# High Energy Laser Systems Test Facility (HELSTF) Enhanced Laser and Range Operations

## Environmental Assessment

**16 June 2005**

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HELSTF is the most comprehensive site in the United States capable of supporting directed energy technologies for the DoD, other government agencies, industry, and academia. HELSTF represents a national investment of approximately $800 million in high energy laser technology. As a result of the existing laser technologies and supporting infrastructure, which have an established record of successful and innovative laser testing, research, and development, HELSTF is an important national asset to support continued laser technologies. It is imperative that our nation's military and scientific communities have access to up-to-date facilities for increasingly complex research, development, testing, and evaluation of new and existing laser technologies. National defense also requires that foreign laser technologies be evaluated to counter threats to U.S. and Allied deployed forces.

The purpose of the Proposed Action is to enhance the capability of HELSTF in order to better accommodate a more comprehensive suite of lasers, beam directors, sensors, associated equipment, meteorological equipment, multiple test areas, and pointing and tracking systems.

The Proposed Action is needed for HELSTF to remain technologically competitive in directed energy development and to provide a comprehensive test facility for all aspects of military laser technology.

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# EXECUTIVE SUMMARY

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## INTRODUCTION AND SCOPE

This Environmental Assessment (EA) analyzes the potential environmental consequences of enhancing the capabilities and the operation of the High Energy Laser Systems Test Facility (HELSTF), White Sands Missile Range, (WSMR), New Mexico. The environmental resource areas analyzed herein reflect the unique features of HELSTF and its environmental setting. The U.S. Army Space and Missile Defense Command proposes to develop a fully enhanced capability to conduct laser testing at HELSTF, including associated range operations. The enhancement would include the testing of one or more new laser technologies or completion of one or more new range operations. These laser technologies are from various Department of Defense (DoD) and civilian agencies. Enhanced testing would begin in the fourth quarter of fiscal year 2005 and would occur concurrently with existing activities at HELSTF.

This EA also presents for revalidation the activities currently being conducted at HELSTF, as well as potential new activities. The No-action Alternative describes the current ongoing activities at HELSTF and is an update of what was described in the 1998 HELSTF EA. The Proposed Action presents several new types of laser developments and associated range operations that would potentially occur at HELSTF.

## PURPOSE AND NEED

The purpose of the Proposed Action is to enhance the capability of HELSTF to better accommodate a more comprehensive suite of lasers, beam directors, sensors, associated equipment, meteorological equipment, multiple test areas, and pointing and tracking systems. The Proposed Action is needed for HELSTF to remain technologically competitive in laser development and to provide a comprehensive test facility for all aspects of military laser technology.

## NO-ACTION ALTERNATIVE

By describing the No-action Alternative first in the document, a baseline of activities is provided that will make new activities presented in the Proposed Action much more understandable. Additionally, the previous HELSTF EA is now over 6 years old, so another purpose of reanalyzing the elements of the No-action Alternative is to revalidate the current activities at HELSTF. Under the No-action Alternative, the same laser test activities that currently occur at HELSTF and that were previously analyzed in the 1998 HELSTF EA and the 1998 Tactical High Energy Laser (THEL) Advanced Concept Technology Demonstration (ACTD) EA would continue. No additional enhanced laser activities would occur at HELSTF.

The current HELSTF activities are directly involved with the use or production of a high energy laser beam. Table ES-1 lists these activities and changes that have occurred since the previous analysis was completed.

**Table ES-1: No-Action Alternative**

| Lasers | Changes in Activities |
|---|---|
| Mid-Infrared Advanced Chemical Laser (MIRACL) | • Fluorspar process not in use<br>• Testing level expected to remain the same or decrease |
| Mobile Tactical High Energy Laser Test Bed (MTHEL TB) | • No change in activities (formerly named THEL ACTD) |
| Low-Power Chemical Laser (LPCL) | • Emission scrubber improved<br>• Hydrogen fluoride now collected and sent to a temporary less than 90-day accumulation site<br>• Testing level expected to remain the same or decrease |
| Laser Device Demonstration (LDD) | • Not currently in use<br>• Hydrogen added as part of new hydrogen fluoride optics<br>• Restarting would require refurbishment of emission scrubber system |
| Pulsed Laser Vulnerability Test System (PLVTS) | • Coalescing filter now separates and reuses oil that was previously disposed |
| **Facilities** | |
| Beam Transfer Area | • No change in activities |
| Effects Test Area | • No change in activities |
| Hazard Test Area/Test Cell B | • No change in activities |
| Vacuum Test System | • No change in activities |
| Sea-Lite Beam Director | • No change in activities |
| Army Pointer Tracker | • No change in activities |
| **Safety Systems** | |
| Hardwire Abort System | • No change in activities |
| Fire Protection | • No change in activities |
| Hazardous Atmosphere Monitor & Detection System | • No change in activities |
| Dedicated Safety Intercom Net | • No change in activities |
| Medical Support | • No change in activities |
| **Chemistry Laboratory** | • No change in activities |
| **Support Activities** | • No change in activities |

## PROPOSED ACTION

The U.S. Army Space and Missile Defense Command proposes to develop a fully enhanced capability to conduct laser testing at HELSTF, including the associated range operations. The enhancement would include the testing of one or more new laser technologies or completion of one or more new range operations, additional target launches, and facility and system improvements. Enhanced testing would begin in the fourth quarter of fiscal year 2005, and would occur concurrently with existing activities at HELSTF. Table ES-2 lists the proposed activities.

**Table ES-2: Proposed Action**

| Lasers | Proposed Activities |
|---|---|
| Solid State Heat Capacity Laser (SSHCL) | Program intended to develop a lightweight, high-average-power, high-pulse-energy solid state laser technology |
| Mobile Tactical High Energy Laser (MTHEL) Prototype | MTHEL Test Bed (TB) technology on a mobile platform at the Limor site |
| Airborne Laser (ABL) | Program would use the Mid-Infrared Advanced Chemical Laser (MIRACL) to simulate the ABL by altering wavelengths |
| Advanced Tactical Laser (ATL) | The ATL could use HELSTF test areas for targets; also, would use the MIRACL to simulate the ATL by altering wavelengths |
| High Power Carbon Dioxide Lasers | Similar to Pulsed Laser Vulnerability Test System (PLVTS) |
| Free-Electron Laser (FEL) | An electric discharge laser that represents an alternative to conventional lasers with flexibility and high power |
| **Targets and Flight Testing** | Most target launches would occur at established launch sites and artillery firing points, others would occur from launch vehicles parked on existing dirt roads and trails. |
| **Facility and System Improvements** | Implementation of a new closed-loop cooling system for the MIRACL that would eliminate the use of chromates<br>Improvements that would occur on previously disturbed land include:<br>▪ New sewage lagoons<br>▪ FEL facility<br>▪ Additional electrical substation |

## METHODOLOGY

Thirteen broad resource areas were considered to provide a context for understanding the potential effects of the No-action Alternative and the Proposed Action and to provide a basis for assessing their severity. A few resource areas are not expected to be affected sufficiently to warrant further discussion and/or that are already analyzed in the referenced HELSTF documents. The areas determined to warrant analysis are air quality, airspace, biological resources, cultural resources, hazardous materials and waste, health and safety, infrastructure and transportation, and water resources.

## RESULTS

This section summarizes the conclusions of the analyses made for each of the resource areas based on the application of the described methodology. Within each resource summary, only those activities for which a potential environmental concern was determined are described.

### Air Quality

Under the No-action Alternative, HELSTF emission levels would continue to be monitored and maintained according to WSMR's Title V Air Permit. Air pollution dispersion modeling is conducted prior to operation or refueling of any chemical laser system on HELSTF. The HELSTF Atmospheric Sciences Group has a staff on site during these activities to perform dispersion modeling functions in accordance with an approved HELSTF procedure.

The emission scrubber system on the Low-Power Chemical Laser (LPCL) was replaced since the 1998 HELSTF EA, as the previous system was more difficult to maintain and prone to a quick loss of scrubbing efficiency. The improved LPCL scrubber system continues to remove deuterium fluoride (DF) and hydrogen fluoride (HF) from exhaust emissions.

It is anticipated that the proposed laser systems would either have no air pollutants, or emission levels produced would be similar to the existing systems and would remain within the existing parameters of WSMR's Title V Permit. The Mid-Infrared Advanced Chemical Laser (MIRACL) laser could be used to simulate Airborne Laser (ABL) and Advanced Tactical Laser (ATL) operations before the actual testing at WSMR. The operation of MIRACL at different wavelengths would not change effluents, and anticipated emissions would be similar to those described for MIRACL.

Due to the intervals between testing events, target launches associated with each test are discrete events. The prevailing conditions at WSMR lend themselves to the rocket emissions rising and dispersing, causing no overall impact on local air quality.

Although minor short-term impacts associated with construction activities for facility improvements may occur, no exceedances of ambient air quality standards would be anticipated.

**Airspace**

Laser activities would have the potential to impact current aerial activities within WSMR airspace. Depending on the individual test design and safety parameters, the standard procedure of one or more of the restricted areas being recalled by WSMR is possible. In addition, military coordination efforts through prior notices of closure are required from WSMR to inform Holloman Air Force Base and other potential airspace users, ensuring minimization of any adverse effects on aircraft operations.

In the unlikely event that the target should move out of contact with the laser beam, test design and safety parameters would ensure that the laser beam would not exceed any restricted airspace at energy levels that could have the potential to result in eye damage to pilots.

**Biological Resources**

Continuing and proposed laser activities conducted within HELSTF's fenced boundary are not likely to affect biological resources since wildlife use of the area is limited to species such as birds and small forms of wildlife such as rabbits and lizards. No threatened or endangered plant or wildlife species have been observed within the fenced HELSTF site.

Target and flight testing activities would take place in previously disturbed areas and generally are not expected to adversely affect plant species or wildlife. The potential for debris to land on an individual cactus or wildlife species is possible; however, debris landing on an individual plant or animal would not be detrimental to the whole population. No adverse impacts to migratory birds; threatened, endangered, or candidate species; or other biological species are anticipated.

No impacts to biological resources are anticipated from facility improvements since the area is previously disturbed with little vegetation and thus provides no substantial wildlife habitat. The proposed sewage lagoons would hold domestic sewage and sometimes receive non-hazardous chiller or process water that would either be sampled prior to putting it in the lagoons or known to be non-hazardous. No hazardous industrial waste would be placed into the lagoons. Injured birds as in the one past reported case would need assistance for removal. The only other wildlife that could potentially use the new lagoons would be small animals that could get through fencing. Historically there has been no observation by HELSTF personnel of harm to the occasionally observed migratory birds or other wildlife within the fenced area in the vicinity of the existing lagoons. Thus, no adverse impacts to migratory birds; threatened, endangered, or candidate species; or other wildlife that could be attracted to the lagoons to drink, rest, or forage are anticipated.

All electrical poles would be designed to prevent raptor electrocution using standard techniques provided in White Sands Missile Range Commander's Guidance policy, which addresses the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

**Cultural Resources**

Continuing activities and proposed activities conducted at HELSTF are not likely to affect cultural resources, since the area is covered by asphalt or is previously disturbed; moreover, no traditional cultural resources, nor cultural resources that are National Register of Historic Places-listed or –eligible or listed on New Mexico's State Register of Cultural Properties have been observed within the immediate area of HELSTF facilities.

In the event that previously undisturbed areas are identified for facility improvements, a cultural resources survey could be required. However, construction of the Free Electron Laser (FEL) building, substation, and new sewage lagoons or are planned to take place within previously disturbed areas.

**Hazardous Material and Waste**

Operation of the existing systems would not impact the use, storage, transportation, or disposal of hazardous materials at HELSTF. All routine hazardous wastes generated at HELSTF are managed in temporary less than 90-day accumulation sites. Non-routine and large quantity one-time wastes are managed as needed by the hazardous waste contractor. No long term storage of hazardous waste occurs at HELSTF.

The primary byproduct of environmental concern produced by the MIRACL is DF, which is chemically equivalent to HF. The DF, which is gaseous, makes up a part of the MIRACL exhaust. The exhaust is chemically scrubbed to remove the hazardous nature of the fluoride. The resulting sodium fluoride solution is accumulated onsite in a tank that circulates the solution repeatedly until disposal is required. The sodium fluoride solution is disposed of in one of two ways: disposal by a licensed hazardous waste handler or treating the solution with lime to generate a non-hazardous solid waste, a calcium fluoride sludge commonly known as fluorspar.

The emission scrubber system of the LPCL has been changed and improved since the 1998 HELSTF EA. The new system allows the HF to be collected and sent to a temporary less than 90-day accumulation site for proper disposal.

Previously, the excess or contaminated Pulse Forming Network oil and minerals for the Pulsed Laser Vulnerability Test System were disposed of through the HELSTF hazardous waste collection and disposal system. Currently a coalescing filter separates the oil and the oil is reused; therefore there is a minor decrease in hazardous waste generated.

The MIRACL laser may be used to simulate the ABL and ATL. Operation of the MIRACL would be at different wavelengths; however, this would not change current hazardous material use or production and handling of hazardous waste.

In addition to laser activities, the assembly and flight testing of targets has the potential to involve hazardous materials and to generate hazardous waste. Any potential effects would be minimized by following appropriate standard operating procedures and regulations, including the HELSTF Hazardous Material Management Policy, the Hazardous Chemical Spill/Release Response Plan, and the Hazardous Material Management Policy, as well as WSMR hazardous material and hazardous waste management procedures.

Any hazardous materials used or hazardous waste generated during construction for facility improvements would be handled in compliance with appropriate HELSTF and WSMR standard operating procedures. The current cooling system used for the MIRACL is an 11,000-gallon closed-loop system. Current planning includes the possible replacement of the cooling system with a system not using chromates. This replacement, if it occurs, would require the disposal of the chromates.

**Health and Safety**

Health and safety concerns associated with laser operation and activities of the Proposed Action are anticipated to be similar to those of the No-Action Alternative. Similar standard operating procedures would be developed for each proposed laser and included in the HELSTF Safety Standard Operating Procedures and Laser Safety Information.

A FEL is expected to generate x-ray radiation hazards significant enough to require protection, including lead shielding in buildings. However, these concerns would be addressed through standard operating procedures that would minimize any impact to the health and safety of the public and workers.

In addition to laser operation, target flight testing has the potential to affect the health and safety of personnel and the public. Any potential effects would be minimized by following appropriate standard operating procedures and regulations and establishing appropriate on-base roadblocks prior to lasing activities. The implementation of personnel safety practices would limit the number of people exposed to increased hazards and, as a result, no health and safety impacts are expected.

It is anticipated that any construction activity associated with facility improvements would be done in accordance with all HELSTF and WSMR regulations and would not pose an impact to the health and safety of personnel or the public

**Infrastructure and Transportation**

Under the No-action Alternative, infrastructure and transportation demands would remain at current levels, as would the requirement for periodic routine maintenance and repair. Infrastructure and transportation resources exceed current needs.

The Proposed Action would be compatible with ongoing test programs and procedures at HELSTF. No adverse impacts on infrastructure or transportation within the HELSTF region of influence are expected to occur as a result of the Proposed Action. This includes electrical power, water usage, wastewater, and solid waste.

The current resources are sufficient to meet the demands of facilities improvement activities. Adequate infrastructure exists for increased personnel levels. Such activities, including the new substation, FEL building, and new sewage lagoons, would have little or no impact on current water, wastewater, or solid waste handling capacity or levels. The possible exception is in the case of the FEL. Higher power requirements for the FEL could require the construction of a new substation, if current facilities are determined to be inadequate.

**Water Resources**

Under the No-action Alternative water usage would not increase at HELSTF and therefore, water availability or quality are unlikely to be affected.

Based on the anticipated number of tests and minimal water demand by the proposed new laser systems, the total HELSTF usage would not increase under the Proposed Action. Thus, the proposed activities would not be expected to affect water availability or quality.

All construction activities for facility improvements would utilize standard operating procedures to curtail any potential dust generation and erosion during construction. No significant impacts to the water supply are expected as a result of construction water requirements. In addition, through maintaining effective grading and drainage controls, impacts due to erosion from construction would not occur.

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# Acronyms and Abbreviations

# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AAQS | ambient air quality standards |
| ABL | Airborne Laser |
| ACTD | Advanced Concept Technology Demonstration |
| AFB | Air Force Base |
| AGL | above ground level |
| APT | Army Pointer Tracker |
| ATC | Air Traffic Control |
| ATL | Advanced Tactical Laser |
| BOSS | Battlefield Optical Surveillance System |
| $C^3I$ | Command, Control, Communication, and Intelligence |
| CEQ | Council on Environmental Quality |
| COIL | Chemical Oxygen Iodine Laser |
| DF | deuterium fluoride |
| DoD | Department of Defense |
| DOT | Department of Transportation |
| EA | Environmental Assessment |
| EIS | Environmental Impact Statement |
| FAA | Federal Aviation Administration |
| FEL | Free-Electron Laser |
| FY | fiscal year |
| HELSTF | High Energy Laser Systems Test Facility |
| HF | hydrogen fluoride |
| ICRMP | Installation Cultural Resource Management Plan |
| IFR | instrument flight rules |
| kV | kilovolt |
| kW | kilowatt |
| LDD | Laser Device Demonstration |
| LPCL | Low-Power Chemical Laser |
| $\mu g/m^3$ | microgram per cubic meter |
| MAR | Multi-Function Array Radar |
| MDA | Missile Defense Agency |
| MIRACL | Mid-Infrared Advanced Chemical Laser |
| MSDS | Material Safety Data Sheets |
| MTHEL | Mobile Tactical High Energy Laser |

| | |
|---|---|
| MTHEL TB | Mobile Tactical High Energy Laser Test Bed |
| MUDPACK | Motor Deflagration and Rupture Effects on Payloads Program |
| MW | megawatt |
| NAAQS | National Ambient Air Quality Standards |
| NASA | National Aeronautics and Space Administration |
| NEPA | National Environmental Policy Act |
| Nd:YAG | Neodymium: Yttrium Aluminum Garnet |
| OSHA | Occupational Safety and Health Administration |
| PLVTS | Pulsed Laser Vulnerability Test System |
| PM-2.5 | particulate matter greater than or equal to 2.5 microns in diameter |
| PM-10 | particulate matter greater than or equal to 10 microns in diameter |
| PMOA | Programmatic Memorandum of Agreement |
| psi | pounds per square inch |
| PTS | Pointer Tracker Subsystem |
| ROI | region of influence |
| SHPO | State Historic Preservation Office |
| SLBD | Sea-Lite Beam Director |
| SMDTC | US Army Space and Missile Defense Technical Center |
| SSHCL | Solid State Heat Capacity Laser |
| THEL | Tactical High Energy Laser |
| TNT | trinitrotoluene |
| UAV | Unmanned Aerial Vehicle |
| USC | United States Code |
| USASMDC | United States Army Space and Missile Defense Command |
| USFWS | United States Fish and Wildlife Service |
| VFR | visual flight rules |
| W/cm2 | watts per square centimeter |
| WSMR | White Sands Missile Range |

