSMR intends to protect. Mitigation and monitoring are proposed to ensure that effects to the SNA do not reach the level of significance.

Management of remaining large-scale native plant communities at WSMR, including withdrawal from livestock grazing, is intended to ensure that high-quality large-scale native plant communities, including the Grasslands SNA, will persist at WSMR. Additionally, WSMR has established Land Condition Trend Analysis (LCTA) long-term monitoring plots that are monitored periodically. There are concerns that the grasslands may be losing viability, perhaps due to drought (Nethers, personal communication 2015). To track grassland condition and effects over time, monitoring plots were established close to the Granite site and access road. Data from these plots are provided in Appendix E.

BMPs for vegetation communities would include:

- Vegetation cover would be retained on site wherever possible until clearing is required for targets.
- Support vehicles would be limited to existing roads and test bed boundaries. Off-road travel would be limited to placement of testing infrastructure, cameras and recovery activities using a single path in and out.
- Following the end of their usefulness as test beds, disturbed areas would be restored to the extent feasible and native vegetation would be allowed to reseed naturally, according to a closure plan submitted to WSMR.
- Equipment would be inspected and cleaned when entering and leaving the site to prevent spread of non-native species.

Mitigation measures for vegetation include:

- Road maintenance and improvements would be designed to prevent water from running down or off the road in a concentrated flow that would create ruts and erosion, as described in Water Resources, Section 4.5. Concentrated flow removes both soil and water from adjacent vegetation. Proper management of road drainage would help protect the surrounding grassland.
- Following the end of their usefulness as test beds, disturbed areas would be restored to the extent feasible and native vegetation would be allowed to reseed naturally, according to closure plan submitted to WSMR.
- DTRA/SCC-WMD would provide funding to WSMR for periodic (every 3-5 years) monitoring of plots that have been established close to the site and the access road. Monitoring will allow WSMR Land Management personnel to track effects over time and to determine appropriate management actions that would help the grasslands remain viable.

4.7. Invasive Species and Noxious Weeds

The proposed action may result in a minor increase in the area affected by invasive species. Lehmann lovegrass currently exists at the Granite site along the entrance road. As soils on the Granite site or along the access road are disturbed, there is the potential for Lehmann lovegrass or other invasive species to colonize disturbed areas. The no-action alternative would have no effect on invasive species because existing test sites and their access roads are already disturbed.

To prevent the introduction of exotic plants, vehicles and equipment would be inspected and, if necessary, cleaned to remove plant parts and potentially contaminated soils prior to arrival at the site. This might consist of a visual inspection and removal of soil and plant parts that become stuck in wheel wells or grills of vehicles by brushing off. A notice would be placed at Pond site to remind operators to inspect and brush off their vehicle. Any equipment that has been used in an area with known invasive species (such as areas near Highway 70 in the southern part of the range, where Lehmann lovegrass occurs) would be cleaned before mobilizing to the Granite site. Additionally, because Lehmann lovegrass is present at the site, the same visual inspection and removal of plant material would occur before vehicles leave the site.

4.8. Wildlife

Both direct effects to individual animals and indirect effects through loss of habitat would potentially occur from the proposed action. Individuals that have not left the area when targets are cleared could be injured or killed during test and construction activities. There would be a potential trapping hazard from impact craters. Noise from construction and test activities would temporarily disturb fauna, and impulse noise (blast) could impair hearing of fauna near the test site.

Most wildlife is expected to move out of the test area when targets are cleared prior to testing. Burrowing rodents would likely remain in the area and are the most likely group of animals to be injured or killed. However, most rodent burrows were observed near the arroyo on the edge of the site, not in the central area where targets would be located. The rocky drainage in the northern, shrubby part of the site is likely used by small mammals that could also be injured or killed due to proximity to tests. Some wildlife species would become habituated to test activities and remain in the surrounding area. There would be a minor, insignificant loss of grassland-shrubland habitat with each test when targets are cleared of vegetation. There would also be a minor loss and fragmentation of habitat for grassland birds. Therefore, the proposed action would have a minor adverse effect on wildlife.

In order to better evaluate and avoid impacts to wildlife in general and kit foxes in particular, DTRA/SCC-WMD would fund surveys including time-area counts twice a year within the footprint of the Granite site to determine species composition at the site. A time-area count consists of knowledgeable personnel spending a predetermined amount of time within the proposed site to be affected and recording all wildlife occurring at the site. This includes recording sign of use and actual animal presence. Following testing activities the time-area count would be repeated making sure to provide the same level of effort so that comparisons can be made to ascertain changes in faunal use of the site pre and post test.

Additionally, prior to clearing of specific test targets, surveys would be conducted specifically for burrows/holes large enough (approximately 20-25 cm high and 20 cm or less wide) to accommodate kit foxes. If burrows of this size are found, WSMR Garrison Environmental Division would be contacted and biologists would determine whether there is an active den. DTRA/SCC-WMD targets would be adjusted to avoid direct impacts to active den sites.

Golden eagles could potentially be disturbed by test events. Disturbance is a form of take and is defined as agitating or bothering an eagle to a degree that causes, or is likely to cause, injury to an eagle, a decrease in its productivity, or nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. A half-mile (800 meter) buffer free of human intrusion has been recommended for golden or bald eagle nest sites during nesting season, December 15 to July 15, to avoid disturbance and potential nest abandonment (Colorado Division of Wildlife 2008; USFWS 2007); however, appropriate buffer distances depend on several factors; see Appendix C. The new nest that was active in 2015 is about 595 meters from the Granite site and is directly overlooking the site, making it vulnerable to disturbance. The other four nests within 1.5 miles are less likely to be disturbed by testing due to the topographic separation of the nest sites from the Granite site by high ridge lines.

DTRA used pressure thresholds for damage to bird eggs or nestlings, which are the most sensitive life stages, to evaluate the potential for injury to eagles (Appendix C). No lethal take of golden eagles would occur from DTRA/SCC-WMD test events because the nearest known nest site is over 500 meters from the Granite site. At this distance from a test event, pressures generated would not be great enough to cause egg shells to crack or hatchlings to be injured (data provided in Appendix B). A more complete discussion of noise and blast pressure follows in Section 4.15.

Indirect impacts to golden eagles are possible from testing and evaluation activities at the Granite site and would constitute non-purposeful take. There is potential for disturbance to the nesting pair, which may reduce their reproductive success or cause them to abandon their territory. For this reason, WSMR is working to apply for the appropriate permit or permits from the USFWS. Mitigation for varying degrees of harm to the eagles will be included as conditions of the permit. Mitigation measures may include setting up cameras to record eagle behavior during tests. This would allow WSMR and the USFWS to better evaluate effects of DTRA/SCC-WMD's testing and evaluation activities on the eagles and to determine whether other mitigation may be needed. As another potential mitigation, DTRA/SCC-WMD would retrofit power poles to prevent raptors that land on the poles from being electrocuted, thereby reducing raptor mortality. This retrofitting would be in addition to any that is already being implemented or planned as mitigation for other actions.

Additionally, raptors, including golden eagles, may be indirectly affected by the proposed action through loss of habitat and a minor reduction in populations of prey animals. The effect of a loss of up to 50 acres of foraging habitat over the site's expected 20 years of use is minimal compared to the home range of golden eagles at WSMR; biologists estimate the size of an occupied breeding area at WSMR is approximately 76 square miles (48,640 acres) (D. Driscoll, unpublished data 2013). However, should the nest site or the entire territory be abandoned, mitigation would be required to offset this loss so that population-level impacts are kept to less than significant. WSMR and DTRA/SCC-WMD will monitor the pair to document their response to mission activities. The USFWS permit is expected to include mitigation that would be required in the event the territory is abandoned.

The no-action alternative would have insignificant effects on wildlife at existing test sites because ongoing testing activity has caused wildlife to move out of the areas or to become habituated to testing activity and noise.

BMPs for wildlife would include:

- DTRA/SCC-WMD would fund surveys including time-area counts twice a year within the footprint of the Granite site to determine what species are using the site and any changes over time in response to disturbance.
- During static high explosive testing the fire department would be on call to manage any wildfire events, as described in Section 3.11.
- Surveys for active bird nests containing eggs or young would take place before targets are put in place or vegetation is cleared.
- Surveys for raptors, particularly golden eagles, and their nests would continue to take place in the surrounding area (within one mile of the site) prior to conducting testing.
- Vegetation would be cleared prior to conducting tests so most wildlife would leave the area and would not be present within the target during tests.
- During surveys conducted prior to target setup, if burrows of the size preferred by kit foxes are found, WSMR biologists would determine whether there is an active den. DTRA/SCC-WMD targets would be adjusted to avoid direct impacts to active den sites.
- To limit disturbance to fauna and habitat, support vehicles would use existing roads whenever possible. Off-road travel will be limited to placement of testing infrastructure, cameras and recovery activities using a single path in and out.

Mitigation measures for wildlife would include:

- If bird nests are found during surveys, consultation with the USFWS would take place to ensure compliance with the Migratory Bird Treaty Act.
- The WSMR Garrison Environmental Division shall be contacted regarding any issues related to raptors, migratory birds, kit fox dens, bat roosts or snake dens. Environmental Division will determine appropriate measures to avoid or minimize harm to these resources.
- WSMR will continue monitoring the eagle pair that nests close to Granite site to identify which nest it is using each year and to track its reproductive success.
- WSMR is working with the USFWS to apply for appropriate permits, which may include the following among the permit conditions:
 - Remote cameras may be placed to monitor eagle behavior during testing.
 - Testing may be precluded, unless essential, during the most critical 6 to 8 weeks of nesting season
 - DTRA/SCC-WMD will retrofit a number of power poles, to be determined by the USFWS, to prevent raptors from being electrocuted when landing on poles. This retrofitting would be in addition to any that is already being implemented or planned.
 - Other mitigation as required by the permit, including measures to compensate for potential loss of the nest site or abandonment of the territory.

4.9. Threatened, Endangered and Rare Species

As described in Section 3.10, there are no known populations of Federally- or state-listed threatened or endangered species or critical habitats present at the Granite site; however, there is potential for the following species to occur in the area seasonally or as transient or foraging individuals: northern aplomado falcon, Sprague's pipit, Baird's sparrow, American peregrine

falcon, and spotted bat. White Sands pupfish is also considered because of the site's proximity to the pupfish area of concern.

The northern aplomado falcon in New Mexico is listed under Section 10(j) of the Endangered Species Act as a Nonessential Experimental Population; therefore, federal agencies are required to determine if their activities could jeopardize the continued existence of the species.

The proposed Granite target site may provide foraging habitat for aplomado falcons. Pre-clearance surveys prior to target establishment would include surveying vegetation and utility poles for nests, including raptor or raven nests that could be used by aplomado falcons. WSMR standard procedures for range users require that projects occurring within Chihuahuan desert grassland habitat will be coordinated with WSMR Environmental Division to ensure that appropriate surveys are conducted. If a northern aplomado falcon nest is observed, projects will be sited to avoid impacts to the falcons, their nests, eggs, or nestlings. Any aplomado falcon sighting is reported to the USFWS within 24 hours (WSMR, 2009).

The absence of tall yuccas for nesting, the rarity of the falcon and very small likelihood of an individual being present in the area, along with adherence to WSMR standard procedures outlined above, make it highly unlikely that there would be any effect to aplomado falcons. Therefore, DTRA/SCC-WMD and WSMR have determined that implementation of the proposed action would not jeopardize the continued existence of the northern aplomado falcon. No further consultation under the Endangered Species Act is required.

Sprague's pipit and Baird's sparrows do not breed in New Mexico, but do have potential to be present in the area in winter. Clearing of targets prior to their use would cause any birds on site to leave the area. This would also result in minor loss and fragmentation of habitat for these wintering grassland birds. Surveys would be conducted prior to target establishment and any sightings of Sprague's pipit or Baird's sparrow would be reported.

The White Sands pupfish (*Cyprinodon tularosa*) would not be affected by the proposed action because of the distance and lack of hydrologic connection to essential pupfish habitat. The Granite site is located approximately 1/3 mile outside the White Sands Pupfish Area of Concern and is separated from the area of concern by the watershed divide of the Mockingbird Mountains, approximately 500 feet in elevation above the Granite site. Test criteria developed for each DTRA/SCC-WMD test would ensure that airborne pollutants and dust are not released into pupfish habitat in significant quantities. Therefore, there would be no effect to White Sands pupfish.

The American peregrine falcon could potentially fly or forage over the site. They are not known to nest at WSMR. Because of their transient presence, it is highly unlikely that the proposed action would affect the peregrine falcon.

Spotted bats or other bat species may roost in suitable cracks and crevices in granite cliffs or outcrops in the vicinity of the site. However, the absence of water makes the Granite site unlikely to support large numbers of bats except for occasional foraging. The nearest outcrops (which are not known to provide bat roosts) are located at least 600 feet from the boundary of the site and most cliffs are over 1000 feet from the site. Bats are considered sensitive and may be particularly

susceptible to noise because they rely on hearing to capture their food. However, any bats in the area would be in their roosts during the daytime when tests would be conducted, and would be protected by distance and the rock they are roosting within.

The no-action alternative would have no effect on threatened or endangered species because none of these species are present in the existing test bed areas. Wildlife has already moved out of these areas.

BMPs for Threatened, Endangered and rare species include:

- Surveys would be conducted for T&E species and nesting birds prior to clearing vegetation. Nest surveys are primarily intended for MBTA compliance, but would also detect any nests of T&E species.
- WSMR is required to report all aplomado falcon sightings to the USFWS within 24 hours.
- If a northern aplomado falcon or Sprague's pipit is sighted in the area, WSMR's Environmental Stewardship Division (WS-ES) would be contacted to ensure compliance with the Endangered Species Act.
- If a Baird's sparrow is sighted in an area where DTRA/SCC-WMD testing activities are planned, WS-ES will be consulted.

DTRA/SCC-WMD and WSMR have determined that implementation of the proposed action would not affect any federally-listed threatened or endangered species or critical habitats and would not jeopardize the continued existence of the northern aplomado falcon. Additionally, the proposed action is unlikely to affect state-listed threatened or endangered species or their essential habitats. No further consultation under the Endangered Species Act is required.

4.10. Wildland Fire

There would be no effect on wildfire frequency from either the proposed action or the no-action alternative. There is minimal potential for fires to start as a result of tests. The potential for wildfire would be minimized by the following BMPs:

- Vegetation would be cleared prior to conducting tests, limiting the amount of fuel present on site.
- During static high explosive testing the fire department would be on call to manage any wildfire events that may result. All fires would be managed in accordance with the WSMR Fire Management Plan.

4.11. Land Use and Aesthetics

Under the proposed action, there would be a minor adverse effect to land use and aesthetics because a site in relatively natural condition that includes part of a SNA would be disturbed. However, use of the Granite site for DTRA/SCC-WMD tests is otherwise compatible with existing land use and with WSMR's Land Use and Airspace Strategy Plan. In this instance, national defense takes precedence over absolute protection of the SNA. DTRA/SCC-WMD has avoided disturbing habitat by using and expanding the SHIST site until there is no suitable granite left. The proposed Granite site, although it infringes on part of the Mockingbird Gap Desert Grassland SNA, affects only the edge of an outlying part of the SNA and would not

fragment a large block of habitat. The access road has been sited to minimize impacts by using the best suited and least erodible existing road (see Table 1). The site is not readily visible from any area that is commonly used by WSMR personnel or public visitors, and is not within the viewshed of the Trinity National Historic Landmark. WSMR and DTRA/SCC-WMD personnel who would access the site are “more accepting to test infrastructure and activities potentially affecting the environment” (DTRA PEIS, Section 4.1.2.1).

According to the INRMP (p. 362), if a proposed action would move the conditions of the SNA away from the goals for which the SNA must be managed, such action must either be modified or not implemented, or the management goals and standards adjusted to meet the evolving management direction. Management practices and designations for SNAs are subject to modification on a case-by-case basis (WSMR EIS, Vol. II LUASP p. 55). Any changes in goals, standards, or actions would be formalized in the five-year revision of the INRMP. Based on the observed discrepancy between the designated SNA boundary and the location of grassland within the proposed Granite site (Figure 6), it is recommended that WSMR conduct a more detailed mapping of piedmont desert grasslands to refine the boundary of the SNA.

The following BMPs would minimize effects to land use and aesthetics:

- To limit disturbance, support vehicles would use existing roads whenever possible. Off-road travel will be limited to placement of testing infrastructure, cameras and recovery activities using a single path in and out.
- All activities will be consistent with WSMR’s Land Use and Airspace Strategy Plan and would follow the siting and review process (LUASP, Section 6). Sensitive species, SNAs and specialized areas have been avoided to the extent feasible. The LUASP identified weapons impact activities under future capabilities (LUASP, Table 5-1).