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## APPENDICES



## FIGURES



## TABLES

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# PURPOSE AND NEED

# 1.0 PURPOSE AND NEED

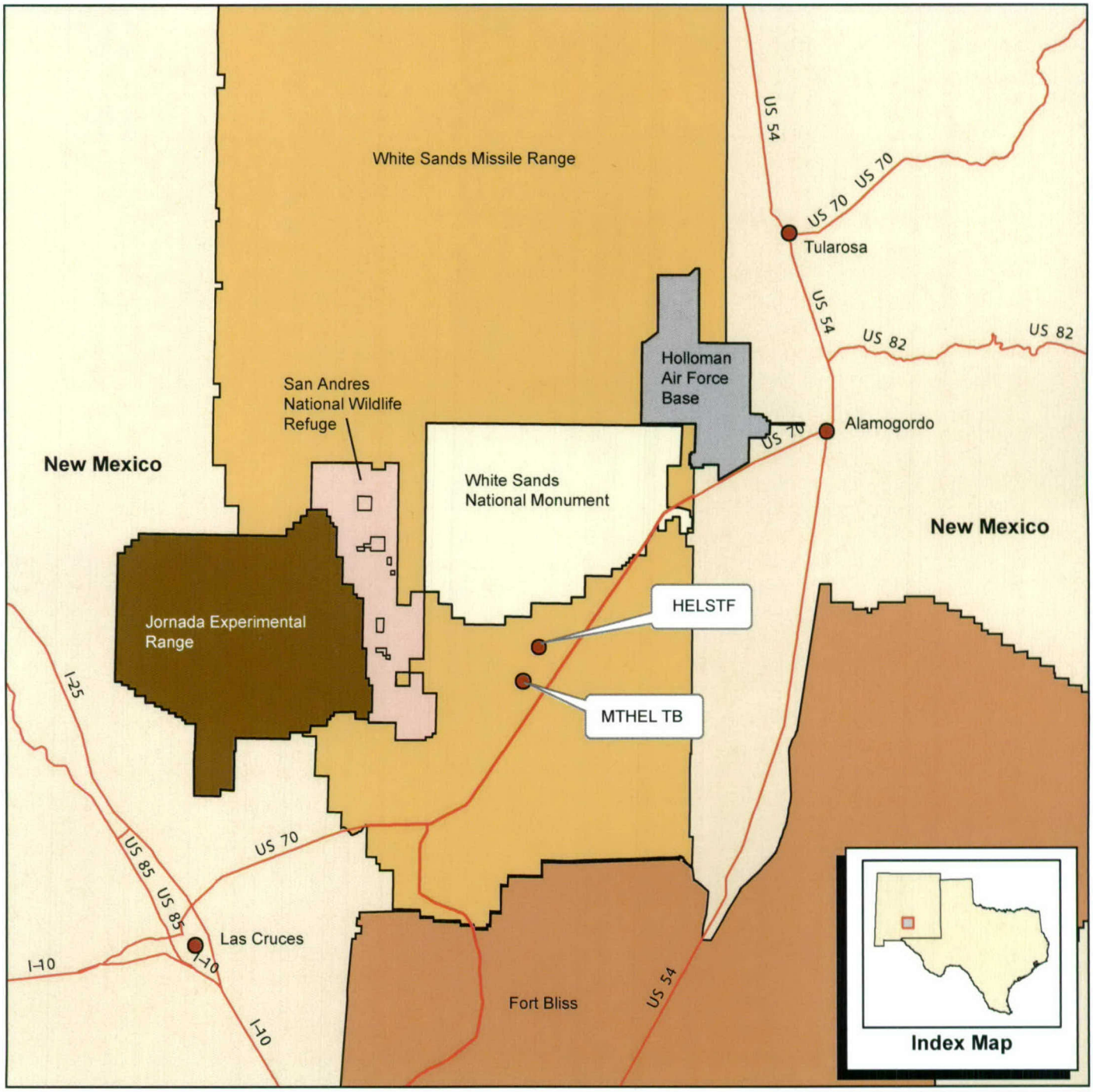
## 1.1 INTRODUCTION

This Environmental Assessment (EA) analyzes the potential environmental consequences of enhancing the capabilities and the operation of the High Energy Laser Systems Test Facility (HELSTF). The National Environmental Policy Act (NEPA) of 1969, Council on Environmental Quality (CEQ) Regulations Implementing NEPA, Department of Defense (DoD), and applicable Service environmental regulations that implement these laws and regulations direct DoD officials to consider environmental consequences when authorizing and approving federal actions. The environmental resource areas analyzed herein reflect the unique features of HELSTF and its environmental setting. The U.S. Army Space and Missile Defense Command (USASMDC) proposes to develop a fully enhanced capability to conduct laser testing at HELSTF, including associated range operations. The enhancement would include the testing of one or more of the new laser technologies or completion of one or more of the new range operations that are described in the Proposed Action section. These laser technologies are from various DoD and civilian agencies. Enhanced testing would begin in the fourth quarter of fiscal year (FY) 2005, and would occur concurrent with existing activities at HELSTF.

## 1.2 BACKGROUND

HELSTF, located at the U.S. Army White Sands Missile Range (WSMR), New Mexico, has been designated as the DoD National Test Range for high energy laser test and evaluation. It is the nation's Tri-Service (U.S. Army, U.S. Air Force, and U.S. Navy) High Energy Laser Systems Test Facility. The facility is located 38 miles northeast of Las Cruces, New Mexico, and 70 miles north of El Paso, Texas (figure 1-1). The USASMDC manages HELSTF, which is the most comprehensive site in the United States capable of supporting U.S. Government, industry, academia, and foreign government high energy laser device testing as well as laser lethality, damage, and vulnerability testing. HELSTF represents a national investment of approximately $800 million in high energy laser technology. As a result of the existing laser technologies and supporting infrastructure, which have an established record of successful and innovative laser testing, research, and development, HELSTF is an important national asset to support continued laser technologies. It is imperative that our nation's military and scientific communities have access to up-to-date facilities for increasingly complex research, development, testing, and evaluation of new and existing laser technologies. National defense also requires that foreign laser technologies be evaluated to counter threats to U.S. and Allied deployed forces.

Fully operational since the fall of 1985, the facility has supported a host of high energy laser test programs for organizations such as the Missile Defense Agency (MDA), other DoD organizations, the National Aeronautics and Space Administration (NASA), aerospace defense and commercial technology companies, and universities and academic institutions. Non-lasing tests at HELSTF's Vacuum Test System have provided NASA a facility to test orbital and suborbital devices to verify proper operation prior to launch. Several organizations, including




**EXPLANATION**

HELSTF = High Energy Laser System Test Facility
MTHEL TB = Mobile Tactical High Energy Laser Test Bed

## Vicinity Location Map

NORTH

Scale

0 5.5 11 miles

050311 Location

New Mexico

**Figure 1-1**

MDA, have used the high energy laser beam's pointing device to collect high-quality infrared and visual spectra imagery of missiles in flight. Most recently, HELSTF has hosted the Mobile Tactical High Energy Laser Test Bed (MTHEL TB) system, formerly named the Tactical High Energy Laser (THEL) Advanced Concept Technology Demonstration (ACTD), that successfully shot down target artillery rockets and projectiles with a radar guided chemical laser.

HELSTF was established at WSMR at the Multi-Function Array Radar (MAR) site, a test location that was not being actively used. The site was chosen because of the 90,000 square feet of previously constructed concrete-reinforced space that was available, and its advantageous safety, security, and instrumentation considerations. The MAR facilities were constructed in 1963. The construction of the laser systems from 1981 to 1983 led to the name change of the facility. Operation of HELSTF began in 1984.

The location of HELSTF at WSMR provides access to over 5,000 square miles of highly instrumented land space and 7,000 square miles of controlled airspace for high energy laser testing. The wide array of laser systems, instrumentation, and test facilities currently in use makes HELSTF a unique national asset. Activities at HELSTF have previously been analyzed in the 1998 *High Energy Laser Systems Test Facility (HELSTF) Environmental Assessment* and the 1998 *Tactical High Energy Laser (THEL) Advanced Concept Technology Demonstration (ACTD) Environmental Assessment.*

## 1.3 PURPOSE AND NEED

The purpose of the Proposed Action is to enhance the capability of HELSTF to better accommodate a more comprehensive suite of lasers, beam directors, sensors, associated equipment, meteorological equipment, multiple test areas, and pointing and tracking systems. The Proposed Action is needed for HELSTF to remain technologically competitive in laser development and to provide a comprehensive test facility for all aspects of military laser technology.

## 1.4 SCOPE OF THIS DOCUMENT

This EA presents for revalidation the activities currently being conducted at HELSTF, as well as potential new activities. The No-action Alternative describes the current ongoing activities at HELSTF and is an update of what was described in the 1998 HELSTF EA. By describing the No-action Alternative first in the document, a baseline of activities is provided that will make new activities presented in the Proposed Action much more understandable. Additionally, the previous HELSTF EA is now over 6 years old, so another purpose of reanalyzing the elements of the No-action Alternative is to revalidate the current activities at HELSTF. The Proposed Action presents several new types of laser developments and associated range operations that would potentially occur at HELSTF.

## 1.5 DECISION(S) TO BE MADE

Based on information presented in this EA, a determination will be made if the EA is sufficient to warrant a Finding of No Significant Impact, or if an Environmental Impact Statement (EIS) is required to further assess environmental impacts of the Proposed Action. A Finding of No Significant Impact would allow a decision to be made regarding the Proposed Action or one of the alternatives without the need to do further environmental analysis.

The decision to be made is whether to enhance the test capabilities of HELSTF to allow the testing of new and more technologically advanced laser systems. A further decision would be whether to make full or partial enhancement. A decision not to make the enhancements (the No-action Alternative) would indicate that the current level of activities at HELSTF would continue.

## 1.6 RELATED ENVIRONMENTAL DOCUMENTATION

The conclusions of the NEPA studies below have been summarized and incorporated by reference into this document, as appropriate. The development of these studies included conducting requisite agency consultations encompassing the activities and analyses addressed in this EA.

*High Energy Laser Systems Test Facility (HELSTF) Environmental Assessment* (U.S. Army Space and Missile Defense Command), February 1998.

The Proposed Action of the 1998 HELSTF EA was to moderately increase the level of onsite laser activities, other onsite activities, and offsite activities at HELSTF. This moderately increased activity included the use of the Nautilus, Mid-Infrared Advanced Chemical Laser (MIRACL), Low-Power Chemical Laser (LPCL) and Pulsed Laser Vulnerability Test System (PLVTS) systems. New target launch sites were also analyzed. In addition to the Proposed Action Alternative, the HELSTF EA considered a No-action Alternative and a High Level of Activity Alternative. The resulting environmental analysis showed that no significant impacts would occur from the proposed HELSTF laser testing program. Appendix C includes the signed Finding of No Significant Impact.

*Tactical High Energy Laser (THEL) Advanced Concept Technology Demonstration (ACTD) Environmental Assessment* (U.S. Army Space and Missile Defense Command), April 1998.

The THEL EA analyzed the production and testing of a transportable, defensive weapon designed to defend against artillery rockets and projectiles through the use of a high energy laser to damage or destroy the munition before it can reach its target. The THEL ACTD, now called the MTHEL TB, consists of a Command, Control, Communications, and Intelligence Subsystem; a Laser Subsystem to generate a high power laser beam; and a Pointer Tracker Subsystem (PTS) to acquire, track, and target appropriate threats.

Analysis was prepared for testing at HELSTF that included:

- Lasing of targets by the THEL ACTD Fire Unit (Laser Subsystem and PTS)
- Use of 24 existing paved areas as launch points
- Use of four impact areas, three of which are in previously bladed areas
- Use of area between launch and aim points as debris impact area
- Launch of up to approximately 300 live and 80 inert target missiles during the first phase of testing (first 9 months)
- Launch of up to approximately 220 rockets and 620 artillery projectiles during the second phase of testing (subsequent 4 years)

The resulting environmental analysis showed that no significant impacts would occur from the proposed THEL ACTD program. Appendix C includes the signed Finding of No Significant Impact.

*White Sands Missile Range Range-Wide Environmental Impact Statement* (White Sands Missile Range), January 1998.

The WSMR Range-Wide EIS analyzed a wide scope of ongoing activities at the installation. Most of these activities include the testing of ground-to-ground and ground-to-air tactical missiles. A suite of target vehicles, rockets, artillery, and missiles was also analyzed.

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# 2.0
# DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

# 2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This chapter describes the No-action Alternative and the Proposed Action. Included in the No-action Alternative are current ongoing laser activities at HELSTF that were previously analyzed in the 1998 HELSTF EA and the 1998 THEL ACTD EA. However, because these EAs are over 6 years old, the activities are evaluated to determine what changes have occurred and to revalidate the analysis. These activities consist of lasers, facilities, Safety Systems, Chemistry Laboratory, and various support activities. The current activities occur within the HELSTF fenced boundary or on nearby WSMR land and are supported by HELSTF. Table 2-1 lists these activities and changes since previous analysis was completed. Under the No-action Alternative, no other enhanced laser activities would occur.

**Table 2-1: No-Action Alternative**

| Lasers | Changes in Activities |
|---|---|
| Mid-Infrared Advanced Chemical Laser (MIRACL) | • Fluorspar process not in use<br>• Testing level expected to remain the same or decrease |
| Mobile Tactical High Energy Laser Test Bed (MTHEL TB) | • No change in activities (formerly named THEL ACTD) |
| Low-Power Chemical Laser (LPCL) | • Emission scrubber improved<br>• Hydrogen fluoride now collected and sent to a temporary less than 90-day accumulation site<br>• Testing level expected to remain the same or decrease |
| Laser Device Demonstration (LDD) | • Not currently in use<br>• Hydrogen added as part of new hydrogen fluoride optics<br>• Restarting would require refurbishment of emission scrubber system |
| Pulsed Laser Vulnerability Test System (PLVTS) | • Coalescing filter now separates and reuses oil that was previously disposed |
| **Facilities** | |
| Beam Transfer Area | • No change in activities |
| Effects Test Area | • No change in activities |
| Hazard Test Area/Test Cell B | • No change in activities |
| Vacuum Test System | • No change in activities |
| Sea-Lite Beam Director | • No change in activities |
| Army Pointer Tracker | • No change in activities |
| **Safety Systems** | |
| Hardwire Abort System | • No change in activities |
| Fire Protection | • No change in activities |
| Hazardous Atmosphere Monitor & Detection System | • No change in activities |
| Dedicated Safety Intercom Net | • No change in activities |
| Medical Support | • No change in activities |
| **Chemistry Laboratory** | • No change in activities |
| **Support Activities** | • No change in activities |

The Proposed Action consists of enhancements of current lasers and the addition of new laser technologies at HELSTF. These enhancements would include the testing of one or more new laser technologies or completion of one or more of the new range operations, additional target launches, and facility and system improvements. Table 2-2 lists the activities proposed.

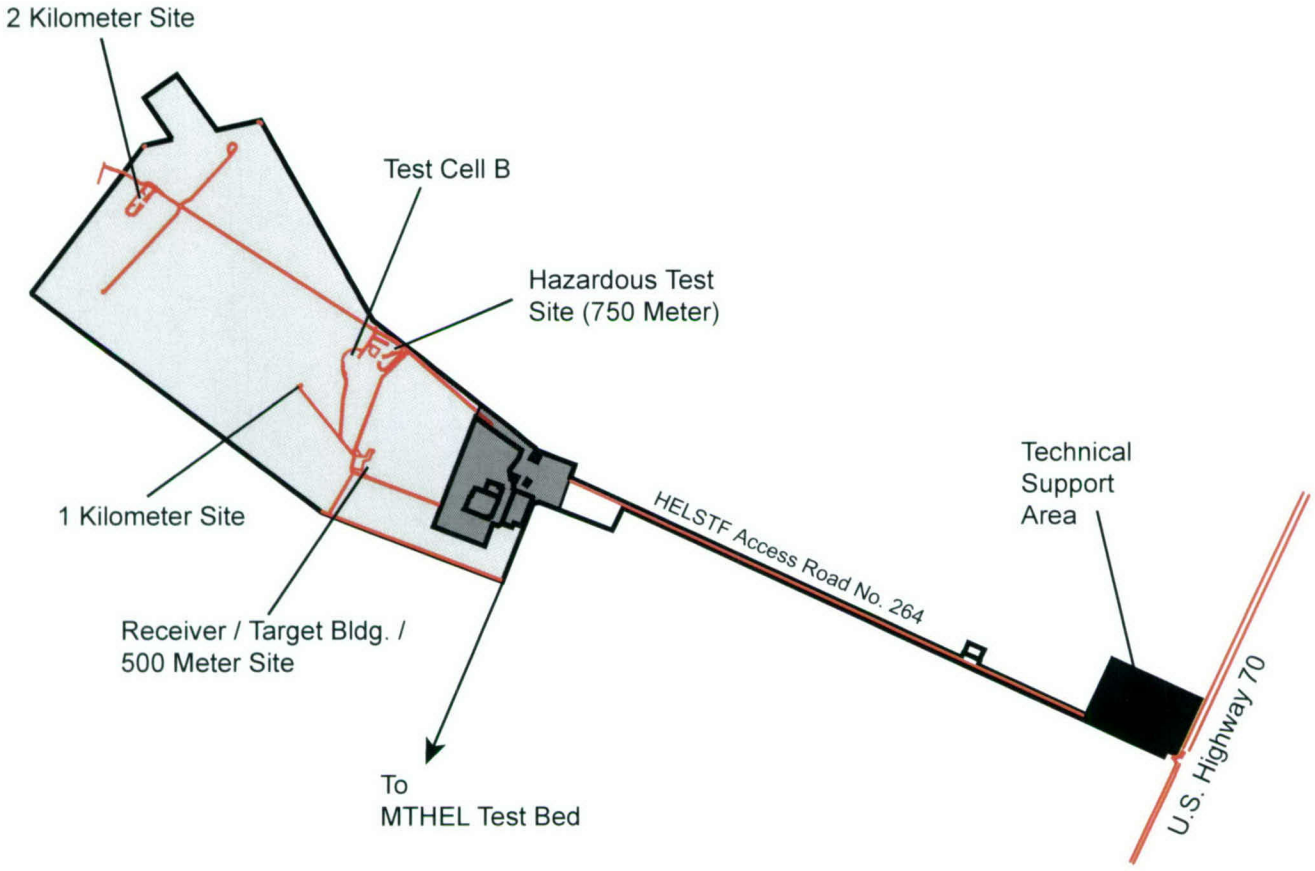
**Table 2-2: Proposed Action**

| Lasers | Proposed Activities |
|---|---|
| Solid State Heat Capacity Laser (SSHCL) | Program intended to develop a lightweight, high-average-power, high-pulse-energy solid state laser technology |
| Mobile Tactical High Energy Laser (MTHEL) Prototype | MTHEL TB technology on a mobile platform at the Limor site |
| Airborne Laser (ABL) | Program would use the MIRACL to simulate the ABL by altering wavelengths |
| Advanced Tactical Laser (ATL) | The ATL could use HELSTF test areas for targets; also, would use the MIRACL to simulate the ATL by altering wavelengths |
| High Power Carbon Dioxide Lasers | Similar to Pulsed Laser Vulnerability Test System |
| Free-Electron Laser (FEL) | An electric discharge laser that represents an alternative to conventional lasers with flexibility and high power |
| **Targets and Flight Testing** | Most target launches would occur at established launch sites and artillery firing points, others would occur from launch vehicles parked on existing dirt roads and trails. |
| **Facility and System Improvements** | Implementation of a new closed-loop cooling system for the MIRACL that would eliminate the use of chromates<br>Improvements that would occur on previously disturbed land include:<br>▪ New sewage lagoons<br>▪ FEL facility<br>▪ Additional electrical substation |

## 2.1 NO-ACTION ALTERNATIVE (CONTINUE CURRENT LEVEL OF TESTING AND CAPABILITIES)

Under the No-action Alternative, the same laser test activities that currently occur at HELSTF and that were previously analyzed in the 1998 HELSTF EA and the 1998 THEL ACTD EA would continue. No additional enhanced laser activities would occur at HELSTF.

These current activities are those that occur within HELSTF's fenced boundary, or on nearby WSMR land and supported from HELSTF. These activities are directly involved with the use or production of a high energy laser beam. These activities are unique to HELSTF, and the high-energy laser beams are potentially very destructive. However, with the exception of the MTHEL TB (formerly THEL ACTD), these activities are strictly controlled, completely contained within HELSTF's boundaries, and have the lowest level of environmental concern. Figures 2-1 and 2-2 show the current HELSTF boundaries and Test Cell areas, and figure 2-3 shows the MTHEL TB test site location.