Mitigation measures for land use and aesthetics include:

- Impact craters and depressions caused by explosions or recovery activities would be filled in and returned to approximate original contours following testing.
- Following the end of the site’s usefulness as a test bed, all remaining disturbed areas would be returned to their approximate original contours, according to a closure plan submitted to WSMR.

4.12. Facilities and Infrastructure

4.12.1. Transportation

Neither the proposed alternative nor the no-action alternative would result in a significant change in traffic. Under either alternative, DTRA/SCC-WMD testing would continue and would require approximately the number of support vehicles as currently are used. There would be no increased use of roadblocks on U.S. Highway 380. Range Road 7 similarly would not experience an increase in traffic, because the route to access the existing SHIST site also uses Range Road 7.

Under the proposed action, the dirt and gravel road that provides access to the Granite site would experience increased traffic, but this would not affect any users other than personnel involved in DTRA/SCC-WMD tests. This road is currently used only for access to the power line on the

southern edge of the Granite site. The proposed minor improvements to the access road (adding gravel to low spots, re-grading and possibly installing culverts at arroyo crossings) would not affect traffic because they would be completed prior to the start of testing activities at the site.

4.12.2. Communication and Radio Frequencies

The proposed action and the no-action alternative would not affect radio frequency use at WSMR. No new frequency bands would be required for the proposed action. Any change in frequency uses would be coordinated with the WSMR frequency manager.

4.12.3. Utilities and energy

The proposed action would have no significant effect on utilities. The only on-site utility at the Granite site is the power line that provides power to a single remote site servicing DTRA/SCC-WMD equipment. Up to three power poles may be relocated outside the site to prevent damage to the power line from test activities. Power for test activities at the site may be provided in part by power from this line, and would also be supplied by an on-site generator.

The no-action alternative would not affect utilities because existing test sites have utilities and infrastructure already in place to accommodate DTRA/SCC-WMD test activities.

Best Management Practices for facilities and infrastructure include ensuring that all construction and testing activities would be consistent with WSMR's Land Use and Airspace Strategy Plan. Replacement of power poles would occur in accordance with the WSMR Avian Protection Plan (WSMR 2014b) and would be coordinated with the power line owner and the WSMR Garrison Environmental Division.

4.12.4. Airspace

The proposed action and the no-action alternative would have no effect on airspace. WSMR airspace use would remain at approximately current levels. Airspace use for DTRA/SCC-WMD-related tests would continue to be coordinated through CRCC. All DTRA/SCC-WMD testing activities would be consistent with WSMR's Land Use and Airspace Strategy Plan.

4.13. Cultural Resources

The proposed action would have no adverse effect on historic properties. As described in Section 3.14, cultural resources surveys conducted along the proposed Pond access road recorded one new archaeological site, LA 181347, which should be treated as eligible for the purposes of this project. The Corps will conduct archaeological testing in order to provide additional data necessary to make a determination of eligibility for archaeological site LA 181347, and to aid in making an informed decision on how to best avoid any adverse effect to the site. Consultation with the New Mexico State Historic Preservation Officer (SHPO) will take place once testing is complete, with a request for concurrence with eligibility determinations, and to determine methods to avoid or minimize impacts to archaeological site LA 181347. Correspondence with the SHPO will be included in Appendix D of the final EA.

The no-action alternative would result in no new areas of ground disturbance and would have no effect on cultural resources.

It is possible that unanticipated cultural resources may be encountered during project execution. Should such an event take place, program personnel would implement the appropriate SOP from the WSMR Integrated Cultural Resource Management Plan (ICRMP) pertaining to inadvertent discoveries. Ground disturbing activity would cease and WSMR archaeologists will be notified immediately. WSMR archaeologists would coordinate the appropriate response according to Section 106 of the NHPA following accepted practices and procedures as outlined in the ICRMP.

BMPs for cultural resources include:

- Vehicle travel to the site shall be restricted to the existing access road
- Site protection measures for site LA 181347 are being determined in consultation with the SHPO and include site protection, signage, periodic monitoring, implementation of erosion control measures to reduce erosion of the site, institute a 30 meter buffer for any staging of work in the area for erosion control, no road widening or alteration to occur within 30 meters of the site boundaries, and surveying of any staging areas prior to implementation .

4.14. Indian Trust Assets

Neither the proposed action nor the no-action alternative would affect Indian Trust Assets. No Indian Trust Assets have been identified in the area.

4.15. Noise and blast pressure

The proposed action would cause a minor adverse effect from increased noise in the Granite site area. Noise impacts from DTRA/SCC-WMD bedrock penetration tests would remain approximately the same on WSMR as a whole, but these tests and associated noise would shift from SHIST to the Granite site.

The effects of noise and blast on wildlife are summarized in the PEIS, Table 4-5 and Section 4.2.1.3, p. 4-45. Wildlife at the Granite site area is presumably habituated to intermittent existing noise such as aircraft fly-over and sonic booms, but the level of noise at this site would increase under the proposed action. Effects from noise would likely include disturbance to fauna. Animals could be disturbed temporarily or change behavior. Animals that remain close to the site may suffer hearing impairment. However, it is expected that most individuals would leave the test site when targets are cleared prior to testing. If any bats are roosting in rock outcrops or cliffs in the area surrounding the Granite site, they would be shielded within rock crevices.

There is potential for raptors, including golden eagles, to be disturbed by noise. However, due to the distance, elevation change, and topography, noise from standard test events when heard from 1,000 m away would be similar to thunder. Current sonic booms that occur on the range would have more impact than a standard DTRA/SCC-WMD ground test event. Weather events, specifically thermal inversions, can cause pressure waves to bounce off the thermal layer, stay near the ground and extend out further from the test area. DTRA/SCC-WMD routinely checks the weather prior to a test and can predict possible impacts to specific locations, including any nests that are close enough to be of concern.

The PEIS, Table 4-5 (page 4-44) reports threshold airblast pressure levels that cause injury to animals. Damage to bird eggs and hatchlings may occur at pressures greater than 3kPa (0.43psi). DTRA/SCC-WMD calculated pressure predictions from single point explosions based on actual test data (data provided in Appendix B). Expected pressures generated from typical tests (1000-2000 lbs. explosive) were compared to this threshold. Test events in this range would only generate damaging pressure at distances closer than 300m (984 ft) (Reinke, personal communication 2014). Therefore, to avoid damage to bird eggs and hatchlings, an area radius of at least 1000 ft (305 meters) from any specific target would be surveyed prior to establishing the target.

Blast pressure from HE tests could cause minor damage to structures. However, there are no existing structures that are close enough to the Granite site to experience damage. The largest weapons that would be tested at the site would have up to 5,000 pounds of explosive. DTRA/SCC-WMD generated ground movement predictions for explosives up to 50 tons (100,000 pounds). A 50-ton explosive would cause minor structural damage such as cracks in walls in structures that are located 1000 meters (0.6 mile) away from the detonation site (Appendix B). Structures farther away would not experience enough ground movement to be damaged. There are no existing structures within 1000 meters of the proposed target site. The Curt site, a remote equipment site, is located at a high point just over 1000 meters from the southern boundary of the Granite site. Equipment at this site would not be sensitive to the level of ground movement that would be experienced from a 5,000-pound weapon test.

The no-action alternative would have no effect on noise. Noise impacts from DTRA/SCC-WMD tests would remain approximately the same as current levels.

Noise and blast mitigation for wildlife would include the following:

- DTRA/SCC-WMD would monitor weather before tests. In case of thermal inversion, predictions would be completed for blast pressures at specific locations of concern such as nests. During specified months, such as during nesting periods, if predictions indicate possible impact to the nests then the testing would be delayed.

Noise mitigation would include the following protection for personnel:

- WSMR activities require adherence to the Occupational Safety and Health Administration (OSHA) Hearing Conservation Standard (29 CFR 1910.95), which protects workers from potentially hazardous occupational noise exposures.
- DTRA/SCC-WMD calculates expected blast pressures and ensures people and equipment are properly protected for every test activity.
- Employees would be enrolled in a hearing conservation program if noise exceeds 85 dBA expressed as an 8-hour time-weighted average and would be required to wear hearing protection.
- Personnel would be evacuated to a safe distance prior to explosive tests.