**EXPLANATION**

- Roads
- Boundary Fence
- Down Range Target Areas
- Laser System Testing Center and Test Cell Area

**High Energy Laser Test Facility (HELSTF)**

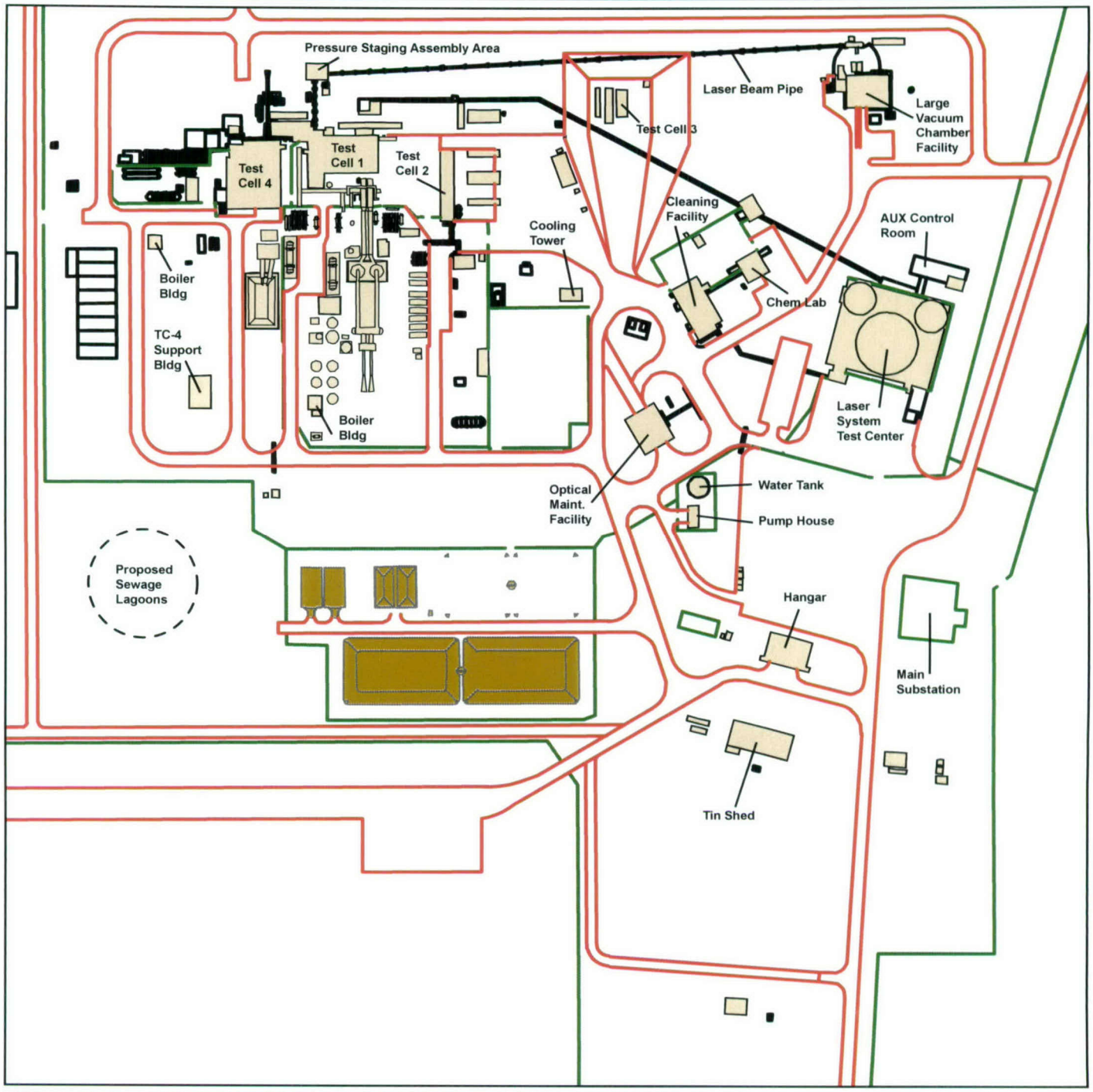
New Mexico

Not to Scale

NORTH

**Figure 2-1**

050311 HELSTF




**EXPLANATION**

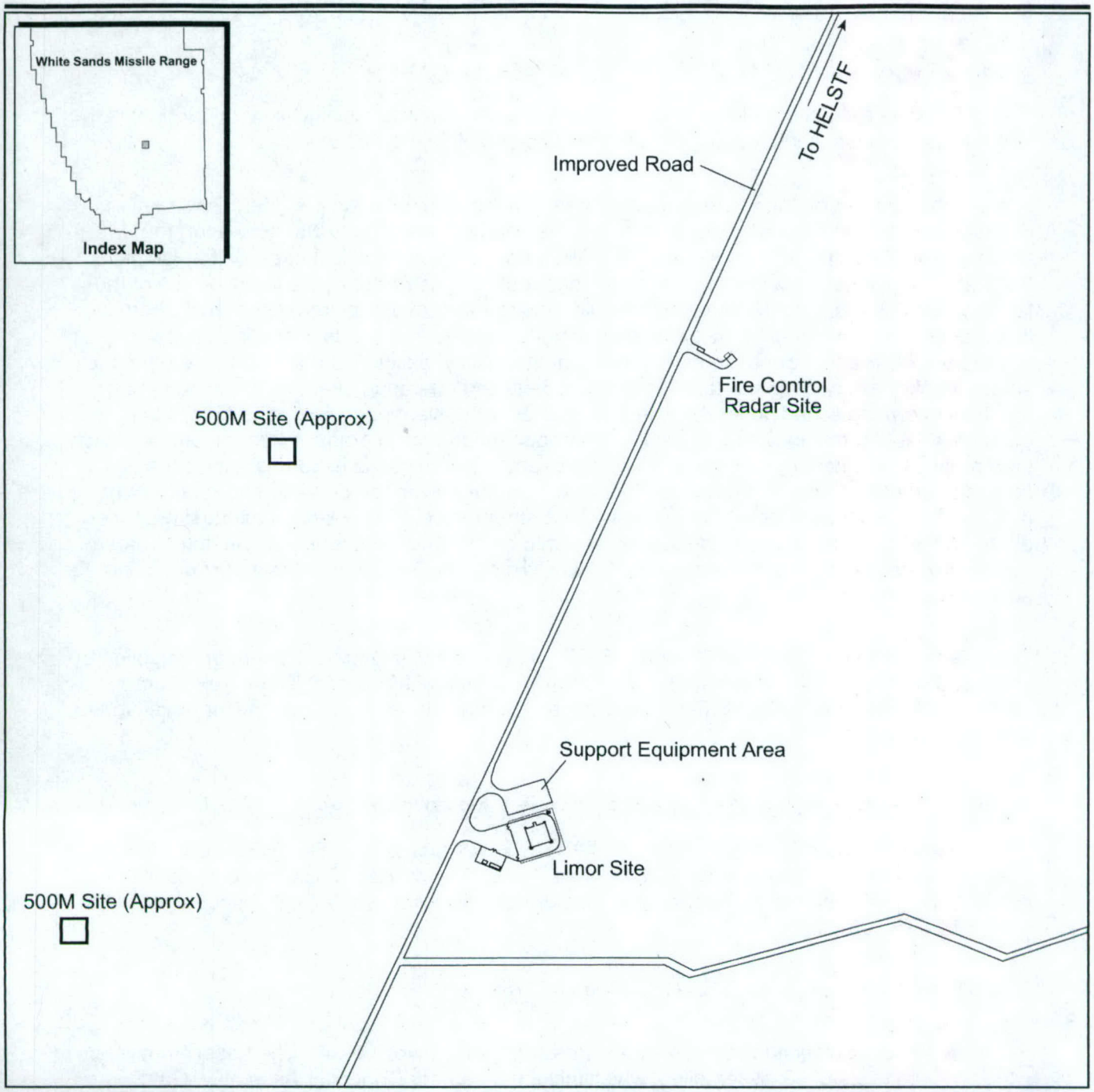
- Buildings
- Sewage Lagoon
- Road
- Existing Boundary Fence

# Laser System Test Center and Test Cell Area

NORTH

Not to Scale

**Figure 2-2**




**EXPLANATION**

Roads

**Mobile Tactical High Energy Laser Test Bed Location Map**

NORTH

Scale

0 280 560 Feet

**Figure 2-3**

050311 MTHEL Loc

### 2.1.1 MID-INFRARED ADVANCED CHEMICAL LASER

The MIRACL is a deuterium fluoride (DF) chemical laser that was initially lased in 1980. It is the first megawatt-class, continuous wave chemical laser built in the free world.

For the past few years, the MIRACL has operated for six to eight tests per year. This testing schedule would potentially decrease to as little as one per year after 2005. However, the MIRACL could also be used to simulate the ABL and Advanced Tactical Laser (ATL) (section 2.2.1.2), in which case six to eight tests per year could still be performed annually. Use of the MIRACL for ABL and/or ATL simulation would require the conversion from DF to hydrogen fluoride (HF), which changes the beam wavelength. However, impacts, including emissions, would be comparable. Because of the nature of the facility, a significant amount of equipment setup, breakdown, and maintenance is required between operating events. The maximum practical operating schedule for the MIRACL is about one event per week. The MIRACL combusts a fuel (ethylene) and an oxidizer (nitrogen trifluoride) to produce fluorine atoms, which then react with deuterium to produce the laser beam. Helium gas is used to stabilize the reaction and control the temperature. The laser's output power can be varied from full power down to 12 percent by altering the fuel flow rates and mixture. The gaseous exhaust produced by the MIRACL is drawn out of the system and into a scrubber by means of a vacuum created by the Pressure Recovery System. The Pressure Recovery System creates a vacuum using superheated steam.

The gases needed by the MIRACL and HELSTF's other smaller chemical lasers are supplied by the HELSTF Fluid Supply System. Fluids currently in the Fluid Supply System are helium, nitrogen, nitrogen trifluoride, ethylene/helium mix, fluorine, deuterium, argon, sulfur hexafluoride, and oxygen.

### 2.1.2 MOBILE TACTICAL HIGH ENERGY LASER TEST BED

The MTHEL TB, formerly known as the ACTD THEL, was analyzed in the THEL ACTD EA, 1998. It has been in operation at HELSTF since 1999. The MTHEL TB is not on a mobile platform, but is a fixed facility located at the Limor site approximately 3.4 miles southwest of the main HELSTF complex.

The MTHEL TB is composed of the following subsystems:

- Laser Subsystem, which generates the high power beam. The Laser Subsystem consists of six assemblies, which include the Laser Controller Assembly, Gain Generator Assembly, Laser Optics Assembly, Fluid Supply Assembly, Pressure Recovery Assembly, and Laser Enclosure Assembly. The MTHEL TB uses a DF chemical beam to engage its targets.
- PTS, capable of steering the beam such that the system optically tracks the threat objects and directs the laser beam to the target.
- Command, Control, Communication, and Intelligence ($C^3I$) Subsystem, which controls and monitors the MTHEL TB system; provides battle management, including target acquisition through the fire control radar, engagement control, kill assessment, and communication with other assets; and provides the operator interfaces.

Upon detection by the MTHEL TB fire control radar, the radar establishes trajectory information about the incoming rocket, and then "hands off" the target to the PTS, which includes the beam director. The PTS tracks the target optically, and then begins a "fine tracking" process for MTHEL TB's beam director, which then places MTHEL TB's high energy laser on target. The energy of the laser causes intense heating of the target, which causes its warhead to explode. The debris from the target falls quickly to the ground, far short of the defended area.

### 2.1.3 LOW-POWER CHEMICAL LASER

The LPCL is used to align the optics in the MIRACL beam path prior to a MIRACL event. The LPCL is an electrically driven continuous wave, DF/HF laser, which has a laser beam with wavelengths similar to that of the MIRACL. The LPCL has a maximum output of up to 100 watts and is typically operated for 300 to 600 hours per year, although testing frequency would decrease if MIRACL laser testing decreases. At full power, the LPCL can operate continuously for 3 hours. The LPCL uses sulfur hexafluoride gas rather than nitrogen trifluoride. A new scrubber system was installed since the 1998 HELSTF EA analysis to improve the exhaust emission efficiency, as the previous system was more difficult to maintain and prone to a quick loss of scrubbing efficiency.

### 2.1.4 LASER DEVICE DEMONSTRATION

The Laser Device Demonstration (LDD) is a 10- to 15-kilowatt (kW) mid-infrared chemical laser that permits access to MIRACL-like characteristics at lower power levels. The LDD uses fluorine rather than nitrogen trifluoride. Hydrogen has been added as part of the new HF optics that are now being used. The LDD typically operates 0 to 900 seconds per year. Typical LDD test programs have included materials effects and hardening, optical components, and precursors to major MIRACL tests. The LDD is not currently in use. If reactivated, the scrubber system would require refurbishment before it could be operational.

### 2.1.5 PULSED LASER VULNERABILITY TEST SYSTEM

The PLVTS is a threat surrogate capable of duplicating many tactical laser systems. The device is a closed-cycle, electric discharge, pulsed carbon dioxide laser operating at a wavelength of 10.6 microns with a power of 12 kW. The PLVTS, which has been operational at HELSTF since June 1992, supports testing of systems and materials to the effects of medium- to high-power laser illumination. The system is tested an average of 2 times per month or 24 times a year, with a maximum of about 4 times per month. The system consists of a suite of lasers including excimer, argon-ion, Neodymium:Yttrium Aluminum Garnet (Nd:YAG), tunable dye, deuterium fluoride, and carbon dioxide, as well as frequency doubling devices. These lasers can be utilized in the laboratory environment, sent through the 50-centimeter telescope to the HELSTF downrange test areas, or sent through the 60-centimeter pointer tracker for illumination of airborne platforms and satellites. The centerpiece of the PLVTS is the Textron HPPL-300 electric discharge carbon dioxide laser. Unlike the chemical lasers such as MIRACL, the HPPL-300 requires only 200 kW of external power (of which 120 kW is converted to laser energy). The medium in this laser is a 3:2:1 mixture of helium, nitrogen, and carbon dioxide. Lead shielding around the device limits the emitted x-ray radiation (as routinely measured by the WSMR Radiation Protection Office). An electric discharge of up to 27 kilovolts (kV) excites the

nitrogen molecules in the mixture, which then transfer energy to the carbon dioxide molecules in collisions. The helium is provided to remove heat and return the carbon dioxide to its ground state so it may be pumped again by the nitrogen. The vibrationally excited carbon dioxide molecules emit photons that are controlled by the mirrors in the laser cavity and are emitted as a laser beam at a wavelength of 10.6 microns. The HPPL-300 emits its energy as a series of 30-microsecond pulses, providing peak powers of up to 33 megawatts (MW) at the output. The device can produce an average output power of over 12 kW.

The HPPL-300 hosts a closed-cycle gas recirculation system in which flowing gases in the laser cavity are circulated continuously. The laser gas is replaced at a rate of 5 standard cubic feet per minute during operation to purge carbon monoxide generated during the electrical discharge. The exhaust gases, consisting of helium, nitrogen, carbon-dioxide, and a trace amount of carbon monoxide and oxygen, are released directly into the atmosphere without scrubbing approximately two times per month. Approximately 424 cubic feet are exhausted each month. The gas supply consists of six bottles of helium, four bottles of nitrogen, and two bottles of carbon dioxide. This gas supply will sustain typical laser operations for approximately 3 days before gas bottle replacement is required.

The PLVTS Pulse-Forming Network contains approximately 2,140 gallons of Shell Dial-AX mineral oil for electrical insulation and cooling purposes. Previously, Pulse-Forming Network oil contaminated from dust or water leaks was disposed of through the HELSTF hazardous waste collection and disposal system. Now a coalescence filter separates the oil, and the oil is reused. During system maintenance, mineral oil coated tools and instruments are wiped with paper towels which, along with any contamination filtered from the oil, are disposed of through the HELSTF hazardous waste collection/disposal. As with the oil system, the glycol water system is closed cycle and does not "wear out." As such, only during maintenance procedures does any of the glycol water mixture escape and require clean up with paper towels. These towels are also disposed of through the HELSTF hazardous waste collection/disposal.

### 2.1.6 BEAM TRANSFER AREA

The Beam Transfer Area acts as a switchyard that allows the MIRACL, LPCL, and Krypton beam to illuminate static targets in the Effects Test Area, Hazard Test Area, or the Vacuum Test System, or to be used by the Sea-Lite Beam Director (SLBD) to engage flying targets. By using the Beam Transfer Area's sophisticated control system, tests can be conducted at different test areas during the same MIRACL run. For example, tests can be conducted at the Hazardous Test Area, the Vacuum Test System and the Effects Test Area during a single lase, by switching the beam from one area to another.

### 2.1.7 EFFECTS TEST AREA

The Effects Test Area is an indoor laser effects laboratory for testing materials and equipment components that are less than 3.3 feet across. The Effects Test Area houses a Target Material Handling System capable of handling up to 60 material samples, each one measuring 10 inches square by 3 inches thick. The system allows the flexibility to modify these samples to add instrumentation, cooling, heating, or stress devices to the materials being tested. The Target Material Handling System is also equipped with an air-flow system capable of producing 0.2 to

0.9 Mach air flows across the target. With a cycle rate of 1 second, the system provides an extremely flexible and economical materials testing capability. Also available at the Effects Test Area are unique diagnostic instruments, including pyrometers, particle imagers, and plume extinction measurement devices.

### 2.1.8 HAZARD TEST AREA/TEST CELL B

The Hazard Test Area/Test Cell B facility is located 2,950 feet downrange from Test Cell 1. The facility consists of relay and shaping optics, diagnostic instrumentation, and a test pad. The Hazard Test Area/Test Cell B facility is capable of supporting high-energy laser effects testing on a wide variety of samples ranging from those of the size used in the Effects Tests Area to full-scale and operational targets. Up to 21 targets have been lased at the Hazard Test Area during a single test run. The test pad is rated to withstand a 20,000-pound TNT-equivalent blast.

### 2.1.9 VACUUM TEST SYSTEM

The Vacuum Test System consists of a 50-foot-diameter sphere capable of producing a vacuum equivalent to an altitude of 600,000 feet for the simulation of a low-earth orbit environment. Connected to the MIRACL through a series of optics and a 1,000-foot-long laser beam pipe, multiple targets in the large vacuum chamber can be illuminated in a single MIRACL run. The Vacuum Test System has the only large vacuum chamber in the country capable of allowing the entry of full-power, high-energy laser beams and small explosives. Test articles up to 15 feet in diameter, 30 feet in length, and weighing 25 short tons can be accommodated. The Vacuum Test System is also used for non-lasing activities.

### 2.1.10 SEA-LITE BEAM DIRECTOR

The SLBD is located in a special structure, 67 feet above ground level, on top of Test Cell 1. In addition to pointing the MIRACL high-energy laser beam, the SLBD has been used successfully to passively track and image aircraft and missiles in flight. Both the SLBD's visible and infrared sensors collect high-speed, high-quality imagery of plume and hardbody signatures and phenomenology, as well as recording point-of-intercept imagery. The SLBD has been used to successfully capture in-flight imagery of various interceptor missiles during target intercepts.

### 2.1.11 ARMY POINTER TRACKER

The Army Pointer Tracker (APT) is a 24-inch dynamic pointer tracker developed for tracking and illumination of aerial platforms and satellites to the PLVTS located within Test Cell 3 of HELSTF. The APT utilizes aircraft hydraulic fluid operating at 3,000 pounds per square inch (psi) in a closed-cycle configuration for system operation. The fluid is continually cleaned and cooled as it circulates through the system. Only during maintenance procedures does any of the hydraulic fluid escape and require cleanup with paper towels. These towels are also disposed of through the HELSTF hazardous waste collection/disposal.