4.16. Hazardous Materials and Hazardous Wastes

The proposed action and the no-action alternative would have potential minor impacts from hazardous materials or waste. DTRA/SCC-WMD equipment and service vehicles use petroleum, oils, and lubricants (POL). Under the proposed action, there may be a minor, temporary increase

in the use of POL from equipment used to improve the access road and for preparation of targets at the Granite site. Under the no-action alternative, the amount of POL used may increase slightly from increased use of equipment to remove damaged rock from existing test sites. Under either alternative, POL waste generated from test activities would remain at approximately the same level, as testing would remain similar. There is a low potential for hazardous debris at the Granite site because the site has not been previously used for tests or other activities. With mitigation measures and BMPs in effect, there would be no effect on the environment from hazardous materials or waste.

Mitigation measures and BMPs for hazardous materials and hazardous waste include:

- Vehicles, construction equipment, generators, and fuel storage units would employ a spill containment system in accordance with the WSMR Spill Prevention Plan.
- All equipment that shall be used at the site shall be inspected prior to being mobilized to the site to ensure that there are no leaks or drips. The equipment operator shall keep a spill kit on board. Any equipment in disrepair shall be repaired or removed from the site immediately.
- In the case that any discolored soil, soil with an odor, or any debris are discovered during excavation or clearing, work would be stopped and the WSMR Environmental Division would be notified.
- Prior to construction or clearing of targets, pre-clearance surveys would be conducted to ensure no hazardous materials are present.

4.17. Human Health and Safety

Health and safety concerns under the proposed action would not differ significantly from current DTRA/SCC-WMD testing. Properties of DTRA/SCC-WMD test materials are provided in the PEIS, Appendix F. A subset of the materials listed therein would be used at the Granite site, primarily explosives. There would be no use of chemical, biological or radiological stimulants at Granite. The high explosive Tritonal would be commonly used and is provided as an example. Tritonal explosives consist of 20 % aluminum and 80 % trinitrotoluene (TNT). Detonation products of Tritonal are provided in Appendix B and consist primarily of carbon monoxide, nitrogen, aluminum oxide, aluminum, carbon (as graphite), carbon dioxide and methane (Fraher, personal communication 2013). None of these detonation products are hazardous or would be generated in hazardous quantities. Other carbon and nitrogen-based compounds would be generated in small quantities.

There would be no public access to the test site or the surrounding surface danger zone and the public would not be exposed to explosives. A map illustrating the surface danger zone surrounding the Granite site and safety buffers for different size tests is provided in Appendix B.

Under the no-action alternative, health and safety concerns would not differ from current DTRA/SCC-WMD testing.

Mitigation practices for human health and safety would include:

- All personnel shall receive unexploded ordnance (UXO) training.

- Prior to construction or clearing of targets, pre-clearance surveys would be conducted to ensure no UXO is present.
- Personnel will use personal protection equipment (PPE) in accordance with safety data sheets (SDS) recommendation for all potentially hazardous or toxic materials.
- Personnel would be trained on safe operation of heavy equipment and wear hardhats and other appropriate PPE.
- Measures to reduce hazards concerning engine exhaust emissions include monitoring for CO, proper ventilation of work areas, and the use of proper PPE.
- Personnel would be evacuated to a safe distance prior to explosive tests.
- Hearing protection would be provided as stated above (Noise).

4.18. Socioeconomics

Neither the proposed action nor the no-action alternative would have an effect on socioeconomics. There would be no change in DTRA/SCC-WMD staffing levels and no change in economic activity in the surrounding area or communities near the DTRA/SCC-WMD test beds.

4.19. Environmental Justice

Neither the proposed action nor the no-action alternative would have environmental justice effects. There would be no adverse impacts to minority populations located in the region of influence. The proposed action would not disproportionately affect minority and low-income populations compared to the general population.

5. CUMULATIVE EFFECTS

Cumulative effects are the impacts on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or entity (Federal or non-Federal) or person undertakes such other actions (40 CFR 1508.7)

For most resources, the Region of Influence for this cumulative effects analysis is the northern part of WSMR, as shown in the PEIS, Figure 5-1, and adjacent lands. The PEIS, Section 5 provides information on past, present, and foreseeable future actions near the DTRA/SCC-WMD Test Beds. The WSMR EIS, Section 4.19, provides information on actions relating to the entire range. Additionally, the biological survey report for the Thurgood West Maneuver Area (HDR 2014) describes existing conditions and future expanded training activities that will occur on this 26,535 acre site (10,738 hectares) located south and southwest of the Granite site.

Activities that contribute to cumulative effects in the northern part of WSMR in the area surrounding the DTRA/SCC-WMD test beds include: past mining and ranching; past, present and future military uses, including Thurgood West and other actions related to the WSMR EIS; aircraft overflights; and Bureau of Land Management actions on adjoining lands.

The following resources are analyzed for cumulative effects: air quality, soils and geology, vegetation communities, wildlife, threatened and endangered species, and land use and

aesthetics. A summary of cumulative effects is provided in Table 5. Cumulative effects were not analyzed for other resources because there would be no effect to these resources from the proposed action.

Table 5: Granite Target Site Cumulative Effects Summary

Resource	Cumulative Effects of the Proposed Action	Rationale
Air Quality	Cumulative effects would not be significant	- Amount of dust generated would be minimal due to mitigation measures and BMPs, as discussed in Section 4.1. - Any dust generated on site would be unlikely to be transported off-range. Site's location within a drainage basin and prevailing SW winds would tend to trap dust within the local basin. - There would be minimal or no increase in emissions of regulated pollutants compared to baseline conditions. Amounts generated would not cause deterioration in regional air quality.
Geology and Soils	Minor adverse cumulative effects On a regional scale, cumulative impacts to this type of granite would not be significant.	- Impacts to 50 acres of soils combined with ongoing impacts at WSMR would still affect less than 1% of acreage annually (WSMR EIS) - Impact craters and depressions caused by explosions or recovery activities would affect less than 50 acres of granite. Similar activities at the existing test sites have affected another 50-60 acres (SHIST, Alt SHIST). The area of surface granite at the proposed target site is 7134 acres. Therefore, only about 1.5% of this particular exposure of granite would be affected. Within the northern part of WSMR, 58,253 acres of this type of granite exist at the surface. Less than .02% of this surface geology would be affected by the proposed action.
Climate and Climate Change	No effect Emissions of greenhouse gases (GHG) would remain essentially the same as baseline conditions.	No cumulative effects analysis required because there would be no change in baseline conditions
Water Resources	No effect Appropriate stormwater controls and spill prevention would prevent effects to water resources	No cumulative effects analysis required because there would be no change in baseline conditions

Vegetation communities	Minor to moderate adverse effect - Over the lifetime of the target site, up to 50 acres of vegetation could be disturbed or destroyed. This would contribute to ongoing vegetation disturbance at WSMR. - The WSMR EIS approved changing the land use classification of a large portion of the Range to allow increased off-road activity. This would occur with or without DTRA/SCC-WMD's activity at the proposed Granite site.	- Each of the vegetation types present on site exists at WSMR on the scale of a few thousand acres. Management of remaining large-scale native plant communities at WSMR, including withdrawal from livestock grazing, is intended to ensure that high-quality large-scale native plant communities will persist at WSMR. - The WSMR EIS describes mitigation measures for ground disturbing activities that are likely to result from increased off-road testing and training activity. - WSMR retains large protected areas and other areas where activities are restricted. (LUASP, WSMR EIS Appendix A) - Conservation/protected areas 148,400 acres - Lava flows 42,700 acres - Steep slopes 466,470 acres - Land use constraints cover 54% of WSMR acreage
Invasive Species and Noxious Weeds	Minor to moderate adverse effect	- With preventive measures in place, there would be no change in baseline conditions from testing at the Granite site. - However, WSMR has increased the potential for off-road maneuvers in 4 Operational Test Maneuver Areas (OTA). Vegetation communities may have increased disturbance from heavy military vehicles. Disturbed areas are more likely to experience invasion by non-native invasive species and noxious weeds. - The increased military vehicle traffic may spread seeds of invasive plants because vehicles are not cleaned or inspected for invasive species when moving onto or around WSMR.
Wildlife	Minor adverse effect Individual animals could be injured or killed. Populations of animals would be displaced. Minor loss of habitat.	- Habitat loss minimized by WSMR's LUASP and existing conservation/protected areas. - There may be minor decreases in populations of some wildlife species when the effects of the proposed action are combined with ongoing WSMR activities. The large acreage of remaining habitat ensures that population-level effects would not significant.
Threatened and Endangered Species	No effect - No critical habitats present at or near site - No resident T&E species present at or near site	- Due to the rarity of these species and their transient occurrence at WSMR, there would be no cumulative effects on populations. - WSMR activities have been determined to have no cumulative effect on populations of T&E species (WSMR EIS).

Wildland Fire	Potential to alter fire regimes	• Possible increase in Lehmann lovegrass associated with site disturbance could increase fire frequency or severity. • Increased vehicle traffic could result in more frequent fires.. • Fire suppression could increase the interval between fires, which could have ecological effects
Land Use and Aesthetics	Minor adverse effect • Disturbance of the Granite site would contribute towards overall levels of disturbance at WSMR.	• Cumulative impacts to aesthetics would be minor. Designated military land use has not changed since WSMR was designated as a missile range. The areas affected by military use are not readily visible to the public.
Facilities and Infrastructure	No effect	• No cumulative effects analysis required because there would be no change in baseline conditions
Airspace	No effect • WSMR airspace use would remain at approximately current levels	• No cumulative effects analysis required because there would be no change in baseline conditions
Cultural Resources	No adverse effect • Historic properties have been identified in the area but would not be adversely affected	• No cumulative effects analysis required because with preventive measures in place, there would be no change in baseline conditions.
Noise and Blast	Minor adverse effect • Noise impacts from DTRA/SCC-WMD tests would remain approximately the same, but would shift from SHIST to the Granite site. • Combined with noise from other WSMR activities there would be minor cumulative effects	• With preventive and safety measures in place, there would be no cumulative effect to personnel. • The proposed action would contribute to minor cumulative effects to wildlife. Because of the large acreage of open space and habitat available at WSMR, effects would not be significant. • The proposed action would not have any cumulative effects on structures, including historic structures and mines, because there are none close enough to be affected.
Hazardous Materials and Hazardous Wastes	No effect	• No cumulative effects analysis required because with preventive measures in place, there would be no change in baseline conditions.
Human Health and Safety	No effect	• No cumulative effects analysis required because with preventive measures in place, there would be no change in baseline conditions.

Socioeconomics	No effect	No cumulative effects analysis required because there would be no change in baseline conditions.
Environmental Justice	No effect No adverse or disproportionate impacts to minority or low-income populations have been identified.	No cumulative effects analysis required because there would be no change in baseline conditions. No disproportionate effects to minority or low-income populations have been identified.

5.1. Air Quality

Effects to air quality from activities in the region and surrounding communities may include dust from degradation of rangelands and construction; emissions from military tests, aircraft and vehicles; and growth and development in surrounding communities. Effects from DTRA/SCC-WMD's tests and other military tests and maneuvers are transitory (PEIS, page 5-9) and would not result in accumulation of pollutants or dust. Mitigation measures and BMPs discussed in Section 4.1 of this document and in Section 4.6.4 of the PEIS would minimize dust and other effects to air quality. Additionally, there would be no increase in emissions of regulated pollutants compared to baseline conditions.

The communities around the northern part of WSMR, including Socorro and Carrizozo, have experienced little population growth in recent years (U.S. Census Bureau 2014). Socorro's community development, guided by the Infrastructure Capital Improvement Plan, includes utility and road infrastructure projects that would not have significant impacts on air quality (City of Socorro 2013). Additionally, the land use changes and enhanced capabilities analyzed in the WSMR EIS would have only minor effects on air quality (WSMR EIS, Section 4.19.2.3.1). Therefore, the effects of the proposed action combined with other actions would not cause significant effects or degradation in regional air quality.

5.2. Soils and Geology

Cumulative effects to geology and soils from DTRA/SCC-WMD activities would primarily result from test bed construction and ongoing weapons testing. Soils in the region have been affected by past and ongoing activities such as road construction, trenching, construction of new test infrastructure, and impact craters from weapons testing activities. Past livestock grazing and mining activities in surrounding lands as well as military activities at WSMR have contributed to cumulative impacts on soils, resulting in increased soil erosion and soil compaction (PEIS, Section 4.1.4 and WSMR EIS, Section 4.19.2.5). The planned construction of a new test bed at the Granite site would add to the overall amount of disturbance to geology and soils. The PEIS estimated a total of approximately 262 acres (106 ha) would be disturbed as a result of the expansion of DTRA/SCC-WMD test beds. The minor impacts to an additional 50 acres from activities at the Granite site, combined with Range-wide activities at WSMR, would still affect less than 1% of the Range's 2.2 million acres annually (WSMR EIS, Section 4.19.2.5.2). Section 4.6.5 of the WSMR EIS describes mitigation and management practices to minimize impacts to soils.

Geologic resources in the project area and surrounding region have been affected by weapons testing impact craters, including those at DTRA/SCC-WMD test sites (SHIST, Alt SHIST). There are no commercially valuable mineral resources or unique geologic features at the Granite site, or any DTRA/SCC-WMD test bed, that would be affected by testing activities. Impact craters and depressions caused by explosions or recovery activities at the Granite site, combined with similar activities at the existing test sites (SHIST, Alt SHIST), would affect a total of about 110 acres. The area of surface granite contained in the geologic map polygon at the proposed site is 7134 acres. Therefore, only about 1.5% of this particular exposure of granite would be affected. Within the northern part of WSMR, 58,253 acres of this type of granite exist at the surface. Less than .02% of this surface geology would be affected by the proposed action.

in combination with other DTRA/SCC-WMD actions. WSMR Range-wide activities are not projected to have any impacts to geology (WSMR EIS, Section 4.6.1). Therefore, DTRA/SCC-WMD testing at the Granite site would have no significant cumulative effects to geology.

5.3. Vegetation communities

There would be minor cumulative impacts to vegetation from the proposed action in combination with other actions in the northern part of WSMR. Over the lifetime of the Granite target site, up to 50 acres of vegetation could be disturbed or destroyed, contributing to ongoing vegetation disturbance at WSMR. Effects to vegetation are mitigated by environmental requirements specified in the LUASP (WSMR EIS, Appendix A) and by WSMR's Integrated Training Area Management Program, which includes long-term monitoring of biological resources (PEIS, Section 5.2.4; WSMR EIS, Table 4.20-1).

DTRA/SCC-WMD's ongoing test program includes several other sites in varying stages of disturbance or recovery. DTRA/SCC-WMD and USACE used aerial imagery to identify and visually estimate the recovery of test areas used in the 1970s and 80s to 2010. The 1470 acres could still be identified based on lines on the ground, such as former roads and faint scars from blading. These areas were compared to surrounding areas and the recovery of vegetation was estimated at 72% (weighted average, acres x percent recovery). Another 600 acres in the area of the Large Test Bed have been repeatedly disturbed and overall are only about 10% vegetated. The Granite Site would add another 50 acres of disturbance over its lifetime, increasing the disturbance due to current, ongoing DTRA/SCC-WMD activities by 9%, or the area of total disturbance- past and current- by 2.5%.

WSMR retains large protected areas and other areas where activities are restricted. As reported in the LUASP (WSMR EIS, Appendix A) land use constraints cover 54% of WSMR acreage. These constraints include conservation/protected areas (148,400 acres), lava flows (42,700 acres), and areas with steep slopes (466,470 acres). Additionally, within areas not subject to these constraints, management of remaining large-scale native plant communities at WSMR and mitigation of impacts is intended to ensure that high-quality large-scale native plant communities will persist. Each of the vegetation types present at the Granite site exists at WSMR on the scale of a few thousand to several thousand acres. Therefore, cumulative impacts to vegetation from the proposed action in combination with other actions would be minor. The Granite site, at 52 acres, is less than one percent of the 9,162 acre Piedmont Desert Grassland SNA. No other activities that would affect this SNA are currently planned.

There is a possibility of significant cumulative effects due to increased ground activity at WSMR such as the Thurgood maneuver area (HDR 2014), drought (personal communication, D. Nethers 2015) and challenges implementing protections in SNAs. These impacts would occur whether or not the Granite site project proceeds.

5.4. Invasive Species and Noxious Weeds

There may be minor to moderate adverse cumulative effects from invasive species and noxious weeds at WSMR due to increased ground activity by heavy military vehicles within four Operational Test Maneuver Areas (OTA) at WSMR, including the Thurgood West maneuver area. Heavy military vehicles have the potential to disturb vegetation, creating open areas that are

easily colonized by invasive species. These vehicles are not cleaned or inspected for invasive species when moving onto or around WSMR and therefore are likely to spread seeds of invasive species and noxious weeds. However, these impacts would occur whether or not the Granite site project proceeds.