### 2.1.12 SAFETY SYSTEMS

HELSTF is equipped with a variety of safety systems to protect personnel and equipment during the preparation and conduct of high-energy laser tests. These systems include the following:

- **Hardwired Abort System**—This system includes over 200 software, hardware, and man-in-the-loop aborts. Manual aborts can be initiated by the WSMR Range Safety Officer, the HELSTF Site Safety Officer, or the HELSTF Test Director when, in their opinion, problems exist with either target or laser system. The automatic abort system is built into critical subsystem hardware and software timeline routines. The abort system continuously monitors these systems for failures or out-of-spec operations. If initiated, abort signals are routed to the System Abort Logic and Switching Unit. In response, this unit initiates an orderly shutdown of the affected laser and support systems.
- **Fire Protection**—Fire protection is provided by installed sprinkler and water deluge systems, Halon 1301 fire suppression systems, fire hose, and extinguisher stations. Halon is used in interior areas to protect critical equipment or in spaces where flammable fluids are used. Additionally, WSMR provides round-the-clock protection and remote monitoring of all HELSTF fire alarms. There is an operational fire department located at HELSTF. HELSTF's safety standard operating procedures require WSMR firefighters and equipment to be onsite during all MIRACL lasing activities.
- **Hazardous Atmosphere Monitor and Detection System**—This 24-hour automated system is dedicated to detection of toxic, flammable, or asphyxiating gases in the laser system test complex and Test Cell Area. This system is remotely monitored. The system is capable of remotely controlling selected air-conditioning and ventilation equipment to purge toxic gases from areas that may have been exposed to leaks.
- **Dedicated Safety Intercom Net**—An emergency announcing system is provided on a dedicated intercom net throughout the facility. This system is used by the site monitor or Site Safety Officer to notify personnel prior to the start of any hazardous operation. In the event of an emergency, personnel are notified as to the nature and location of the emergency and immediate action to be taken.
- **Medical Support**—The HELSTF Fire Department is staffed by emergency medical technicians. A fully equipped ambulance is available for emergency transportation of sick or injured persons to local medical facilities at WSMR or surrounding communities.

### 2.1.13 CHEMISTRY LABORATORY

The Chemistry Laboratory performs quality control analysis of the fluids used at HELSTF as well as a wide variety of analyses in support of test operations, customer requests, and environmental and safety tasks. The Chemistry Laboratory is equipped with a wide range of analytical equipment.

### 2.1.14 SUPPORT ACTIVITIES

Support activities at HELSTF are typical of activities that would be performed at any light industrial or commercial site:

- Food preparation and garbage disposal
- Security
- Fabrication, inspection, repair, and maintenance of wooden and metal structures and objects
- Interior and exterior painting
- Facility interior inspection, alteration, repair, and maintenance
- Sandblasting
- Fencing erection, inspection, repair, and maintenance
- Masonry construction, inspection, repair, and maintenance
- Roof inspection, repair, maintenance, and replacement
- Door inspection, repair, maintenance, and replacement
- Vehicle maintenance and repair
- Emergency first aid and medical evacuation
- Heavy and light vehicle operation
- Hazardous waste temporary less than 90-day accumulation site

## 2.2 PROPOSED ACTION

The USASMDC proposes to develop a fully enhanced capability to conduct laser testing at HELSTF, including the associated range operations. The enhancement would include the testing of one or more of the new laser technologies or completion of one or more of the new range operations that are described in this Proposed Action section. These laser technologies are from various DoD and civilian agencies. Enhanced testing would begin in the fourth quarter of FY 2005, and would occur concurrent with existing activities at HELSTF.

### 2.2.1 POSSIBLE FUTURE LASER TECHNOLOGY/SYSTEMS DEVELOPMENT AND TESTING

Enhanced testing at HELSTF could include one or more of several types of existing experimental and conceptual laser systems. This section will describe these systems and their intended battlefield targets. Proposed laser systems to be tested at HELSTF can be categorized into three basic technologies: solid state lasers, chemical lasers, and free electron lasers (FELs). Under each of these three basic laser systems, several specific laser systems will be described.

### 2.2.1.1 Solid State Lasers

**Solid State Heat Capacity Laser**

The goal of the Solid State Heat Capacity Laser (SSHCL) development program is to develop a lightweight, high-average-power, high-pulse-energy solid state laser technology that is suitable for a variety of short-range and time-critical air and missile defense missions. Because of its expected compact size, the SSHCL has the potential to be mounted on either a ground-mobile or airborne platform. Since the SSHCL is an electrically driven laser, a hybrid-electrical ground vehicle is ideally suited to carry such devices because the same prime power source can provide both the propulsion of the vehicle and power to the laser. The vehicle and the laser would be powered using the vehicle's diesel engine with electrical power stored in lithium ion batteries. Emissions would be from the diesel engine only and there would be no laser by-products.

The first SSHCL to be tested at HELSTF was the 10-kW flash-lamp pumped heat-capacity laser in 2004. It was used in conjunction with the APT beam director to assess scaled range testing. Future 10-kW SSHCL testing would be against static targets in 2005 and against dynamic targets in 2006. Testing frequency would potentially be one test per week in 2005 and two tests per month in 2006. The SSHCL would be located and fired from Test Cell "4". It is expected that the SSHCL would be tested against targets located in Test Cell "B", the 500 Meter Site and the 2 Kilometer Site.

Based on the success of the 10-kW tests, a 25-kW diode pumped SSHCL module and a 100-kW diode pumped SSHCL would possibly be developed and tested as part of a sequence of SSHCL development and would be onsite at HELSTF as early as 2006. The 100-kW diode pumped system would be integrated with a more robust beam director to perform dynamic, full range testing, but would be tested in the same facility as the 10-kW laser.

Power for the 10-kW would be provided by standard commercial electric power. The 25-kW and the 100-kW would be fired from lithium ion batteries. The batteries would be recharged with commercial power.

The target set could include artillery projectiles, tactical rockets, and aerial drones or unmanned aerial vehicles (UAVs). The system may also be tested on buried and unburied landmines, and Improvised Explosive Devices.

### 2.2.1.2 Chemical Lasers

**Mobile Tactical High Energy Laser Prototype**

Transition to a Mobile THEL (MTHEL) Prototype began in FY 2001 with an amendment to the U.S.-Israeli THEL Memorandum of Agreement initiating an MTHEL System Engineering and Trade Studies program. At the end of 2001, the study defined a range of candidate MTHEL weapon system architectures that can be built with existing technology. The MTHEL Prototype would use essentially the same technology that was proven in the MTHEL TB, but will be tested on a mobile platform.

Chemicals used during the process include ethylene, nitrogen trifluoride, deuterium, helium, liquid oxygen, JP-8 (jet fuel), and water. Effluents include DF, tetrafluoromethane, HF, nitrogen, carbon dioxide, and water. Exhaust emissions could be scrubbed or just emitted to the atmosphere. Byproducts would be minimal and would be handled in a similar manner as the MTHEL TB. Onboard storage would be provided for water requirements. The standoff area is estimated to be 492 feet (a 180-degree radius) behind the exhaust.

The MTHEL program's goal is to develop one or two mobile THEL prototypes capable of defending against a broad category of threats. The objective MTHEL weapon system will consist of DF Laser firing units and Battle Management and Control capable of managing firing units. MTHEL will be designed to provide a defense against artillery rockets, artillery projectiles, mortars, unmanned aerial vehicles (UAV), cruise missiles, and short-range ballistic missiles.

The prototypes would be mounted on a common Army vehicle platform and would consist of three elements: Battle Management Command and Control, Sensor, and Laser Firing Platform. The laser with the Optical Beam Control System and Pressure Recovery System would be mounted on a trailer. A second vehicle would provide the Fuel Supply Element. Approximately 20 MTHEL tests would be conducted a year, starting in 2009. Testing would occur at the HELSTF Limor site.

**Airborne Laser**

The U.S. Air Force initiated development of the Airborne Laser (ABL) program, and MDA now manages the program. The objective of the ABL program is to develop a cost-effective, flexible airborne high energy laser system that has the capability to acquire, track, and destroy ballistic missiles during their powered boost phase. The ABL is being installed on a modified commercial 747-400F freighter, and will be able to be deployed worldwide within 24 hours. The program goal is to deliver an initial operating capability in 2007. The laser subsystem of the ABL is based on the Chemical Oxygen Iodine Laser (COIL) technology developed by the Air Force in the 1980s. Unlike the HF/DF chemical lasers, the COIL is not a combustion-driven device. The chemical reactions occur relatively close to room temperature, and as a result the COIL has improved beam quality.

ABL testing would occur at WSMR/Holloman Air Force Base (AFB) as discussed in the Final Supplemental EIS Airborne Laser Program, June 2003, but not at HELSTF. However, the MIRACL laser may be used to simulate the ABL before the actual ABL is tested at WSMR. This could occur in FY 2005, FY 2006, or later. To use the MIRACL to simulate the ABL, some changes would be required. MIRACL is normally operated at 3.6 to 4.0 microns. Altering the MIRACL to operate at different wavelengths (2.7 and 1.6 microns, for example) may be used to simulate operation of the COIL of the ABL and other HF/DF chemical lasers. Operation of MIRACL at different wavelengths would not change effluents or necessitate significant changes in HELSTF infrastructure. Outside lasing would involve use of both static and dynamic targets and test areas similar to those currently in use. Operation of the MIRACL to simulate COIL devices, as described above, could be used for ABL and another Air Force project, the ATL testing (see next section). The use of the MIRACL for ABL and ATL is addressed under the MIRACL (section 2.1.1). Another test activity that could be considered for HELSTF includes use of HELSTF assets, such as the SLBD, for tracking targets during actual ABL or ATL engagements with ballistic missile targets. These activities and their analyses are addressed under the No-action Alternative.

**Advanced Tactical Laser**

The ATL is an emerging concept for a family of compact, modular COIL high energy laser weapon systems that have a high degree of commonality at the subsystem level and that draw heavily on technology developed over the last decade in various Army and Air Force programs. ATL provides a unique capability to conduct engagements at significant standoff distances with little or no collateral damage. Platform independent, the ATL is designed as a modular weapon system that can roll-on/roll-off any number of tactical platforms, including ground fighting vehicles, tactical aircraft, or rotorcraft. The weapon element of the ATL is readily reconfigured for ground-vehicle installation for use in air defense applications. The airborne ATL concept envisions a 100- to 300-kW infrared laser carried on a tactical platform such as the AC-130U Spectre. Aircraft used in testing would be staged from Kirkland Air Force Base. The primary mission application is air-to-ground strike missions in situations where collateral damage limitation is a primary consideration.

The first low power testing of ATL at HELSTF would occur in 2005 and is expected to be conducted from an AC-130U. Six to seven tests are expected to take place in 2005. Up to 20 tests per year would occur in 2006 and 2007. Targets for the ATL would be stationary vehicles and simulated communications towers on or near roads in existing HELSTF test areas, most likely on the existing road between the Laser System Test Facility and the 2 Kilometer Site. This document does not address the ATL system and operations, only ATL's use of HELSTF targets.

The MIRACL could also be used to simulate ATL testing. If implemented, a conversion from DF to HF would be required. Additionally, the beam wavelengths would change. Scrubber, removal, and emissions would remain about the same. The use of the MIRACL is described in section 2.1.1.

**High Power Carbon Dioxide Lasers**

The PLVTS, described in section 2.1.5, is a carbon dioxide laser that was previously analyzed in the HELSTF EA and is currently being tested at HELSTF. Other carbon dioxide lasers similar to the PLVTS may also be tested at HELSTF. Other carbon dioxides lasers would most likely use the same facilities as the PLVTS and have similar testing operations and frequencies. Therefore, impacts of other carbon dioxide lasers would be similar to those of PLVTS and are covered in the PLVTS analysis.

### 2.2.1.3 Free Electron Lasers

A FEL is an electric discharge laser that provides intense, powerful beams of laser light that can be tuned to a precise color or wavelength. FELs absorb and release energy at any wavelength, because the electrons are freed of atoms. This key feature enables the FEL to be controlled (more precisely than conventional lasers) to produce intense powerful light in brief bursts with extreme accuracy. Minimal chemical/fuel usage, emissions, or byproducts are anticipated. Water requirements are also minimal.

FELs represent a radical alternative to conventional lasers, as potentially the most flexible, high-power, and efficient generators of tunable coherent radiation from the ultra-violet to the infrared. A FEL does not have the restrictions of conventional lasers on operating wavelengths, and is constrained only by the phase-matching condition for strong interactions between the electrons

and laser field; i.e., for a given periodic magnet (wiggler) structure, the wavelength is determined only by the energy of the electron beam.

A FEL could be considered for use as a test device at HELSTF, either augmenting or replacing the MIRACL laser. This would be feasible only in the long term, and only if technology advances in FEL research allow reliable operation of high-power devices well in excess of 100 kW. Installation of a high-power FEL would involve infrastructure changes, including providing protection from induced radiation and provisions for high-capacity electrical power supply to HELSTF.

If the FEL is tested at HELSTF, it may be tested in Test Cell 4 or could require a new test facility. The current substation would likely be adequate, however, an additional electrical substation could be required to accommodate increased power demands for this new laser technology. These activities are addressed in section 2.2.6.

Testing would potentially be as frequent as several times per day. Operation of the laser would be expected to generate x-ray radiation hazards (Stanford University, 1990). Lead shielding would be installed in test facilities to prevent radiation from escaping test cells.

## 2.2.2 COMPONENTS OF TEST AND EVALUATION OF LASER TECHNOLOGIES AND WEAPONS SYSTEMS

The U.S. Army Space and Missile Defense Technical Center (SMDTC), which is part of the USASMDC, is developing high energy lasers to defeat a wide variety of targets, including tactical rockets, artillery projectiles, aerial drones or UAVs, mines, and unexploded ordnance. Each target offers its own unique engagement challenges, and, in many cases, no other single weapon system exists that is capable of successfully eliminating these threats. SMDTC has a requirement to conduct all types of test and evaluation of high energy lasers. Those tests that would be conducted at HELSTF under the Proposed Action are outlined in this section.

### 2.2.2.1 Lethality Test and Evaluation

The kill mechanism for a target is different for a high energy laser weapon compared to the hit-to-kill or warhead detonation of a kinetic energy interceptor. The high energy laser weapon can eliminate a target by disrupting its infrared sensor, burning through a critical structural component, or heating a target's warhead or fuel tank, causing a range of reactions that neutralize the target. SMDTC has an extensive lethality test program to validate computer simulations of laser beam and target interactions. This basic science test and evaluation program uses a variety of high-power laser beam sources to irradiate different types of materials, explosives, and projectile components. These laser beam sources include MIRACL and MTHEL TB located at HELSTF, pulsed SSHCLs (10 to 100 kW) and a lower-power solid-state laser mounted on a tactical vehicle, and the PLVTS laser.

- **Basic Science Laser Beam Propagation**—The initial tests would be against non-explosive static materials such as sheet metals and other structural components. The goal is to see what effect the laser beam has on these static targets.
- **Static Testing**—The next-higher-level of lethality testing is the irradiation of static targets. Projectiles are instrumented with thermocouples to document their response

to the laser beam, and are spun in a blowing air environment to simulate actual flight conditions.

- **Dynamic Testing**—The highest level of lethality testing is with dynamic or in-flight targets. This is the most expensive type of testing and requires thorough planning. It has been a challenge to integrate projectiles with instrument packages that accurately measure temperature changes, and are also survivable during flight. In fact, most targets are not instrumented. This makes it difficult to determine the actual location of the laser beam on a target. Generally, the testers rely on backscatter measurements from the target to verify achieving an accurate aim point, resulting in placing the maximum fluence on the target. Dynamic testing would use a host of targets, including tactical rockets, artillery projectiles, aerial drones or UAVs, and ground vehicles.

#### 2.2.2.2 Beam Characterization

This type of testing is to verify the characteristics of the high energy laser beam as it leaves the weapon system and propagates through the atmosphere to the target. By the very nature of the laser beam, it is not possible without great expense to actively measure the beam's output power and wave front characteristics, exiting from a high energy laser. However, it is possible—for example, on the MTHEL TB—to estimate the beam characteristics by measuring its thermal effects on the exit window and mirrors within the optical train. Also, as the beam propagates to the target, atmospheric molecules, aerosols, temperature changes, and wind conditions affect the direction, size, and quality of the beam. The laser's pointer tracker subsystem must be capable of recognizing and adjusting for these perturbations to the laser beam before it reaches the target. Down-range targets are often used to evaluate atmospheric effects on the laser beam to validate propagation computer simulations.

#### 2.2.2.3 Beam Pointing

Another objective during high energy laser test and evaluation is to consistently know the true location of the beam. Since high energy laser beams are normally in the infrared, systems depend on accurate tracking measurements of elevation and azimuth to point the laser beam. Fine corrections are made based on backscatter measurements from the target. Receiving and using radar track data from different types of sensors on the battlefield will be a major challenge to high energy laser weapon system developers.

It is also critical that a high energy laser weapon system identify, early–on, the type of target it is tracking so as to properly select the most efficient aim point for the laser beam. SMDTC recently completed tests to verify the aim point selection for the 4.8-inch Katyusha rocket. This rocket was mounted on a pole 1,640 feet away from the MTHEL TB. By varying the rocket's orientation, SMDTC verified the performance of the algorithm used to compute the aim point offset from the nose of the rocket.

#### 2.2.2.4 Relay Mirror System

Relay Mirror Systems are currently being developed at other military installations. Relay mirrors would allow directed energy weapons fired from ground or sea or air to overcome many limiting factors, including hitting targets beyond the line of sight and refocusing beams that lose some of their form traveling though the atmosphere. This and future mirror systems could be tested in

the vacuum chamber at HELSTF. The MIRACL laser could be used to illuminate and test relay mirrors. Testing could include locating the relay apparatus on Salinas Peak.

#### 2.2.2.5 High Energy Laser Low Aspect Target Tracking

High Energy Laser Low Aspect Target Tracking is a U.S. Navy project that would use the MIRACL laser to test engagement scenarios of specific low-flying, level-trajectory targets. This type of test would evaluate the applicability of laser defense of naval vessels from cruise and other flat trajectory missiles with head-on engagements. High Energy Laser Low Aspect Target Tracking engagements would use tactical rockets or aerial drones or UAVs for dynamic target engagements.

### 2.2.3 TARGET LAUNCHES IN SUPPORT OF DYNAMIC TESTING

Several classes of dynamic targets would be used for laser testing at HELSTF. These targets fall within four classes, which will be described in this section. These types of rockets are routinely tested or used as targets at WSMR. On average, 400 target system missions a year are conducted at WSMR.

#### 2.2.3.1 Tactical Rockets

This class of target includes artillery rockets, anti-tank missiles, and surface-to-air anti-aircraft missiles. Artillery rockets are short-range battlefield rockets that are designed to extend the tactical reach of the field artillery. These rockets would be in various sizes up to approximately 13.4 inches (with a potential range of up to approximately 47 miles). Most would have a unitary high explosive or a cluster warhead.

Anti-tank missiles are shoulder or tube launched. They are low, level-trajectory rockets that are guided by wire or laser designator. Warheads are high explosive anti-tank shaped charges that are designed to penetrate vehicle armor.

Surface-to-air anti-aircraft missiles would be small-diameter, shoulder-fired missiles that are normally used to engage low-altitude jet and rotor-wing aircraft. These missiles are heat or infrared guided and normally have a relatively small high explosive fragmentation warhead that is designed to disable aircraft.

#### 2.2.3.2 Artillery Projectiles

Artillery projectiles are the explosive projectiles used in howitzers and mortars. Howitzer projectiles would range in size from 6 to 8 inches and would have high-explosive filler. Mortar projectiles would range in size from 3 to 4.7 inches and would also have a high-explosive filler.