5.5. Wildlife

There would be minor cumulative effects to wildlife from the proposed action in combination with other actions. Minor loss of vegetation communities described above would contribute to minor loss of wildlife habitat. Habitat loss would be minimized by measures described above for vegetation communities. Additionally, there may be minor decreases in populations of some wildlife species when the effects of the proposed action are combined with ongoing WSMR activities. It is anticipated that populations of animals would be displaced from the site due to disturbance such as clearing of targets and noise impacts from testing. However, due to the large acreage of remaining habitat and the implementation of mitigation measures and BMPs described in Section 4.8 and in the WSMR EIS, population-level effects would not be significant.

5.6. Threatened and Endangered Species

There are no resident populations of threatened or endangered species or designated critical habitat present at or near the proposed Granite site, as documented in Section 3.10. Two federally listed species, aplomado falcon and Sprague's pipit, may forage or occur as transients in the general vicinity of the site. In Section 4.9 of this document it was determined that the proposed action would not affect Sprague's pipit and would not jeopardize the 10(j) population of aplomado falcon. Additionally, WSMR activities have been determined to have no cumulative effect on populations of T&E species (WSMR EIS, Section 4.19). Due to the rarity of these species and their transient occurrence at WSMR, there would be no cumulative effects on populations.

5.7. Land Use and Aesthetics

Establishment of a new test bed at the Granite site would contribute towards overall levels of disturbance and aesthetic changes at WSMR. Use of the Granite site would add 54 acres to the area currently being used for DTRA/SCC-WMD activities; this would be approximately a nine percent increase in currently used areas and a 2.5% increase in total (past and present) disturbed area. Over time, the natural landscape of WSMR and its surroundings has been altered by construction of ranching homesteads, roads, test beds, impact areas and other infrastructure (PEIS, Section 5.2.1). The proposed action would add to this visual impact. However, many formerly used test areas are also becoming revegetated. Approximately 1,470 acres of DTRA test sites that were used in the 1970s, 80s and 90s have been identified using aerial imagery. These areas are visually estimated to have recovered about 72% of their vegetation cover and structure. Additionally, the Granite site and other areas affected by DTRA/SCC-WMD and military use are not readily visible to the public. People who would be affected by these visual impacts include WSMR and DTRA/SCC-WMD personnel. Cumulative impacts to aesthetics would be minor.

The WSMR EIS analyzed a change in land use that would convert most of WSMR's 1.6 million acre Primary Test Zone to an Augmented Test Zone land use classification. This change would expand the range of allowable activities to include off-road vehicle use, subject to environmental

coordination and restrictions based on management constraints. Related to this land use classification change, the Thurgood West Maneuver Area located south and southwest of the Granite site has been selected for expanded activities. These activities would be subject to WSMR Standard Procedures and Requirements for Range Users and are consistent with WSMR's purpose and designated primary land use, military testing and training. WSMR concluded in its EIS that cumulative impacts to land use would be minor.

6. IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES

The proposed establishment of a new test site at the Granite site would result in minor irreversible and irretrievable commitments of resources, as described in the PEIS, Section 7. Irreversible resource commitments are related to the use or destruction of resources that could not be replaced in a reasonable period of time. Irretrievable resource commitments involve a loss in the value of a resource that could not be restored.

The proposed new test site would result in minor long-term loss of habitat for plants and animals. The length of time that would be required to restore soil, vegetation, and wildlife habitat could be long enough for the impact to be considered nearly irreversible. The loss of approximately 18 acres of the Mockingbird Gap Piedmont Desert grasslands SNA is considered irreversible and irretrievable because the near-pristine quality of this part of the grassland would be lost.

The construction or improvement of facilities for the proposed Granite target site would involve an irretrievable commitment of construction materials and petroleum-based fuels. Test activities would also require the irretrievable commitment of petroleum, other non-renewable fuel resources, minerals and chemical products throughout the lifespan of DTRA/SCC-WMD operations at WSMR. These unavoidable resource commitments are similar to those required for many other defense research and development programs and would not be significantly different under the No-Action Alternative.

Finally, the operation of this additional testing area would require the irretrievable commitment of fiscal resources by DTRA/SCC-WMD. However, this activity is considered a necessary investment for the Nation's security.

7. CONCLUSIONS AND SUMMARY

This draft EA describes the potential effects of the DTRA/SCC-WMD's proposed establishment of a new test bed, the Granite target site. This new site would provide an area for DTRA/SCC-WMD to conduct its hard rock penetration tests, static high explosive tests, and Advanced Weapon Systems tests, replacing the existing SHIST site. Effects to the environment associated with the proposed action are listed in Table 4, Section 4. Mitigation measures and Best Management Practices have been proposed to minimize or eliminate adverse impacts to the environment. Mitigation measures include obtaining an incidental take permit or other appropriate permit from the U.S. Fish and Wildlife Service for potential effects to golden eagles, and required mitigation. If the proposed mitigation measures described in this draft EA are followed, then the proposed action will not have a significant impact on the human environment.

The proposed project when combined with past, present, or future activities may raise cumulative adverse environmental impacts to a level of significance; however, this would occur with or without the proposed project.

8. PREPARATION, CONSULTATION AND COORDINATION

8.1. Preparation

This draft Environmental Assessment was prepared by the U.S. Army Corps of Engineers, Albuquerque District, for the Defense Threat Reduction Agency. Preparers are:

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8.2. Quality Control

This draft Environmental Assessment was reviewed by:

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8.3. Consultation and Coordination

Agencies that were consulted in preparation of this Environmental Assessment include:

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New Mexico Department of Transportation

Ms. Daniela Roth
Endangered Plant Program
State Forestry Division
New Mexico Energy, Minerals, and Natural
Resources Department

New Mexico State Historic Preservation
Office

8.4. Public and Agency Review

The Draft Environmental Assessment (DEA) was available for public review and comment from August 20 to September 18, 2015. A Notice of Availability was published in the El Defensor Chieftain, printed and published each week in the county of Socorro, New Mexico, on August 20. The Notice of Availability was also published in the Las Cruces Sun-News, a newspaper published daily in the county of Dona Ana, New Mexico, on August 20. The DEA was available on the U.S. Army Corps of Engineers, Albuquerque District website at:

<http://www.spa.usace.army.mil/Missions/Environmental/EnvironmentalComplianceDocuments.aspx>

and at the following libraries: White Sands Missile Range Post Library, Building 465, WSMR, New Mexico; Socorro Public Library, 410 Park St., Socorro, New Mexico; and Thomas Branigan Memorial Library, 200 E. Picacho Avenue, Las Cruces, New Mexico.

A summary of the public and agency comments with the Corps' responses is provided below in Table X. Agency comment letters are included in Appendix X. Comments were received from the National Park Service White Sands National Monument and from the U.S. Fish & Wildlife Service, Division of Migratory Birds, Albuquerque NM. [As of September 28] No other comments were received.

Table 6: Public Review Comments and Responses

ID	Comment	Response
1) White Sands National Monument (WSNM)	White Sands NM has reviewed the Draft EA for the Granite Target Site, White Sands Missile Range, New Mexico. We believe that the preferred alternative for the proposed action will have no significant impact on White Sands NM as proposed.	Noted; thank you
2) WSNM	We ask that the cumulative impacts be considered throughout the missile range in particular with regards to impacts to wildlife, spread of invasive plants, impacts to ground water quantity and quality, to air quality and to cultural resources throughout the Tularosa Basin.	WSMR and DTRA believe that the EA adequately addresses cumulative impacts to wildlife, spread of invasive plants, impacts to water and air quality, and cultural resources. The proposed action is not within the Tularosa Basin.
3) WSNM	If the condition or description of the preferred alternative is changed from the proposal in the DEA, please notify White Sands NM as soon as possible with modifications.	Noted; you will be notified of any modifications.
4) U.S. Fish and Wildlife Service, Division of Migratory Birds (USFWS-MB)	Suggest that the USFWS list of Birds of Conservation Concern also be considered here. Please see comment on this in my review of Appendix A, specifically Table A-5.	Birds of Conservation Concern have been added to new Table 5 in Appendix A. Species were added from the USFWS' ipac system and the 2008 Birds of Conservation Concern list for the Chihuahuan Desert region.
5) USFWS-MB	Bird observations noted in the EA are just a cursory example of late fall presence	Agree; formal bird surveys were not conducted. However, even formal surveys would be unlikely to detect these rare and transient species. Therefore, we are assuming potential for occurrence based on habitat.
6) USFWS-MB	Several editorial comments and changes of wording	Changes were made as suggested.
7) USFWS-MB	[Re: peregrine falcon] is there potential to nest there [Granite site] as well?	Peregrine falcons reportedly nest on WSMR in the San Andres and Oscura Mountains. Granite site lacks suitable cliffs, but there are cliffs and rocky outcrops in the general surrounding area. Added: There may be potential for peregrine falcons to nest on cliffs in the Mockingbird Mountains.