#### 2.2.3.3 Aerial Drones

Aerial drones are sub-scale, turbojet-powered or propeller-driven, fixed-wing aircraft. Many of the turbojet-powered targets were originally designed to be used for air-to-ground and air-to-air gunnery practice. Most of the drones have command guidance systems, and the operator can track them either visually or through radar. Drones can simulate a variety of targets, mimicking

the heat and radar returns of missiles, cruise missiles, and aircraft. In addition, they can drop chaff and flares. Drones would be launched from a ground site with the aid of solid fuel boosters to accelerate the vehicles. A small turbojet engine would then take over for the remainder of the flight. The drone's route of flight would be programmed prior to launch, or changed during flight by a ground controller using a radio link. At the end of the mission, a parachute recovery system could be used to recover undamaged vehicles.

Propeller-driven aerial drones are sometimes known as UAV. Most of these targets were originally designed as reconnaissance and intelligence-gathering platforms.

#### 2.2.3.4 Ground Targets

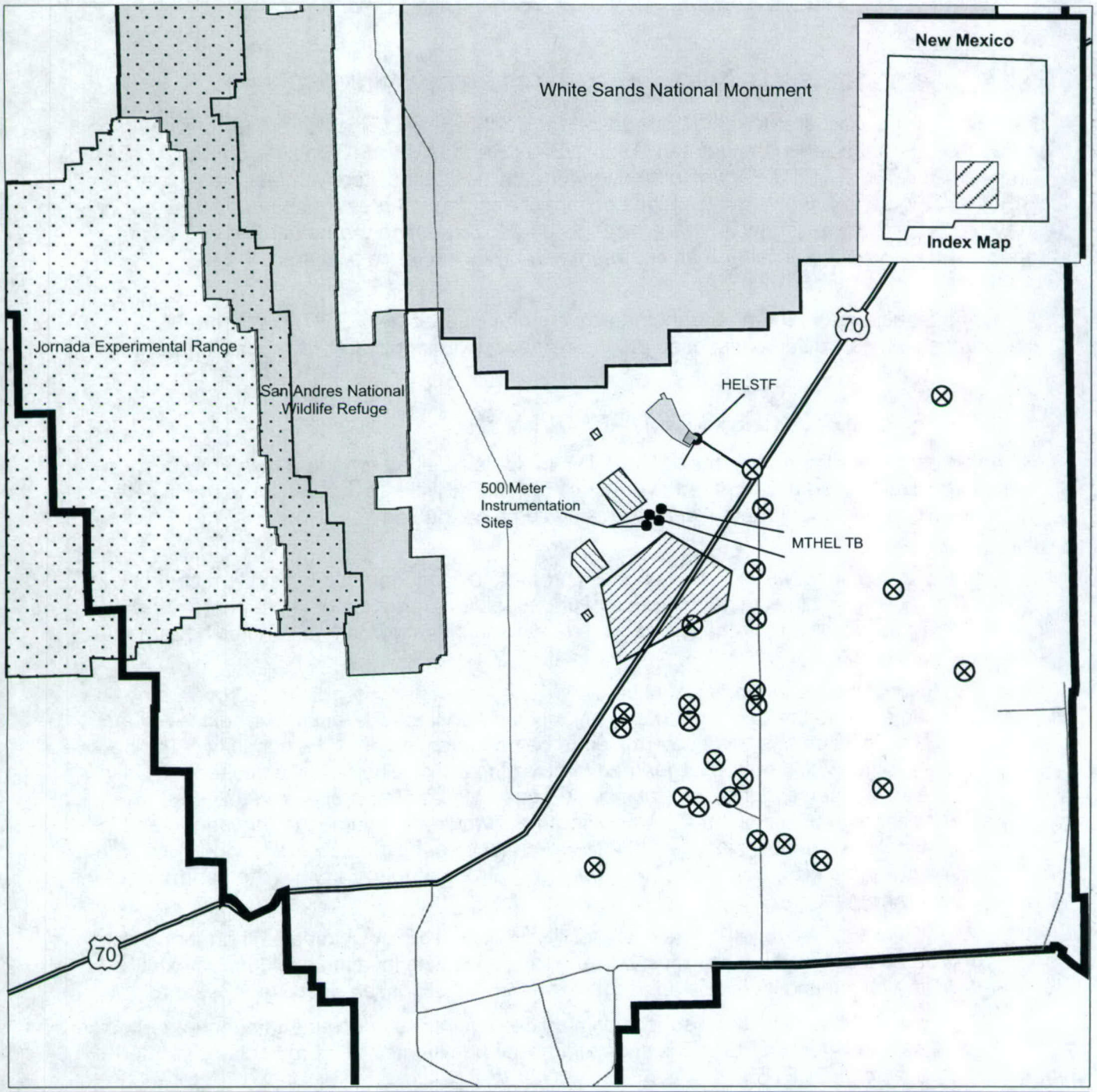
Lasers would be tested against two types of ground targets. The first would be stationary or moving wheeled or armored vehicles that are remotely controlled. Vehicles may be empty, may have only fuel on board, or may be combat loaded to test the effects of the laser on on-board ammunition and weapons systems. Most target vehicles would be stationary on established test stands or parked on established roads or disturbed areas. Testing on stationary wheeled vehicles currently occurs at WSMR and HELSTF. The second type of ground target would be an operational communications tower, buildings, and other simulated infrastructure.

All debris resulting from target engagements would be cleared by HELSTF personnel. Hazardous wastes would be disposed of in accordance with applicable laws and regulations.

### 2.2.4 TARGET LAUNCH AND FIRING POINTS

Most target launches and artillery firings would occur at established launch sites and artillery firing points as described in the January 1998 WSMR Range-Wide EIS and the 1998 HELSTF EA. Some launches would occur from launch vehicles parked on existing dirt roads and trails. Launches from this type of site would require an Explosive Launch Permit from the WSMR Environmental Office. Appropriate biological and archaeological surveys would be conducted prior to the issuance of the Explosive Launch Permit. Figure 2-4 shows the locations of launch points that have been used for previous laser testing.

For some laser tests involving longer-range artillery rocket targets, launches from Doña Ana Range at Fort Bliss would be required. Fort Bliss straddles the New Mexico-Texas border and is adjacent to WSMR to the south. Launches of large artillery rockets were previously analyzed in the December 2000 *Fort Bliss Texas and New Mexico, Mission and Master Plan Programmatic Environmental Impact Statement*. Only established launch points would be used at Fort Bliss.




**EXPLANATION**

- Target Impact Area
- Target Debris Area
- Jornada Experimental Range
- Potential Launch Site
- THEL ACTD Locations
- WSMR Boundary
- Roads

HELSTF = High Energy Laser System Test Facility

MTHEL TB = Mobile Tactical High Energy Laser Test Bed

NORTH

Scale 0 2.3 4.5 miles

050311 Impact Debris Area

## Potential HELSTF Impact / Debris Areas and Target Launch Points

**Figure 2-4**

### 2.2.5 ASSOCIATED ROCKET AND ARTILLERY IMPACT AREAS

No new target impact areas would be required for laser testing at HELSTF. Only current impact areas that are analyzed in the January 1998 WSMR Range-Wide EIS, the 1998 HELSTF EA, and the 1998 THEL ACTD EA would be used for activities associated with laser testing at HELSTF. Figure 2-4 shows the locations of impact and debris areas that have been used for previous laser testing. If new test requirements should determine that additional impact areas need to be established, follow-on environmental analysis would be prepared.

All debris resulting from target engagements would be cleared by HELSTF personnel. Hazardous wastes would be disposed of in accordance with applicable laws and regulations.

### 2.2.6 FACILITY AND SYSTEM IMPROVEMENTS

Some infrastructure improvements at HELSTF would be required for some new activities, or existing facilities would be improved to enhance current activities. Though some details are not yet available, the following potential activities could be conducted:

- The existing MIRACL laser optics chromate closed-loop cooling system could be redesigned to eliminate the use of undesirable chromates. If implemented, the chromates would require proper removal and disposal using a certified hazardous waste contractor.
- New sewage lagoons would be constructed in a previously disturbed open area adjacent to the existing sewage lagoons and drying beds within the next few years. The location has been determined to be uncontaminated. The capacity of the new lagoons would not be larger than the existing ones. The lagoons accept primarily sanitary sewage, but also take some non-contaminated process water. No discharge would occur. Sewage treatment would be confined to the lagoon and would eventually evaporate. WSMR would close the old sewage lagoons after the new ones are completed. New fencing could be required around the perimeter of the new lagoons.
- The FEL may require a new test facility. This building would be built on a one-acre area that has been previously disturbed. A possible location could be an existing gravel parking lot that is adjacent to the MIRACL Pressure Recovery System.
- An additional electrical substation may be required to accommodate increased power demands for the FEL. The substation would be located in a previously disturbed area on HELSTF.

# 3.0
# AFFECTED ENVIRONMENT

# 3.0 AFFECTED ENVIRONMENT

This chapter describes the environmental characteristics that may be affected by the Proposed Action. The information provided serves as a baseline from which to identify and evaluate environmental changes resulting from conducting enhanced HELSTF laser and range operations. To provide a baseline point of reference for understanding any potential impacts, the affected environment is briefly described; any components of concern are described in detail.

Several NEPA documents (section 1.5) have been prepared that analyze the effects of laser-related operations at HELSTF, target launch sites, and target impact areas. These available reference materials, EAs, EISs, and installation master plans, were acquired to assist in the selection of environmental resources that could be affected and their subsequent description in the following affected environment discussion. To fill data gaps (questions that could not be answered from the literature) and to verify and update available information, installation and facility personnel; federal, state, and local regulatory agencies; and private individuals were contacted.

**Environmental Resources**

Thirteen broad areas of environmental consideration were considered to provide a context for understanding the potential effects of the Proposed Action and to provide a basis for assessing their severity. These areas included air quality, airspace, biological resources, cultural resources, geology and soils, hazardous materials and waste, health and safety, infrastructure and transportation, land use, noise, socioeconomics, water resources, and environmental justice.

Although the construction of a new FEL facility would require a limited amount of clearing and excavation, it is not expected to create any adverse erosion effects to geology or soils. The facility would be constructed on a previously disturbed area of approximately 1 acre. Any construction activities would follow applicable standards and guidelines. Based on initial analysis, it was determined that the proposed activities would not result in impacts to land use or to the visual and aesthetic environment of the areas proposed for use. HELSTF would continue to be used for laser tests and research. The Proposed Action is consistent with the mission of HELSTF and WSMR and would not conflict with any known land use plans, policies, or controls.

The proposed enhanced activities would result in noise effects from laser operations and target launches similar to those analyzed in prior documents such as the HELSTF and THEL ACTD EAs (U.S. Army Space and Missile Defense Command, 1998a; b) and are thus not discussed further.

Only a limited number of employees would be involved in the proposed enhanced activities; thus, there would be no socioeconomic concerns. Because there would be little to no effect to off-range populations, disproportionate impacts would not occur to any minority or low-income populations as required under Executive Order 12898 (Environmental Justice) or environmental health and safety risks that may disproportionately affect children as required under Executive Order 13045 (Protection of Children).

Air quality, airspace, biological resources, cultural resources, hazardous materials and wastes, health and safety, infrastructure and transportation, and water resources are analyzed.

## 3.1 AIR QUALITY

Air quality in a given location is described by the concentrations of various pollutants in the atmosphere, expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). Pollutant concentration is determined by the type and amount of pollutants emitted into the atmosphere; the physical characteristics, including size and topography of the affected air basin; and meteorological conditions related to prevailing climate. The significance of a pollutant concentration is determined by comparison with National Ambient Air Quality Standards (NAAQS) and state ambient air quality standards (AAQS) that establish limits on the maximum allowable concentrations of six pollutants to protect public health and welfare. These pollutants include carbon monoxide, lead, oxides of nitrogen, ozone, particulate matter (with a diameter less than or equal to 10 micrometers [PM-10] and with a diameter less than or equal to 2.5 micrometers [PM-2.5]), and sulfur dioxide.

According to the U.S. Environmental Protection Agency (EPA) guidelines, an area with air quality better than the NAAQS is designated as being in attainment; areas with worse air quality are classified as nonattainment areas. A nonattainment designation is given to a region if the primary NAAQS for any criteria pollutant are exceeded at any point in the region for more than 3 days during a 3-year period. Pollutants in an area may be designated as unclassified when there is insufficient data for the EPA to determine attainment status.

New Mexico has established AAQS. Emissions of air pollutants from operations in New Mexico are limited to the more restrictive standard (federal or state). Table 3-1 compares NAAQS and New Mexico AAQS.

### Region of Influence

The region of influence (ROI) for air quality would include the air basin surrounding the areas in which the proposed activities would take place, including HELSTF, target launch sites, and impact areas. HELSTF is located in Otero County. The target launch sites and impact areas are located in portions of Doña Ana and Otero counties.

### Affected Environment

*Climate*

The climate of HELSTF, launch sites, and impact areas is typical of arid regions at low altitudes. Rainfall varies with elevation, but averages approximately 10 inches annually. Annual snowfall totals average approximately 8 inches. The prevailing winds are from the west, except during July and August when the wind has a strong southerly component.

**Table 3-1: Federal and New Mexico Air Quality Standards**

| | | National Standards | New Mexico Standards |
|---|---|---|---|
| Ozone | 8-hour average | 0.08 ppm | None |
| | 1-hour average | 0.12 ppm | None |
| Carbon Monoxide | 8-hour average | 9.0 ppm | 8.7 ppm |
| | 1-hour average | 35.0 ppm | 13.1 ppm |
| Nitrogen Dioxide | Annual average | 0.053 ppm | 0.05 ppm |
| | 24-hour average | None | 0.10 ppm |
| Sulfur Dioxide | Annual average | 0.03 ppm | 0.02 ppm (1) |
| | 24-hour average | 0.14 ppm | 0.10 ppm (1) |
| | 3-hour average | 0.5 ppm | None |
| Lead | Calendar quarter | 1.5 $\mu g/m^3$ | None |
| PM-10 | Annual average | 50 $\mu g/m^3$ | 60 $\mu g/m^3$ (2) |
| | 24-hour average | 150 $\mu g/m^3$ | 150 $\mu g/m^3$ (2) |
| PM-2.5 | Annual average | 15 $\mu g/m^3$ | 60 $\mu g/m^3$ (2) |
| | 24-hour average | 65 $\mu g/m^3$ | 150 $\mu g/m^3$ (2) |

Source: New Mexico Environment Department, 2004
(1) New Mexico standard with the exception of the area within 5.6 kilometers (3.5 miles) of the Chino Mines Company
(2) The maximum allowable concentrations of total suspended particulate in the ambient air
$\mu g/m^3$ = micrograms per cubic meter
PM-2.5 = particulate matter with a diameter less than or equal to 2.5 micrometers
PM-10 = particulate matter with a diameter less than or equal to 10 micrometers
ppm = parts per million

*Regional Air Quality*

While the main HELSTF facility is located within Otero County, launch sites and impact areas could also be located in portions of Doña Ana County as well. Otero County is in attainment for all state and federal air quality standards. In Doña Ana County, the Sunland Park area is in marginal nonattainment for 1-hour ozone levels and the town of Anthony is in moderate nonattainment for PM-10 levels; however, areas within the ROI are considered to be in attainment for all state and federal air quality standards. In response to the PM-10 levels, a Natural Events Action Plan for Doña Ana County was submitted to the EPA in December 2000. In response to the ozone exceedances, a State Implementation Plan was instated by the State of New Mexico. (New Mexico Environment Department, Air Quality Bureau, 2004.) In addition, WSMR has signed a Memorandum of Agreement with the New Mexico Environment Department in support of the Doña Ana County Natural Events Action Plan. In the agreement, WSMR agreed to consider reasonable efforts to control dust generation and to develop and implement a Particulate Matter Control Plan that would control human-caused dust. (New Mexico Environment Department, Air Quality Bureau, 2000)

*Existing Emission Sources*

WSMR currently operates under an approved Title V Air permit, which includes all HELSTF facilities. WSMR is currently in compliance with their Title V Air permit. Air pollution sources at HELSTF includes boilers, aboveground storage tanks, degreasers, wood working, a paint booth,

sand blasting, and existing laser activities. All of these sources are currently covered under WSMR's Title V Air permit.

## 3.2 AIRSPACE

Airspace is defined as that space which lies above a nation and comes under its jurisdiction. Although airspace is generally viewed as being infinite space, it is a finite resource with distinct vertical, horizontal, and often temporal dimensions.

Under the Federal Aviation Act of 1958, as amended (42 U.S. Code [USC] 1301 et seq.), the Federal Aviation Administration (FAA) is charged with the safe and efficient use of our nations airspace through the establishment of specific airspace criteria and usage limits. Certain types of uses within the described ROI include controlled airspaces, uncontrolled airspaces, and restricted areas.

Controlled airspace is described as an area within which Air Traffic Control (ATC) service is provided to flights in accordance with the airspace classification. Specific designations include class A, class B, class C, class D, and class E airspace areas. An uncontrolled airspace is an area that has not been classified as a controlled airspace and is designated as class G. In addition, no ATC services are provided, and the only requirement for flight is certain visibility and cloud clearance minimums. Both controlled and uncontrolled airspaces are subject to certain pilot qualifications, operating rules, and equipment requirements.

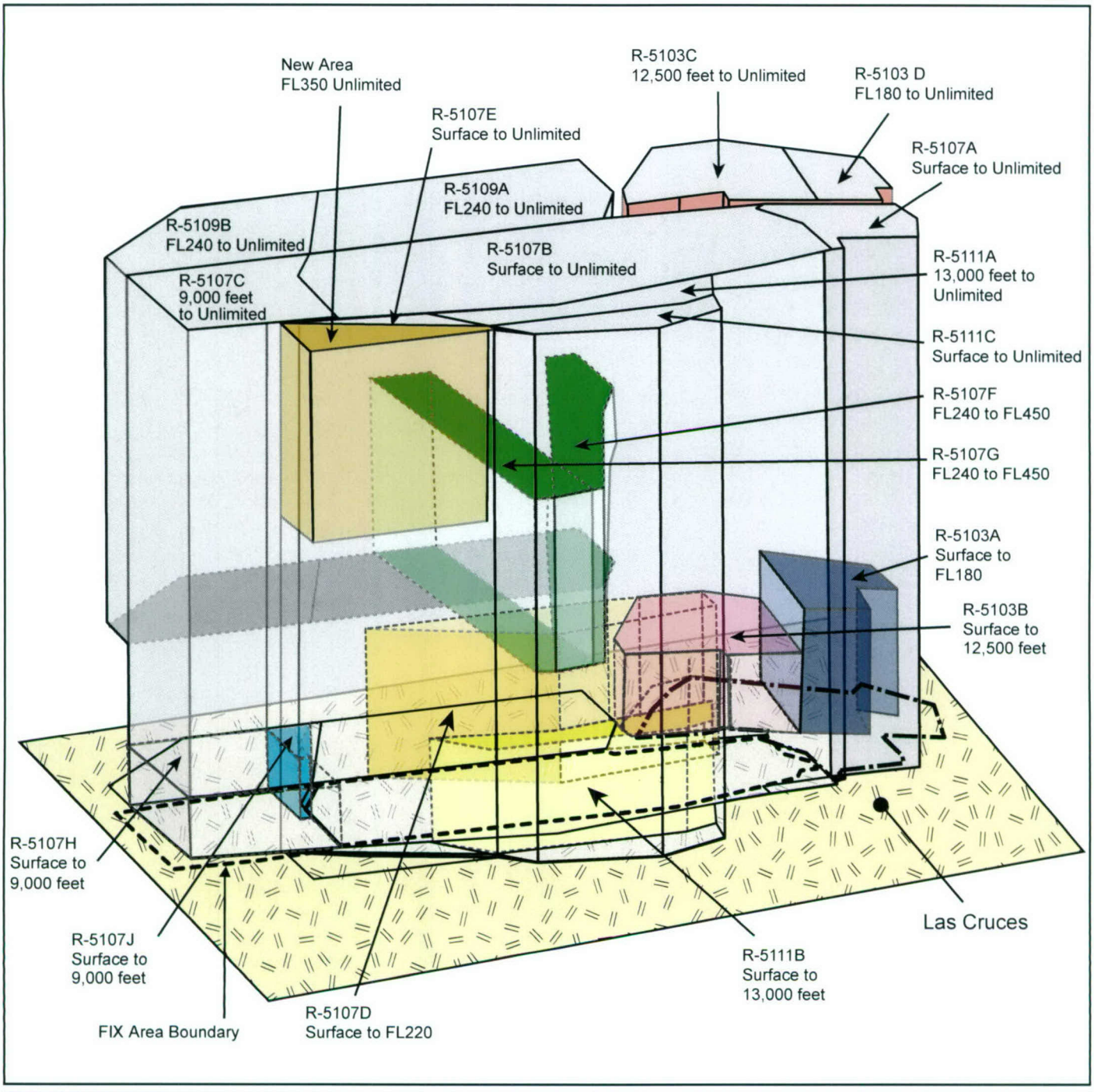
The only special use airspace in the ROI is the restricted areas airspaces which are used by military testing or flight training and are not usually accessed by civilian or commercial aircraft. Activities within these areas must be confined, because of their nature, or limitations imposed upon aircraft operations that are not a part of these activities, or both.

### Region of Influence

The ROI for airspace includes the complex of controlled and uncontrolled airspaces, and restricted areas under the governance of WSMR and Fort Bliss, and the corridor of airspace between WSMR and Fort Bliss (figure 3-1).

### Affected Environment

The Deputy for Air Force, WSMR is the using agency responsible for the 13 restricted areas within WSMR's airspace. All aircraft that have not been previously authorized and scheduled are prohibited from entering any restricted airspace. With the exception of R-5107B, all restricted areas are joint-use and provisionally released to the FAA for civilian aircraft under a shared-use agreement between WSMR and the FAA. However, R-5107C, D, F, G, H, and J; R–511A; and R-5109A and B are used extensively by Holloman AFB for training. (U.S. Army Space and Missile Defense Command, 1998a)




**EXPLANATION**

- White Sands Missile Range Base Boundary
- Fort Bliss Boundary

# White Sands Missile Range Airspace

White Sands Missile Range,
New Mexico

Not to Scale

NORTH

**Figure 3-1**

050311 WSMR Airspace ROI

By the agreement with the FAA through the Albuquerque Air Route Traffic Control Center (ARTCC), some of the airspace in the ROI is controlled under a radar approach control facility located at Holloman AFB. The radar approach control airspace has been divided into areas 1, 2, 3, 4, and 5 (figure 3-2). Depending on the airspace and safety requirements of a particular WSMR or HELSTF mission, one or more of these areas can be recalled by WSMR for a specified period of time. Radar approach control areas 1, 2, and 3 are recalled regularly for research and development missions, resulting in limiting instrument approaches from the north, limiting departures to the north directly into WSMR airspace, modifying visual flight rule (VFR) arrival from the south, and tightening instrument flight rule (IFR) departures to the southwest. (U.S. Army Space and Missile Defense Command, 1998a)

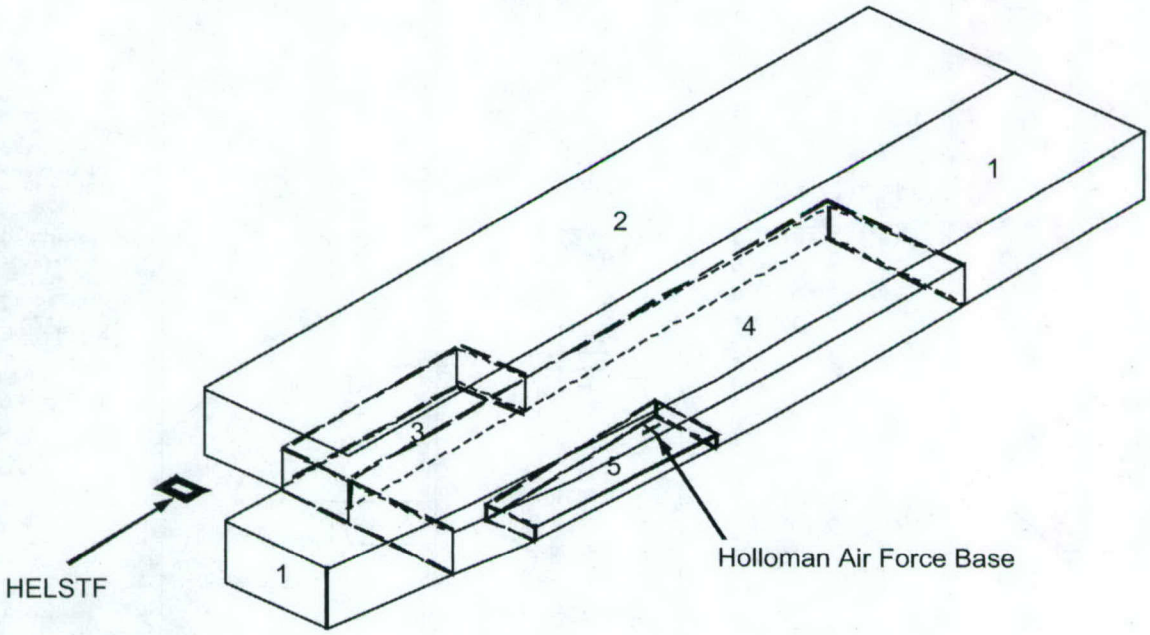
Aircraft arriving or departing from Holloman AFB are controlled by the base air traffic control tower facility. Holloman AFB is located within a transition area that also contains the Alamogordo–White Sands Regional Airport as shown in figure 3-3. An approach control area has been established to provide air traffic control approach and departure services to aircraft transiting between those airports located within the approach control area and enroute airspace system. Controlled airspaces for the Holloman vicinity include a control zone (class D), a transition area (class E) and continental control area (class E). (U.S. Army Space and Missile Defense Command, 1998a)

A control zone is a controlled airspace area typically covering a buffer zone of 5 statute miles around an airport with extensions including instrument arrival and departure paths. A transition area is designated to contain arriving and departing IFR operations within a terminal area, or while transiting between the terminal area and enroute airspace system. The continental control area for this ROI includes airspace at and above 1,200 feet above ground level (AGL) that is outside of restricted or prohibited areas. Aircraft that move into the continental control area from the Holloman Approach Control are under the control of the Albuquerque ARTCC. (U.S. Army Space and Missile Defense Command, 1998a)

In New Mexico, uncontrolled airspace (class G) in the ROI includes all of the airspace outside the lateral boundaries of the transition area and WSMR restricted airspace from the surface to 1,200 feet AGL. The Albuquerque ARTCC controls all airspace adjacent to the WSMR and Fort Bliss restricted areas. Air traffic within the controlled airspaces (classes A and E) are managed within sectors that divide the airspace both vertically and horizontally. (U.S. Army Space and Missile Defense Command, 1998a)

The Commanding General, Fort Bliss is the using agency responsible for the five restricted areas within Fort Bliss's airspace. All are considered joint-use areas and provisionally released to the FAA for civilian aircraft under a shared-use agreement between Fort Bliss and the FAA. (U.S. Army Space and Missile Defense Command, 1998a)

A narrow controlled airspace (class E) floored at 1,200 feet exists above an uncontrolled airspace (class G) between WSMR and Fort Bliss. This air corridor is a VFR flyway approximately 53 miles long traveling between the El Paso and Alamogordo areas (figure 3-3). (U.S. Army Space and Missile Defense Command, 1998a)




**EXPLANATION**

1. Surface to 22,000 feet MSL (except areas 4 and 5)
2. Surface to 22,000 feet MSL
3. Surface to 15,000 feet MSL
4. Surface to, but not including, 15,000 feet MSL
5. Surface to 8,000 feet MSL

HELSTF = High Energy Laser System Test Facility
MSL = Mean Sea Level

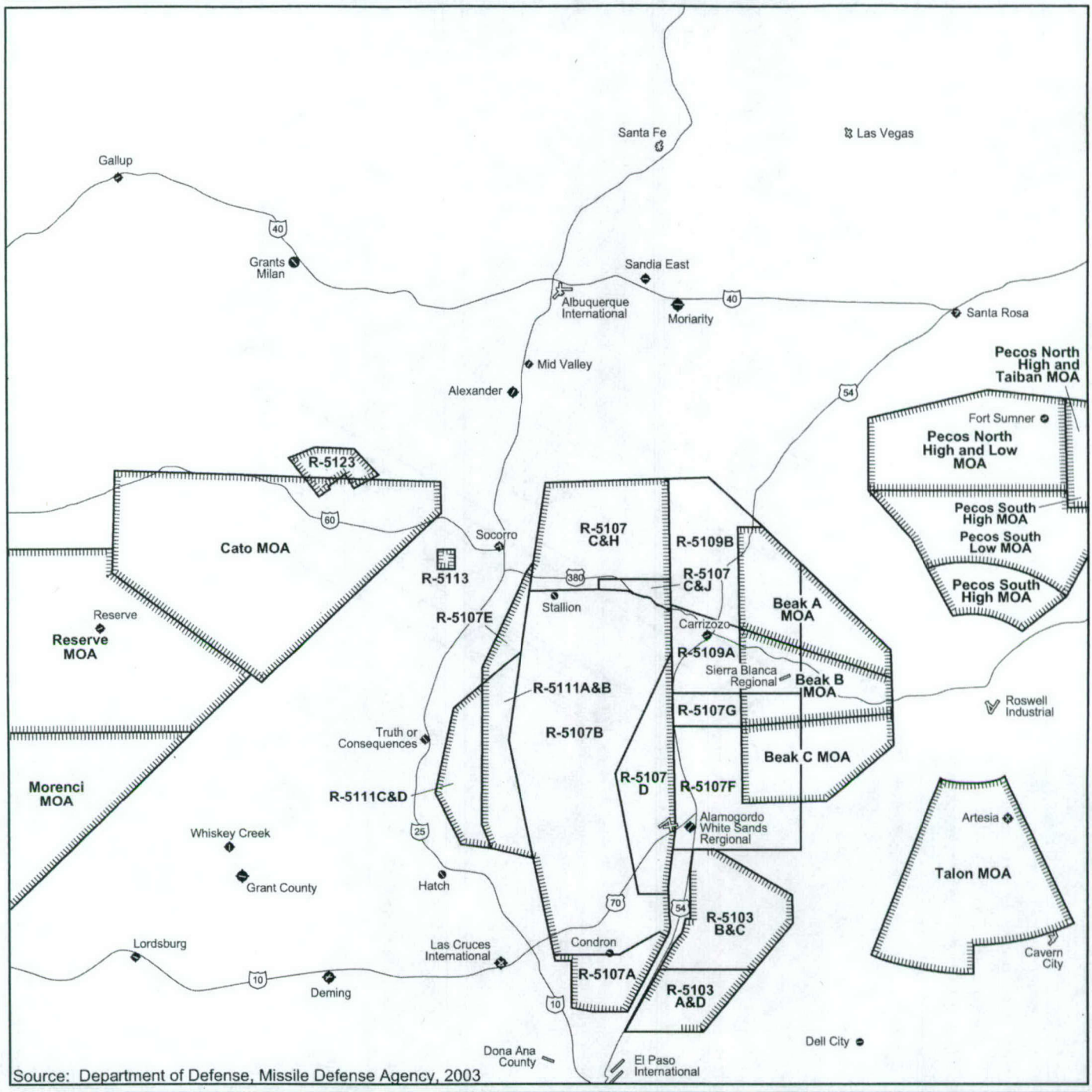
## Radar Approach Control Areas

NORTH

Not to Scale

050311 Radar Control Areas

**Figure 3-2**




Source: Department of Defense, Missile Defense Agency, 2003

**EXPLANATION**

Special Use Airspace

# Special Use Airspace and Airports/Airfields in the White Sands Missile Range Region

New Mexico

**Figure 3-3**

NORTH

Scale

0 27.7 55.3 miles

050311 WSMR ROI Airspace

## 3.3 BIOLOGICAL RESOURCES

Native or naturalized vegetation, wildlife, and the habitats in which they occur are collectively referred to as biological resources. Existing information on plant and animal species and habitat types in the vicinity of the proposed sites was reviewed, with special emphasis on the presence of any species listed as threatened or endangered by federal or state agencies, to assess their sensitivity to the effects of the Proposed Action. For the purpose of discussion, biological resources have been divided into the areas of vegetation, wildlife, threatened and endangered species, and environmentally sensitive habitats.

The Endangered Species Act of 1973 (16 USC 1531 *et seq.*) declares that all federal departments and agencies shall seek to conserve endangered species and threatened species. Further, the act directs federal agencies to use their authorities in furtherance of the purposes of the act. A key provision of the Endangered Species Act for federal activities is Section 7 consultation. Under Section 7 of the act, every federal agency must consult with the Secretary of the Interior, U.S. Fish and Wildlife Service (USFWS), to ensure that any agency action (authorization, funding, or execution) is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat of such species.

The Migratory Bird Treaty Act of 1918, as amended (16 USC 703-712) protects most species of migratory birds. Specifically, the act prohibits the pursuit, hunting, taking, capture, possession, or killing of such species or their nests and eggs.

### Region of Influence

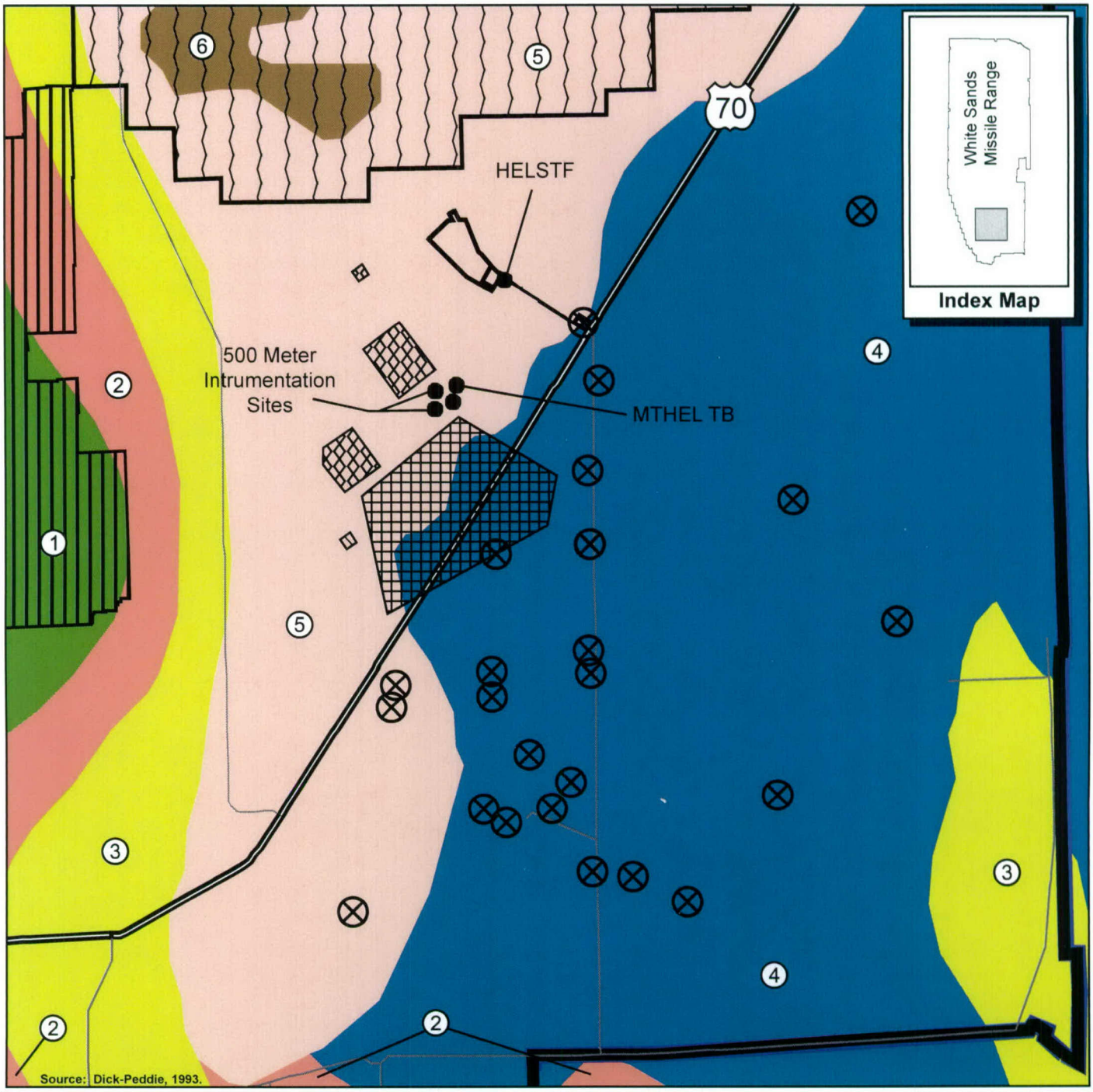
The ROI for biological resources would include areas within the boundaries of the WSMR South Range, primarily basin areas that may be disturbed at HELSTF, existing and new launch sites, and existing impact areas.

### Affected Environment

WSMR is located in the northern Chihuahuan Desert and features a diverse biotic community composed of grasslands, shrublands, and woodlands (figure 3-4). More than 300 wildlife species have been documented at WSMR, including migratory waterfowl and raptors and mammal species ranging from large mammals such as the introduced African oryx to rodents. Less than half of the species are known as regular residents.

*Vegetation*

The areas proposed for use are located within areas composed of closed basin scrub and plains-mesa sand scrub. Common species include creosotebush, black grama, bush muhly, tarbush, fourwing saltbush, alkali sacaton, and honey mesquite. Scattered pinyon pine and alligator juniper are present, with ground cover of a variety of grama grasses. The thin stony soil on the lower slopes within the mountains supports sparse grasses and a variety of shrubs and cacti. (White Sands Missile Range, 2001)




**EXPLANATION**

- WSMR Boundary
- Roads
- Potential Launch Site
- Target Impact Area
- Target Debris Area
- San Andres National Wildlife Refuge
- White Sands National Monument

1 - Coniferous and Mixed Woodland
2 - Desert Grassland (Ecotone)
3 - Chihuahuan Desert Scrub
4 - Plains-Mesa Sand Scrub
5 - Closed Basin Scrub
6 - Dune Area

HELSTF = High Energy Laser System Test Facility
MTHEL TB = Mobile Tactical High Energy Laser Test Bed

NORTH

Scale
0 1.5 3 miles

## Vegetation Map, South Range

White Sands Missile Range, New Mexico

**Figure 3-4**

050311 S Range Veg

*Wildlife*

Bird species diversity on WSMR is directly related to characteristics of available vegetation. Dry habitat dominated by creosote has the lowest number of species. The most common birds in the ROI include the black-throated sparrow, cactus wren, northern mockingbird, mourning dove, and western kingbird. The mountain plover, recently removed as a species proposed for listing by the USFWS (U.S. Fish and Wildlife Service, 2003), has a summer range that includes portions of the Tularosa Basin, and it has been observed on WSMR. Raptors located in the area include the red-tail hawk, northern harrier, western burrowing owl, and great horned owl.

The primary native large mammals present within the Tularosa Basin are mule deer, pronghorn, and a remnant population of desert bighorn sheep. The most common larger mammals within the ROI include the coyote, common gray fox, and kit fox. The introduced African oryx occur throughout the area. Small mammals common in the ROI include the kangaroo rat and desert pocket mouse.