8) USFWS-MB	[Re: golden eagles] Possible breeding failure or even territory abandonment should be included here, should be explicit.	Added potential for breeding failure or nest or territory abandonment in several places in document
9) USFWS-MB	Monitoring is not management per se and would not constitute a mitigation activity per se... What exactly is the management? And, what if the outcome is breeding failure or territory loss - what will "mitigation" be? (Similar comments in several places in document.)	Monitoring is needed to inform WSMR, DTRA and USFWS of impacts and management needs. Mitigation measures should be finalized in the permitting process. Statements regarding use of monitoring data to determine appropriate measures, and inclusion of mitigation in permit conditions, have been added.
10) USFWS-MB	Time-area counts are a weak approach if goal is to assess change other than perhaps a vague, qualitative idea and probably of only dramatic changes, if any occur. What is "faunal use" and how exactly would it be documented? The nature of this assessment approach for wildlife in general should be acknowledged as being cursory & superficial.	This method was suggested by WSMR biologists in combination with their existing wildlife cameras as an efficient way to assess general wildlife use.
11) USFWS-MB	Is the term "mitigation" defined explicitly in this document? It seems to be used loosely in this section. "Mitigation" could be all of avoidance, minimization, offsetting loss, etc. though sometimes it is used to describe only the latter	Mitigation is defined in the opening paragraph of section 4, Environmental Consequences: "BMPs are standard practices that are implemented as part of the proposed action to minimize or avoid adverse impacts. Additional mitigation commitments are proposed to minimize, rectify or compensate for unavoidable adverse environmental effects that could be significant without mitigation."
12)USFWS-MB	[Re: retrofitting power poles as mitigation] This retrofitting would have to be over & above what's already being done/planned	Added: "This retrofitting would be in addition to any that is already being implemented or planned as mitigation for other actions."
13) USFWS-MB	Important here to distinguish 50 acres of foraging habitat, vs nest site habitat, as the latter is what's at stake here. Wording here should be cast with more caution.	Changed wording to distinguish loss of foraging habitat from potential loss of nest site or territory. "The effect of a loss of up to 50 acres of foraging habitat over the site's expected 20 years of use is minimal compared to the home range of golden eagles at WSMR ... However, should the nest site or the entire territory be abandoned, mitigation would be required to offset this loss so that population-level impacts are kept to less than significant."

14) USFWS-MB	[Re: monitoring the pair of eagles] Monitor in what way? In the context of this paragraph, my sense is that this would be monitoring of area use - eg, by telemetry.	Monitoring by remote cameras during tests; occupancy and breeding success monitoring as conducted by WSMR, with other monitoring as required by permit.
15) USFWS-MB	[Re: having fire dept. on call to manage wildfires] Assumes reader believes fire is negative for the wildlife... is this so? No context provided here, so I'd expect some readers to raise questions especially those less familiar with this particular ecotype & its dynamics	Added reference to Section 3.11, Wildland Fire. Here it is stated: WSMR currently adheres to DOD policies on fire management as well as working with fire as an ecological process for those fires that pose no threat to public safety or the mission, and are not harming any resources.
16) USFWS-MB	[Re: BMPs, surveys for raptors in area prior to targets being set up] Should specify - what is "surrounding area"	WSMR suggests it would be one mile; added to text.
17) USFWS-MB	[Re: mitigation for wildlife; WSMR Environmental Division to be contacted regarding issues related to bat roosts, etc. How will this communication result directly in mitigation?	Added: "Environmental Division will determine appropriate measures to avoid or minimize harm to these resources."
18) USFWS-MB	[Re: mitigation commitments; possibly limiting testing during critical 4-6 weeks of eagle nesting] Which "4-6" would be "most critical," the period I believe critical encompasses laying through hatching, at the very least... this would be about 7 wks, but should really include early nestling... total 8+ wks	Changed to 6-8 weeks as editorial marks suggest. Also per editorial suggestion, changed "testing would be limited" to "testing would be precluded, unless essential". However, testing is an essential part of DTRA's mission.
19) USFWS-MB	[Re: eagles, mitigation] Worst-case scenario is permanent loss of territory... highly unlikely, it seems, but it's possible that a permit would include a condition to somehow replace the nest site(s) to sustain the territory.	Added: "including measures to compensate for potential loss of the nest site or abandonment of the territory." This should be resolved during permit discussions.
20) USFWS-MB	There's much redundancy between the body of appendix C and text in the related section of the DEA. Necessary?	Reviewed these sections. Appendix C is more comprehensive and provides all eagle-related information in one place. Text of EA mostly summarizes this information. Some redundant info in EA has been removed.
21) USFWS-MB	[Re: eagles are resident at WSMR, do not migrate.] May not be true for all golden eagles from WSMR. Based on tagging of about 65 golden eagle nestlings in the Four Corners area, USFWS has found that ~40% of the subadults migrate 350-1250 km north to spend summer in northern states, especially WY.	WSMR eagle biologists feel confident that our breeding eagles are year-round residents. That said, we don't know for sure. The 4-corners area is quite different from WSMR. Wording changed to "believed to be non-migratory".

22) USFWS-MB	What was ultimate fate of the nest that was active in 2014, or was it unknown?	Unknown; added "the success of this nest was not documented".
23) USFWS-MB	What exactly is the distance [from the nest sites east of Granite site]? is it within 1.5 mi? How was it determined that this distance was a factor supporting "...not likely to be affected..." ?	Added distance (they're about about 1 mile from Granite site). Topographic separation (1,000-ft ridge line) is more important than distance.
24) USFWS-MB	For golden eagles, there's not a "common" recommendation for nest buffers. It's quite situational; even 1-mile buffers have been used. But almost none are published much less supported by real data.	The 1/2 mile is in the CDOW recommendations. Also in 2007 USFWS bald eagle management guidelines for "Category H, blasting and other intermittent noises". Changed wording, added more info on disturbance and reworded the entire paragraph.
25) USFWS-MB	It's not clear what this "monitoring and data collection" means with regards to buffer distance, can you more fully explain?	Reworded this. The USFWS interim monitoring protocol for golden eagles (Pagel et al. 2010) does not prescribe a fixed buffer distance, but requires action agencies to monitor and collect data to provide a foundation for evaluation of whether activities or conditions may be affecting eagles .
26) USFWS-MB	How is it known that this [pressure] level (& measurements) is the threshold for damaging eggs? In reference to Appendix B... is this the source? if so, should reference it earlier.	Re-organized this section
27) USFWS-MB	A better, more recent reference for this statement [about eagle territories having multiple nests] is the Millsap et al. 2015 publication "Conservation significance of alternative nests of golden eagles," plus ref's therein.	Added reference
28) USFWS-MB	[Re: distances of effect for different size weapons tests] Not intuitive; why would a weapon twice as large pose less threat? Is this conveyed accurately?	Added explanation: "a larger weapon would have a larger radius within which organisms would be harmed".
29) USFWS-MB	[Re: pressures that cause injury to birds] The previous addresses damage to "eggs or hatchlings." If this extends to all eagles (at least all golden eagles - should be specified), the connection & rationale should be explicitly made & supported.	This is general for birds. Eggs and hatchlings are the most vulnerable life stage.