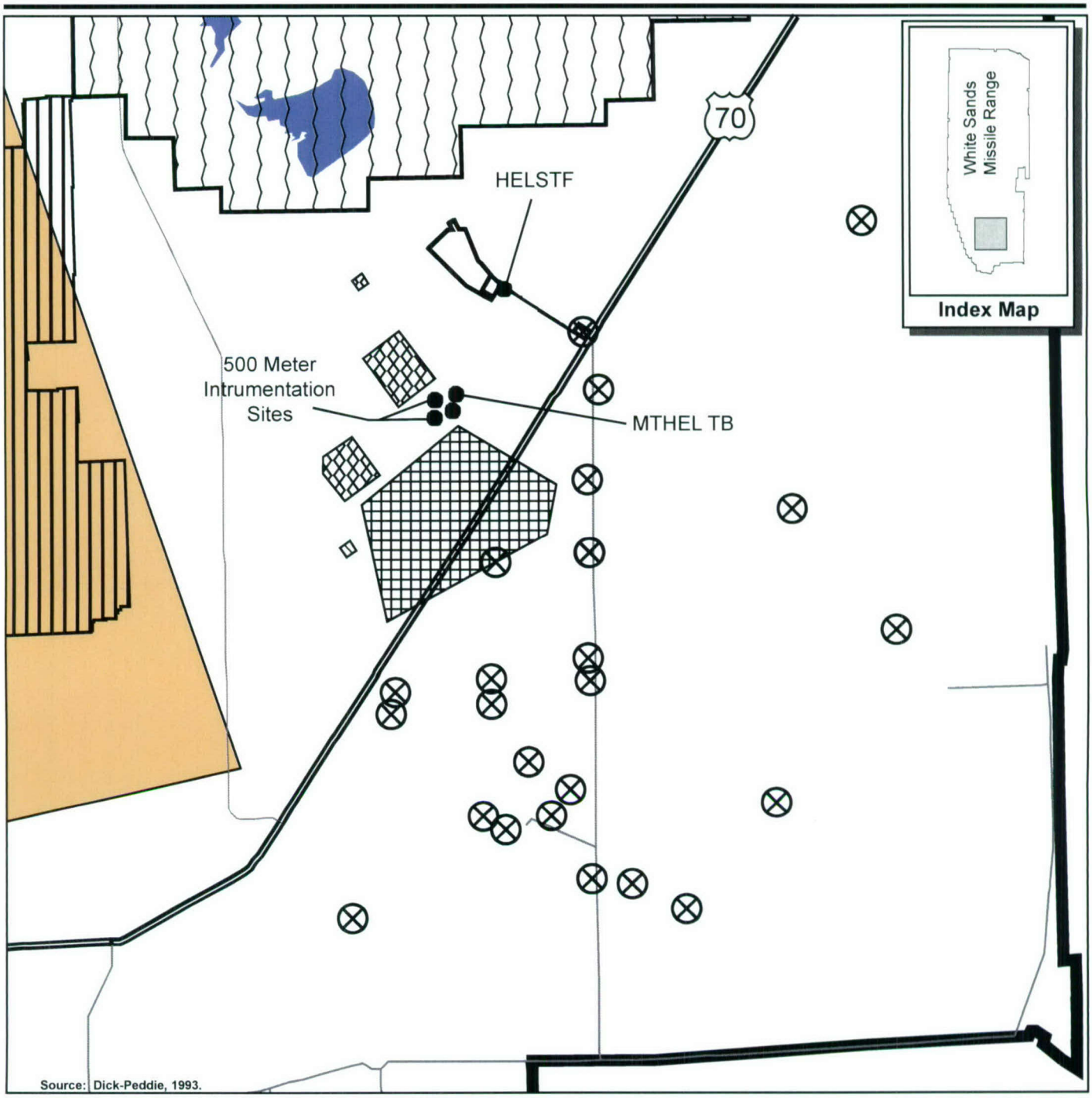
An abundant, diverse group of reptiles is common in the ROI. Lizards are the most frequently observed reptile, and snake species are also abundant. The roundtail horned lizard, collared lizard, state threatened Texas horned lizard, New Mexico whiptail, western whiptail, night snake, longnose snake, western rattlesnake, and western diamondback rattlesnake are found in the majority of habitat on WSMR. Few amphibians are found on WSMR, only a total of 10 species. The green toad and Couch's spadefoot toad have been observed in the ROI. (White Sands Missile Range, 2001; 1998)

*Threatened and Endangered Species*

Threatened and endangered species in the ROI (table 3-2) include plants and animals listed as threatened or endangered by the USFWS.

The following Federally threatened and endangered plants have the potential to occur in the vicinity of the ROI: the threatened Sacramento Mountain thistle (*Cirsium vinaceum*), and endangered Kuenzler's hedgehog cactus (*Echinocereus fendleri* var. *kuenzleri)*, Todsen's pennyroyal (*Hedeoma todsenii*), Sneed pincushion cactus (*Coryphantha sneedii* var. *sneedii*), and Sacramento prickle-poppy (*Argemone pleiacantha* ssp. *pinnatisecta*). The Sacramento Mountains thistle and prickly poppy are located in large canyon drainages in the southern part and canyons on the western slopes of the Sacramento Mountains respectively, east of the ROI. The Kuenzler's hedgehog cactus is located on the eastern and northwestern lower sides of the Sacramento Mountains and the Sneed's pincushion cactus is found in the Franklin, Guadalupe, and Organ Mountains, east and south of the ROI respectively. (New Mexico Rare Plant Technical Council. 1999)

Of the five plants, Todsen's pennyroyal (figure 3-5) is the only federally listed plant species known to occur on WSMR. It is located within the San Andres Mountains on WSMR and in the Sacramento Mountains east of WSMR at elevations of 6,200 to 7,400 feet (New Mexico Rare Plant Technical Council. 1999; White Sands Missile Range, 2001). The localities of these known populations are outside areas likely to be affected by the program. (White Sands Missile Range, 1998)




**EXPLANATION**

- WSMR Boundary
- Roads
- Potential Launch Site
- Target Impact Area
- Target Debris Area
- San Andres National Wildlife Refuge
- White Sands National Monument
- Desert Bighorn Sheep Habitat
- Wetlands

HELSTF = High Energy Laser System Test Facility
MTHEL TB = Mobile Tactical High Energy Laser Test Bed

NORTH

Scale
0 1.5 3 miles

# Sensitive Habitat, South Range

White Sands Missile Range, New Mexico

**Figure 3-5**

050311 S Range Habitat

**Table 3-2: Federally Listed Species in Doña Ana and Otero Counties Known or Expected to Occur in the Vicinity of the Proposed Action**

| Scientific Name | Common Name | Status | |
|---|---|---|---|
| | | State | Federal |
| **Fish** | | | |
| *Hybognathus amarus* | Rio Grande silvery minnow | E | E |
| **Birds and Mammals** | | | |
| *Coccyzus americanus* | Yellow-billed cuckoo | -- | C |
| *Empidonax traillii extimus* | Southwestern willow flycatcher | E | E |
| *Falco femoralis septentrionalis* | Northern Aplomado falcon | E | E |
| *Haliaeetus leucocephalus* | Bald eagle | T | T* |
| *Mustela nigripes* | Black-footed ferret | | E |
| *Sterna antillarum athalassos* | Least tern | E | E |
| *Strix occidentalis lucida* | Mexican spotted owl | -- | T |
| **Plants** | | | |
| *Argemone pleicantha* ssp. *pinnatisecta* | Sacramento prickly poppy | E | E |
| *Coryphantha sneedii* var. *sneedii* | Sneed's pincushion cactus | E | E |
| *Cirsium vinaceum* | Sacramento Mountains thistle | T | T |
| *Echinocereus fendleri* var. *kuenzleri* | Kuenzler's hedgehog cactus | E | E |
| *Hedeoma todsenii* | Todsen's pennyroyal | E | E |

Source: White Sands Missile Range, 2005; U.S. Fish and Wildlife Service, 2005; New Mexico Department of Game and Fish, 2005.
*Proposed for delisting
NOTES:

E = Endangered
T = Threatened
-- = Not listed

The yellow-billed cuckoo, a federal candidate species, is primarily sighted in riparian woodlands in the eastern boundary of the upper Rio Grande River drainage, including the Sangre de Cristo Mountains located north of WSMR and outside of the ROI.

The federal and state endangered Rio Grande silvery minnow is primarily located in the Rio Grande River and its river reaches and the Pecos River and its river reaches, west and east of the ROI respectively. No Rio Grande silvery minnows have been identified as occurring on WSMR.

The endangered least tern (*Sterna antillarum athalassos*) and threatened bald eagle (*Haliaeetus leucocephalus*) are rare visitors to the vicinity (New Mexico Department of Game and Fish, 2004a). The threatened Mexican spotted owl (*Strix occidentalis lucida*) has been sighted on WSMR, and appropriate habitat is adjacent to the range. The endangered southwestern willow flycatcher (*Empidonax traillii extimus*) has not been sighted on WSMR; however, suitable habitat may be present in the vicinity. (White Sands Missile Range, 1998; 2001)

There have been four reported sightings of the federally endangered northern Aplomado falcon (*Falco femoralis septentrionalis*) on or near WSMR since 1991. The most recent confirmed sightings occurred in 1999, on Fort Bliss south of WSMR (White Sands Missile Range, 2001) and in August 1992, just east of San Antonio near WSMR's northern range. Two unconfirmed

reports during a 1994 survey period indicated falcons in the vicinity of the Black and Rita sites located along the eastern boundary of WSMR, outside the ROI. (U.S. Department of the Interior, 1994) Areas identified as suitable Aplomado falcon habitat are located in the northern part of the range (U.S. Army Space and Missile Defense Command, 2002).

The federally endangered black-footed ferret (*Mustela nigripes*) was last confirmed in New Mexico in 1934 and is apparently extirpated in the state (New Mexico Department of Game and Fish, 2004c)

Although not listed by the USFWS as threatened or endangered, two species are considered, at the request of the New Mexico Department of Game and Fish, when proposing projects on WSMR: desert bighorn sheep (*Ovis canadensis mexicana*) and White Sands pupfish (*Cyprinodon tularosa*). Desert bighorn sheep, a state group 1 endangered species, occupy the upper reaches of the San Andres Mountains, appearing individually and in small bands. Five new radio-collared rams were introduced into the herd and are being tracked by the USFWS (White Sands Missile Range, 2000). In November 2002, 31 ewes and 20 rams from both Arizona and New Mexico were released at the southern end of WSMR (White Sands Missile Range, Public Affairs Office, 2002). Reintroduction of bighorn sheep has been identified as critical to state recovery efforts, and the San Andres Mountains are considered the best and largest bighorn sheep habitat in New Mexico (U.S. Army Environmental Center, 2003).

The White Sands pupfish, which is listed as endangered by the State of New Mexico, is the only fish known to occur naturally on WSMR and is endemic to the Tularosa Basin (New Mexico Department of Game and Fish, 2004b). It has been documented in the waters of Salt Creek, Lost River, Malpais and Mound Springs, and Malone Draw. The population appears relatively stable within its limited range. (U.S. Army Space and Strategic Defense Command, 1994; U.S. Department of the Interior, 1996) Habitat for the White Sands pupfish is outside the ROI of the known locations proposed for use as part of the Proposed Action.

*Environmentally Sensitive Habitat*

Several sensitive areas are located within WSMR or adjacent to its boundaries. Sensitive wildlife habitats occurring within the ROI include raptor nesting areas and regionally valuable habitats such as grama grasslands and pinyon-juniper woodland. (U.S. Army Space and Strategic Defense Command, 1994) The San Andres National Wildlife Refuge, an area adjacent to sites used to support HELSTF activities that provides habitat for a variety of sensitive species, was established in 1941 by Executive Order 8646 for the conservation and development of natural wildlife resources. The refuge supports a population of state endangered desert bighorn sheep, as well as mule deer, mountain lions, golden eagles, and gray vireos. The refuge is within WSMR boundaries and operates under a co-use agreement. All missions with the potential to impact protected wildlife within the refuge are subject to review by the USFWS Refuge Manager. Natural resources management is the responsibility of the USFWS. (U.S. Army Space and Strategic Defense Command, 1997)

The closest areas currently designated as Critical Habitat for the Mexican spotted owl are located northwest and east of WSMR and outside the ROI. (U.S. Fish and Wildlife Service, 2004)

## 3.4 CULTURAL RESOURCES

Cultural resources are those tangible and intangible aspects of cultural systems, both past and present, that are valued by or representative of a given culture, or that contain information about a culture. They include prehistoric or historic sites, structures, districts, artifacts, rock inscriptions, burial sites or other physical evidence of human activity, including archaeological (prehistoric and historic), ethnographic or traditional (e.g., American Indian), and historic buildings and structures. For the purposes of this EA, cultural resources are also defined to include paleontological resources. Whether prehistoric, historic, or traditional, significant cultural resources are often referred to as "historic properties."

NEPA requires all DoD installations to consider the environmental effects of their proposed programs, projects, and actions prior to initiation. NEPA guidelines not only protect and conserve the natural resources, but also protect cultural resources. It is the baseline policy for WSMR to avoid cultural resources or adverse effects to cultural resources whenever possible. In May 1985, WSMR entered into a Programmatic Memorandum of Agreement (PMOA) with the Advisory Council on Historic Preservation and the New Mexico State Historic Preservation Officer (SHPO) which is still in effect and to which all users of the facility are bound. This PMOA sets forth procedures governing the treatment of archaeological resources on a programmatic basis, implementing mitigation measures to reduce or eliminate adverse impacts to the range's cultural resources. The WSMR Integrated Cultural Resources Management Plan (ICRMP) presents the plan for management of cultural resources, and satisfies legal requirements (federal and state laws; local agreements) regarding such properties. Furthermore, it allows for amendments to cultural legislation which came into effect after the PMOA was signed, satisfies the existing PMOA, and is the primary tool used to implement the WSMR cultural resources management program (White Sands Missile Range, Environment and Safety Directorate, 2002), in consultation with the New Mexico SHPO. It is HELSTF policy to support the WSMR ICRMP to conserve, protect, and manage cultural resources located on HELSTF. Site personnel finding a cultural resource at HELSTF are required to advise the HELSTF Environmental and Safety Manager of its nature and location. New projects are reviewed for cultural resource impacts through the NEPA review process.

### Region of Influence

The ROI for cultural resources incorporates all areas of possible ground disturbance, including the area within HELSTF's fenced boundary, the existing or new launch sites, and the existing or potential debris impact areas (figure 3-3).

### Affected Environment

The physiography and climate of WSMR have supported a cultural resources chronology that extends into the past for approximately 11,000 years.

### Historic Resources and Structures

As little is known of area cultural development circa A.D. 1400-1540, WSMR's Historic Period (Protohistoric and Euroamerican) is generally accepted as beginning about the time Hispanic exploration and occupation (the Spanish Entrada) began.

Within the HELSTF ROI, cultural resources surveys have been limited; however, no Protohistoric sites have been identified thus far. In addition, there are no known Euro-American sites within the ROI. (U.S. Army Space and Missile Defense Command, 1998b)

There are no military era or National Register-listed properties within the ROI, nor are there any New Mexico State Register properties, National Historic Landmarks, or National Natural Landmarks.

### Traditional Resources and Consultation

Significant traditional resources may include burial sites, ceremonial areas, caves, mountains, water sources, plant gathering areas, or any other natural area culturally important for religious or hereditary reasons, and are afforded the same regulatory protection as other historic properties. WSMR's abundant cultural resource sites and immense unsurveyed area, coupled with Apache reticence to reveal site locations, preclude complete enumeration of National Register-listed or -eligible properties. At this date, there are no recorded traditional sites within the ROI.

### Paleontological Resources

There are no recorded paleontological resources or National Natural Landmarks within the HELSTF ROI.

## 3.5 HAZARDOUS MATERIALS AND WASTE

Although several regulatory agencies (e.g., the EPA, the Occupational Safety and Health Administration [OSHA], and the U.S. Department of Transportation [DOT]) have differing definitions of a "hazardous material" as applied to a specific situation; a general definition of a hazardous material is a substance or material that is capable of posing an unreasonable risk to health, safety, or property. The New Mexico Environment Department is the primary regulatory agency for all hazardous materials in New Mexico.

### Region of Influence

The ROI for hazardous materials and hazardous waste at HELSTF would include all locations where these substances are used, stored, transported, or disposed.

### Affected Environment

*Hazardous Materials Management*

Organizations and private contractors at WSMR (including HELSTF) are responsible for the management of hazardous materials. The WSMR Environment and Safety Directorate has primary responsibility for compiling and tracking hazardous materials information. The WSMR Hazardous Materials Minimization Center purchases and dispenses the majority of hazardous materials used on WSMR and HELSTF. Organizations purchase the materials, use what they need, then return the unused portion. This process is designed to minimize the amount of hazardous materials on-base and also to ensure its use.

HELSTF is responsible for safe storage and handling of the materials they obtain. The WSMR Environment and Safety Directorate is responsible for inspecting all hazardous materials storage facilities at WSMR, documenting the findings, verifying corrective actions, and maintaining accurate records as required by U.S. Army Regulation 420-90, *Fire Protection*. The WSMR Explosive Ordnance Disposal section handles all ordnance and ordnance by-products. Hazardous materials used in support activities include various cleaning solvents, paints, cleaning fluids, pesticides, fuels, coolants, and other materials. Hazardous materials used in range tests include those listed above as well as explosives, propellants, and gases used for HELSTF laser testing (i.e., nitrogen fluoride, fluorine, deuterium, sulfur hexafluoride, fluoride, and 71- to 85-percent hydrogen peroxide).

Appendix A of the HELSTF Integrated Contingency Plan (Hazardous Chemical Spill/Release Response Plan [U.S. Army Space and Missile Defense Command, 2003c]) establishes responsibility, outlines personnel duties, and provides resources and guidelines for use in the control, clean-up, and emergency response for spills. Releases of materials above threshold quantities are reported to the EPA and to state and local level agencies with emergency planning authority as mandated by the Emergency Planning and Community Right-to-Know Act of 1986. Material Safety Data Sheets (MSDSs) are kept at the use and storage sites of each material.

*Hazardous Waste Management*

WSMR is responsible for tracking hazardous wastes; for proper hazardous waste identification, storage, transportation, and disposal; and for implementing strategies to reduce the volume and toxicity of the hazardous waste generated on base. The New Mexico Environment Department's Hazardous Waste Bureau provides regulatory oversight and technical guidance to hazardous waste generators and treatment, storage, and disposal facilities in New Mexico.

The WSMR Environment and Safety Directorate implements the WSMR hazardous waste tracking system, which tracks hazardous wastes from the generation of the waste through the accumulation and storage sites until they are shipped off the range by an authorized contractor. All hazardous waste is disposed of via permitted procedures through the WSMR Hazardous Waste Storage Facility.

The HELSTF Hazardous Waste Management Plan (U.S. Army Space and Missile Defense Command, 2003a) established a systematic approach to handling hazardous wastes in a manner that meets federal, state, WSMR, and USASMDC regulations and policies. At HELSTF physical inventories are performed by each facility on HELSTF, logged by each hazardous waste generator, and tracked by the hazardous waste contractor. Currently, hazardous waste generated is taken to a temporary less than 90-day, accumulation site and then sent to the WSMR Hazardous Waste Storage facility for proper disposal.

## 3.6 HEALTH AND SAFETY

Health and safety includes consideration of any activities, occurrences, or operations that have the potential to affect one or more of the following:

**The well-being, safety, or health of workers**—Workers are considered to be persons directly involved with the operation producing the effect or who are physically present at the operational site.

**The well-being, safety, or health of members of the public**—Members of the public are considered to be persons not physically present at the location of the operation, including workers at nearby locations who are not involved in the operation and the off-base population. Also included within this category are hazards to equipment, structures, plants, and wildlife.

Existing environmental documents were reviewed to determine if public and occupational health and safety concerns are an issue. Applicable safety regulations were also reviewed with regard to hazardous materials.