30) USFWS-MB	[Re: reference to line of sight disturbance.] Only if in line of sight? What of disturbance such as loud noise, the source of which is not necessarily within line of sight?	We are most concerned about line of sight because areas that aren't within sight are also separated topographically, and ridge lines also block noise to some extent. Also some of the references indicated that line of sight is important; eagles require a larger buffer in open country.
31) USFWS-MB	What's the difference between SHIST site and Granite site? Apparently the reader has to find this out elsewhere before reading this appendix.	This information is in the EA (Granite site would replace SHIST). Added this to appendix.
32) USFWS-MB	Capital Peak not mentioned previously in this Appendix. And, in general, what's the relevance of this sentence? The context is not clear - and Granite site is not specifically mentioned in the whole paragraph.	The point is that other DTRA test sites have nearby eagle nests. SHIST has the same kinds of tests that Granite would have. Added that Capital Peak has some of the same types of disturbance that would occur at Granite.
33) USFWS-MB	Many readers would want to know why this [testing] schedule has to be followed... and why, for golden eagles, the most sensitive period of courtship-laying-incubation-early nestling periods cannot be avoided. Is this spelled out elsewhere? It should be, really important.	These tables simply report on the scheduling that has occurred over the past six years. Scheduling these types of tests is complex. We are exploring options regarding scheduling.
34) USFWS-MB	Helicopters are not the best sole example of disturbance for golden eagles, it's well known that eagles seldom respond. The background re: disturbance in this appendix should extend beyond this example. For example, see Steenhof et al 2015, Wildlife Society Bulletin 38:682-688 re: effects of OHV activity; Martin et al 2011 Conserv. Biology 25:316-323 re disturbance by hikers	Helicopters were used because they are military use; almost no other data available on military uses' effects on eagles. Added Steenhof citation. The Martin et al paper is about decision making and does not contain data re: disturbance effects on eagles. Also Martin et al. 2009 re: recreational disturbance in Denali states that "support for the hypothesis of an effect of potential human disturbance on site occupancy dynamics was equivocal."

35) USFWS-MB	re: Monitoring. I strongly suggest marking the adults at the Granite territory with telemetry, ideally GSM technology that records GPS locations as often as every 15 seconds (though a less frequent formatting would probably suffice). If the adult pair could be captured and marked, assessment of their response could be monitored 24/7 in real time, as long as cell towers are available in the broader area. Telemetry also would provide documentation of the fate of adults, e.g., if either leaves the nest area ... plus indirect benefits especially detailed use of the area. In sum, telemetry would preclude the guesswork that would result from other, much less rigorous monitoring methods.... the challenge, of course, is capturing the birds	Capturing the eagles would also constitute take and would need to be negotiated during permitting. WSMR is currently monitoring occupancy and nest success; additional monitoring such as telemetry will be considered.
36) USFWS-MB	Consider identifying each territory and nest sites within by name & number, e.g., Granite west (referring to territory & one of the nests), Granite east... This should be done up front, and include a reference map/figure.	WSMR prefers not to release a map of nest sites due to the sensitivity of this data. Nest sites now referred to by number in text.
37) USFWS-MB	Camera use probably would require permit from USFWS for possible take via disturbance, need to explore.	Address during permitting
38) USFWS-MB	Consider that this period [avoidance of activities that would disturb eagles] could be reduced to half this much - the normal laying, incubation, and early nestling stages, a total of about 70 days... After the early nestling period, breeding pairs are highly unlikely to abandon unless disturbance is relatively severe never-ending.	Noted; changed 150 days to 70 days.
39) USFWS-MB	Question whether removing the nest would "eliminate..." possibility of nest being abandoned due to disturbance. A strong statement... supportable?	Agree that cautious wording is more appropriate. Changed to: "prevent the adult eagles from nesting close to Granite site, where they might later abandon an active nest with eggs or nestlings." If adult eagles are prevented from using this nest site, they would not have eggs or nestlings there that could be abandoned because of disturbance. They would presumably nest farther away where disturbance would not be severe enough to cause abandonment.

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U.S. ARMY WHITE SANDS MISSILE RANGE
WHITE SANDS MISSILE RANGE, NEW MEXICO 88002-5048
ENVIRONMENTAL ASSESSMENT

Title: Environmental Assessment of the Granite Target Site, White Sands Missile Range, New Mexico

PROPONENT:

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SHERRY J. DAVIS

Director

Environmental, Safety and Occupational Health (J4E)
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17 FEB 2016

Date

WHITE SANDS MISSILE RANGE, NEW MEXICO
FINDING OF NO SIGNIFICANT IMPACT

NAME OF THE PROPOSED ACTION: Environmental Assessment (EA) of the Granite Target Site on White Sands Missile Range (WSMR), New Mexico.

DESCRIPTION OF THE PROPOSED ACTION: The Defense Threat Reduction Agency and U.S. Strategic Command Center for Combating Weapons of Mass Destruction (DTRA/SCC-WMD) proposes to establish a new target site for hard rock penetration, static high explosive, and advanced weapon systems testing and evaluation (T&E). These T&E activities were previously evaluated in the 2007 Programmatic Environmental Impact Statement for DTRA Activities on White Sands Missile Range, New Mexico. The proposed new target site would replace the existing Seismic Hardrock In Situ Test site (SHIST), where there is no longer a large enough area of intact bedrock to support these types of tests.

The proposed new target site, known as the Granite site, is located on an approximately 50-acre site in the Mockingbird Mountains in the southeastern corner of Socorro County, New Mexico. Alternative locations for the new test site that were considered included sites northwest and southeast of SHIST; Mockingbird South; and Second In-situ Test Area (SISTA). These potential sites were evaluated for their availability and suitability in having sufficient granite bedrock, slope of less than 15 degrees, and shallow soil overburden. Each of these potential alternative sites failed one or more of these criteria. A No-Action alternative was also considered. Additionally, two alternative access routes were considered: Pond road and Gus (powerline) road.

The preferred alternative would establish the new hardrock test bed at the Granite site with access via Pond road. DTRA/SCC-WMD would establish a new granite test bed with associated facilities at the site. Targets for specific tests would be cleared prior to each test event. There would be no permanent structures constructed at the site. Trailers would be brought on site to provide instrumentation, communications, and generator equipment. A laydown yard for heavy equipment and the trailers would be located on-site on a flat area approximately one acre in size and would be bladed to accommodate placement of facilities. The access road would require minor improvements, including grading and addition of road base or gravel to low spots or installation of drainage features at some arroyo crossings. The existing SHIST and Alt SHIST sites would continue to be used for testing that does not require undamaged granite surfaces. The new test site would be used for approximately 20 years, similar to the length of time that SHIST has been in use.

PURPOSE AND NEED: The purpose of the proposed action is to continue to provide adequate T&E areas for DTRA/SCC-WMD to evaluate the effectiveness of weapon systems used against simulated enemy military assets, including hardened and reinforced structures. These enemy military assets can produce, store or control WMD. Continued testing and evaluation is needed to support DoD, Federal agencies, and friendly nations' programs to counter proliferation of WMD. Counter WMD systems tests and counter WMD technology evaluations against simulated enemy ground targets, such as is done at the existing SHIST and Alt SHIST sites, requires a hard rock test site of at least 50 acres of granite that is relatively flat. SHIST no longer has a large enough area of intact bedrock to support these types of tests. The proposed site represents the best

available combination of location, geology and access, and would allow continued testing at WSMR.

ENVIRONMENTAL CONSEQUENCES: This EA contains the results of an impact analysis of the proposed action and the no-action alternative on the environment. The environmental resources evaluated in this analysis include: air quality, soils, geology, climate, water resources, vegetation communities, invasive species, wildlife, threatened and endangered species, wildland fire, land use and aesthetics, facilities and infrastructure, cultural resources, Indian trust assets, noise and blast pressure, hazardous materials, human health and safety, socioeconomics, and environmental justice. Mitigation measures are proposed to reduce potential adverse impacts on soils, vegetation communities, wildlife, and cultural resources to a level that is less than significant. Mitigations to protect cultural sites will occur in accordance with those outlined in the response letter dated 16 November 2015 from the State Historic Preservation Office. With these mitigation measures in place, there would be no significant impacts on the environment from the proposed Granite Target Site.

The Department of the Army, WSMR recognizes the need for DTRA/SCC-WMD to continue its testing and evaluation program to evaluate the effectiveness of weapon systems used to counter proliferation of WMD.

CONCLUSION: Based on the EA and consideration of the described mitigation measures, and in accordance with the guidelines for determining the significance of proposed federal actions (40 C.F.R. 1508.27) and Environmental Protection Agency (EPA) criteria for initiating an Environmental Impact Statement (EIS) (40 C.F.R. 6.207), WSMR has concluded that the establishment of a new test bed at the Granite Target Site will not result in a significant effect on the environment. Applicable federal, state, and local laws and regulations would be followed. DTRA/SC-WMD and WSMR have determined that an environmental impact statement (EIS) pursuant to the National Environmental Policy Act is not required, and this Finding of No Significant Impact is hereby submitted.


SHERRY J. DAVIS
Director

Environmental, Safety and Occupational Health (J4E)
Defense Threat Reduction Agency/SCC-WMD


Date


TIMOTHY R. COFFIN
Brigadier General, USA
Commanding


Date