### Region of Influence

The standards applicable to evaluations of health and safety effects differ for workers and the public. The ROI for worker safety is limited to a very small area and would not extend beyond HELSTF and testing areas. The ROI for public safety includes HELSTF as well as offsite areas that may be affected by the Proposed Action or related mishaps.

### Affected Environment

WSMR provides a Safety and Health program for all employees, and ensures that the public off base is advised of any potential hazards present at the facility. The Quality Assurance, Reliability, and Safety Office is responsible for implementing occupational and system safety requirements, identifying potential health and safety hazards, and developing controls to protect employees and facility assets. WSMR Emergency Services provides emergency response to fire, explosion, chemical release, and associated medical emergencies.

HELSTF has extensive plans and procedures to handle an emergency. While the current test schedule does not require a staffed fire department, fire protection of the site is provided by a WSMR fire station. The nurse aid station is staffed by a full-time nurse and an emergency medical technician during normal working hours, during high energy laser testing, and during hazardous fluid transfers (fluorine). In the event of an emergency, prior arrangements have been set up with Holloman AFB Hospital, the WSMR McAfee Clinic, and the Las Cruces Memorial Hospital to accept and communicate with the HELSTF ambulance. A full-time safety officer also is on site to oversee hazardous fluid transfers and laser testing. (White Sands Missile Range, 1998)

Over the years, HELSTF has developed extensive standard operating procedures to cover all laser operations and hazardous fluid transfers. The standard operating procedures are updated annually.

The HELSTF Safety Office trains site employees on the hazardous chemicals kept at the site (hazardous communications), confined space entry, and hazardous materials spill response in case of an emergency. The Safety Office also maintains the MSDS files for the site. The MSDSs are available for review at any time. Hazardous chemicals maintained at HELSTF are monitored 365 days a year, 24 hours a day, by a site surveillance team as well as a highly sophisticated Hazardous Atmospheric Monitoring System. In the event of an emergency, site surveillance personnel follow written procedures to alert appropriate personnel and to correct the emergency situation. Emergency procedures are updated annually.

The HELSTF Facility Disaster Control Plan was last updated in 1998. The plan presents potential accident or emergency conditions that could occur at HELSTF and the procedures to be followed in the event of such an occurrence. The primary considerations in dealing with accident or emergency conditions are presented in the Disaster Control Document. Individuals responsible for handling an emergency situation, including an emergency that could affect the public, also are described in the Disaster Control Plan. (White Sands Missile Range, 1998)

A number of Local Emergency Planning Commissions are also involved in emergency management, planning, and response for the area. Some of these include Doña Ana County/Las Cruces, El Paso, Otero/Alamogordo, Sierra/Truth or Consequences, Socorro, and Torrance. (U.S. Army Space and Missile Defense Command, 1998a)

## 3.7 INFRASTRUCTURE AND TRANSPORTATION

For the purposes of this EA, infrastructure elements include facilities and systems that provide power (electricity), potable (drinkable) water, wastewater treatment, and collection and disposal of solid waste for the affected installation. Transportation includes the primary transportation routes on WSMR and, specifically, potentially affected highways within the immediate HELSTF vicinity.

### Region of Influence

The ROI for infrastructure and transportation analysis incorporates all areas within HELSTF's fenced boundary, the existing or new launch sites, and the existing or potential debris impact areas.

### Affected Environment

*Electricity*

Approximately 94 percent of WSMR's electrical service is furnished by El Paso Electric Company. Power is provided by two onsite transformers to both HELSTF and other up-range WSMR users. Current electricity usage at HELSTF is well within capacity, with no foreseeable problems concerning adequate supply (Reynolds, 2004c).

A number of generators are available for use at WSMR; all are considered portable, although some are semi-permanently stationed. Generators range in their output capability from 10 to 700 kilovolt-amperes. Certain lasers and the BOSS rely on generator power as an alternative to battery or commercial electric sources.

*Water*

The potable water supply sources for WSMR are obtained mainly from wellfields (Department of Defense, Missile Defense Agency, 2002) and is tested quarterly (Reynolds, 2004a). HELSTF's water flows through 6-inch polyvinyl chloride conduits from four such wells located 8 miles away; three of these are currently in use. HELSTF is the only group drawing water from these particular wells, yet the piping does not have adequate capacity, leaving the system to be utilized instead for storage and creating a need for increased size in distribution piping (Reynolds, 2004a). Water at HELSTF is chlorinated and processed by the Reverse Osmosis system before being made available through booster pumps and gravity flow, which is constructed to distribute it to and from several storage tanks. The Pump House has a 20,000-gallon holding tank. Although all health and primary drinking water standards are met by onsite potable water, a high concentration of total dissolved solids has been an issue and, as a result, aesthetic standards (such as taste or odor) are increasingly problematic (Reynolds, 2004a).

*Wastewater*

Most HELSTF-generated wastewater is collected by means of sewage collection lines and transferred to the site's lined sewage lagoon facilities, which function by evaporation. It is estimated that the four lagoons hold approximately 3 million gallons and are generally 85 to 95 percent full. Sewage depth within the evaporation ponds averages about 38 inches. Currently, HELSTF has six septic systems: three serve the Technical Support Area (Guard Shack, Cafeteria and main TSA facilities); the rest serve the MTHEL TB (formerly THEL ACTD), Hangar (Heavy Equipment Shop) and the Tin Shed/MTHEL support trailers (Reynolds, 2004c). Proposed sewage lagoons, which would replace the current lagoons, are currently being designed to replace the existing lagoons. It is anticipated that the capacity of the proposed lagoons will not exceed the capacity of the existing lagoons. (Reynolds, 2004b)

*Solid Waste*

Currently, WSMR manages all HELSTF solid waste removal via waste collection and transport as well as the utilization of landfills. Additional waste pickups are coordinated as required. There are three operating landfills located on the Main Post, Stallion Range, and NASA area.

*Transportation*

U.S. 70 provides direct access to the Small Missile Range gate and to Range Road 1 via the Las Cruces and El Paso gates, and is the only U.S.-designated highway within the ROI. U.S. 70 is in good condition and provides Las Cruces and Alamogordo access to WSMR via Range Road 1 (Department of Defense, Missile Defense Agency, 2002). This highway is located within the evacuation area for HELSTF flight tests, and as a result is temporarily closed during such activities. Closures are common and well understood and anticipated by local motorists. Prominent notices are posted beside the road in both directions, and an agreement with the state allows WSMR to establish planned roadblocks lasting 60 minutes (with the option of an extension by up to 1 hour and 10 minutes).

HELSTF is located on WSMR Range Road (HELSTF Access Road) 264, some 2.2 miles north of U.S. 70. HELSTF access is monitored by WSMR DoD guards during operational hours and by HELSTF site surveillance during non-operational hours.

## 3.8 WATER RESOURCES

Water resources include both surface water and groundwater. Water quality and the consumption and diversion of water are regulated by a number of federal and state agencies. The EPA issues permits under the Clean Water Act to maintain and restore the potentially affected water resources within the ROI.

### Region of Influence

The ROI for water resources includes all surface water and groundwater within the Tularosa Basin area of WSMR. The primary areas of consideration are the MAR wellfield, target impact areas and potential debris areas, and HELSTF.

### Affected Environment

The source of all surface water and groundwater in the Tularosa Basin is limited to precipitation. Over half of the rainfall occurs from June to September. The average annual precipitation for the lower elevations at WSMR is approximately 10 inches while the nearby mountains receive approximately 18 to 20 inches. HELSTF and potential target impact and debris areas occupy rather flat terrain. Although the potential for flash floods and standing water does exist, the occurrence is extremely infrequent. (U.S. Army Space and Missile Defense Command, 1998b)

Water supply sources are a critical concern throughout the Tularosa Basin and in many areas of WSMR. Freshwater aquifers are in a state of potential overdraft causing declining water tables and degraded water quality.

*Surface Water*

Infrequent thunderstorm rainfall and snow melt from the surrounding mountainous areas exclusively supplies the limited surface water on WSMR. Most runoff occurs slowly due to gentle slopes with rapid percolation into sandy soils. Several intermittent drainages enter the ROI from the San Andres Mountains that form the western edge of the Tularosa hydrologic basin. Perennial surface waters within the ROI are limited to the intermittent appearance of Lake Lucero, which is also an expression of the groundwater table. (U.S. Army Space and Missile Defense Command, 1998a)

*Groundwater*

Groundwater recharge within the area is primarily from the fairly permeable alluvial fan material along the base of the Sacramento Mountains at the western edge of Alamogordo. Comparatively little recharge occurs in the valley floor due to the existence of impermeable clay, silt, and evaporative deposits. The groundwater in the valley flows south through the basin eventually reaching the Rio Grande Valley near El Paso, Texas. Most groundwater is drawn from underlying fill material, which is somewhat thin along the base of the mountains but several thousands of feet thick in the center of the valley. (U.S. Department of the Interior, Bureau of Reclamation, 2003)

Water for HELSTF is supplied almost exclusively by three wells located at the MAR wellfield. Runoff from the San Andres Mountains and direct precipitation percolates through the alluvial fan deposits to form the alluvial aquifers. The total estimated volume of water in the Tularosa Basin is 4.2 billion acre-feet. An estimated 98 percent of the Tularosa Basin's groundwater is

considered of poor quality and classified as saline having a dissolved solid concentration in excess of 35,000 milligrams per liter (mg/L) (parts per million) (U.S. Department of the Interior, Bureau of Reclamation, 2003).

In the vicinity of the MAR wellfield, it has been estimated that 450,000 acre-feet of fresh groundwater are in storage. The water supply line from the wells to HELSTF has a capacity of approximately 200 gallons per minute. According to the HELSTF EA and THEL ACTD EA, the three MAR wells yielded approximately 380 gallons per minute and produced approximately 52.6 million gallons per year. Present water usage at HELSTF from the MAR wells is unknown.

Depth to water within the ROI ranges from zero at Lake Lucero to approximately 330 feet below ground level on some alluvial fan surfaces. Depth to water in the MAR wells is approximately 215 to 272 feet below ground level. Depth to water at HELSTF and the target impact areas is approximately 70 feet below ground level. (U.S. Army Space and Missile Defense Command, 1998a)

Quality freshwater generally occurs along the base of the Sacramento Mountains range at the eastern edge of the basin and the western edge near the Organ and San Andres Mountains. Water from the MAR wells is considered reasonably fresh, with dissolved solids of approximately 500 to 700 mg/L (U.S. Army Space and Missile Defense Command, 1998a).

# 4.0
# ENVIRONMENTAL CONSEQUENCES

# 4.0 ENVIRONMENTAL CONSEQUENCES

## 4.1 AIR QUALITY

This section addresses potential environmental impacts caused by changes to the air quality environment due to the continuing No-action Alternative or the Proposed Action.

### 4.1.1 NO-ACTION ALTERNATIVE

Potential impacts from the No-action Alternative would result from current levels of HELSTF operations. These current activities occur within HELSTF's fenced boundary or nearby on WSMR land supported from HELSTF. These activities are directly involved with the use or production of a high energy laser beam. The impacts of these activities were analyzed in the HELSTF EA and THEL ACTD EA (U.S. Army Space and Missile Defense Command, 1998a; b) and are summarized below. Any changes to activities to HELSTF since the 1998 EAs were published are also addressed.

HELSTF emission levels would continue to be monitored and maintained according to WSMR's Title V Air Permit. As presented in the 1998 HELSTF EA, table 4-1 lists estimated emissions from stationary sources at HELSTF and Title V emission limits for all of WSMR. Laser emissions include HF emitted by the MIRACL, LDD, and LPCL.

Air pollution dispersion modeling is conducted prior to operation or refueling of any chemical laser system on HELSTF (U.S. Army Space and Missile Defense Command, 1998a). The HELSTF Atmospheric Sciences Group has a staff onsite during these activities to perform dispersion modeling functions in accordance with an approved HELSTF procedure. Two dispersion models are currently used at HELSTF. The first, OCEAN BREEZE/DRY GULCH, is used to model non-buoyant plumes and includes support for planned laser refueling operations and in response to alarms that might indicate a hazardous chemical release. The second, INPUFF, is used to support laser operations where the HF plume is known to be buoyant. (Reynolds, 2004c) Table 4-2 lists the emission factors associated with the MIRACL, LDD, and LPCL during operation for HF.

Current emission scrubbing system for the MIRACL is designed to remove 85 percent of the HF released; however, no HF has been detected in exhaust emissions when tested. Current levels of HF emitted by MIRACL testing would continue to be within the WSMR Title V Air Permit levels, as analyzed in the 1998 HELSTF EA.

The primary emission anticipated due to operation of the MTHEL TB would be HF. As analyzed in the THEL ACTD EA, the MTHEL TB operations at HELSTF would be within the WSMR Title V permit levels.

**Table 4-1: Existing Estimated Emissions at HELSTF**

| Source | Emission Type | Estimated Emission Level (tons per year) | WSMR Title V Air Permit Emission Limit (tons per year) |
|---|---|---|---|
| Lasers | HF (HAP) | 0.64 | 9.9 |
| Boilers | PM | 0.60 | 0.74 |
| | $SO_2$ | 2.55 | 8.79 |
| | CO | 0.15 | 1.43 |
| | $NO_X$ | 0.60 | 6.45 |
| | VOC | 0.01 | 0.2 |
| Gasoline Aboveground Storage Tank | VOC | 1.40 | 41.1 |
| Degreasers | VOC | 6.76 | 21.8 |
| Woodworking | PM | 0.30 | 7.8 |
| Paint Booth | PM | 0.0174 | 0.2 |
| | VOC | 0.642 | 6.1 |
| Sandblasting | PM | 32.5 | 68.5 |
| | $PM_{10}$ | 27.9 | 58.5 |

Source: U.S. Army Space and Missile Defense Command, 1998a
HF = hydrogen fluoride
HAP = hazardous air pollutant
CO = carbon monoxide
$NO_x$ = oxides of nitrogen
PM = particulate matter
$PM_{10}$ = particulate matter less than 10 microns in size
$SO_2$ = sulfur dioxide
VOC = volatile organic compound

**Table 4-2: HELSTF Laser HF Emission Factors**

| Laser | HF Emission Factor |
|---|---|
| MIRACL | 5.75 pounds per second |
| LDD | 0.001 pounds per second |
| LPCL | 0.0001 pounds per second |

Source: Sanchez, 2004
HF = hydrogen fluoride
LDD = Laser Device Demonstration
LPCL = Low-Power Chemical Laser
MIRACL = Mid-Infrared Advanced Chemical Laser

Operations for the LPCL are anticipated to remain as analyzed in the 1998 HELSTF EA and are not expected to increase HF emissions. The emission scrubber system on the LPCL was replaced since the 1998 HELSTF EA, as the previous system was more difficult to maintain and prone to a quick loss of scrubbing efficiency. The improved LPCL scrubber system continues to remove DF and HF from exhaust emissions.

The LDD is currently not in use; however, it would be possible to utilize the LDD once the emission scrubber is refurbished. It is expected that any HF emissions would be similar to those previously analyzed and would not increase.

Exhaust gases from the PLVTS consist of approximately 424 cubic feet of helium, nitrogen, and carbon dioxide (in a 3:2:1 mixture), as well as a trace amount of carbon monoxide and are released directly into the atmosphere about twice a month. No post scrubbing is performed on the PLVTS exhaust emissions.

### 4.1.2 PROPOSED ACTION

The Proposed Action Alternative includes the use of solid state lasers (SSHCL), chemical lasers (MTHEL, ABL, ATL, High Power Carbon Dioxide) and FEL, as well as additional target and flight testing in conjunction with laser testing and possible facility improvements.

#### 4.1.2.1 Lasers

Previous testing of an SSHCL at HELSTF was the 10-kW flash-lamp pumped heat-capacity laser in 2004. Future 10-kW SSHCL testing would be against static targets in 2005 and against dynamic targets in 2006. The 10-kW flash-lamp pumped heat capacity laser would be powered by standard commercial power. The proposed 25-kW and 100-kW diode pumped SSHCLs would be powered by lithium ion batteries, which would be charged from commercial power. It is anticipated that the proposed SSHCLs would have no byproducts; therefore, no air pollutants are anticipated. Engine emissions could be anticipated from the proposed SSHCL ground vehicle; however, this vehicle is expected to be a hybrid-electrical one with minimal diesel engine emissions. Therefore, anticipated emissions associated with the SSHCL would remain within emission limits established in WSMR's Title V air permit.

The proposed MTHEL would be a mobile prototype. Emission levels produced by the MTHEL are anticipated to be similar to the existing MTHEL TB and would include DF, tetrafluoromethane, HF, nitrogen, water, and carbon dioxide. A scrubber may also be used to remove chemicals from the exhaust of the proposed MTHEL. It is expected that the emission levels of the proposed MTHEL would also remain within the existing parameters of WSMR's Title V Permit.

The MIRACL laser could be used to simulate ABL operations before the actual ABL is tested at WSMR. The operation of MIRACL at different wavelengths would not change effluents or necessitate significant changes in HELSTF infrastructure. Anticipated emissions would be similar to those described in 4.1.1 for the existing MIRACL and would not impact WSMR's Title V Permit.

The MIRACL laser could also be used to simulate the ATL before the actual ATL is brought to HELSTF for testing. In the event that MIRACL is used, the current use of DF would have to be converted to HF and would result in different wavelengths. It is expected that these changes, while not trivial, would not change MIRACL effluents or cause significant changes in HELSTF infrastructure. Anticipated emissions would be similar to those described in 4.1.1 for the existing MIRACL.

Other carbon dioxide lasers similar to the PLVTS may also be tested at HELSTF. These lasers would most likely use the same facilities as the PLVTS and have similar testing frequencies. Like the PLVTS, no post scrubbing would be required as the anticipated emissions, including helium, nitrogen, and carbon dioxide, would not significantly impact air quality at HELSTF.

A FEL could be considered for use as a test device at HELSTF, either augmenting or replacing the existing MIRACL laser. This would be feasible only in the long term and only if technology advances in FEL research allow reliable operation of high-power devices well in excess of 100 kW. It is expected that the emission levels from the proposed FEL would be similar to those produced by the existing MIRACL laser and would be included in the current WSMR Title V Air Permit levels.

#### 4.1.2.2 Targets and Flight Testing

Static or dynamic testing of any of the proposed lasers could include tactical rockets, artillery projectiles, aerial drones or UAVs, and ground targets and would not require additional target impact areas.

Due to the intervals between testing events, target launches associated with each test are discrete events. The prevailing conditions at WSMR lend themselves to the rocket emissions rising and dispersing, causing no overall impact on local air quality. In addition, previous analysis in the HELSTF EA, THEL ACTD EA, and the WSMR Range-Wide EIS for testing events determined that air quality impacts would be short-term and localized.

Ground impacts of targets, whether intact or as debris, may cause a brief puff of fugitive dust. Due to the small amount of dust typically raised and the conditions at HELSTF being favorable to pollution dispersion, no air quality degradation is foreseen from target missiles impacting the ground. Previous analysis also determined that this level of fugitive dust would not cause an impact to regional air quality.

Debris-recovery activities would have no measurable effect on air quality. Emissions due to ground vehicle activity would be minimal, and any effects would be short-term due to dissipation and dilution.

#### 4.1.2.3 Facility Improvements

Some infrastructure improvements at HELSTF would be required for some new activities, or existing facilities would be improved to enhance current activities. Included in these improvements would be a test facility for the proposed FEL, along with an additional electrical substation to accommodate increased power demands for this new laser technology. Also, new sewage lagoons with perimeter fencing would be constructed, replacing existing lagoons. It is anticipated that all would be conducted in accordance with appropriate regulations and permits. Although minor short-term impacts typically associated with construction activities may occur, no exceedances of ambient air quality standards would be anticipated.

### 4.1.3 CUMULATIVE IMPACTS

All operations at HELSTF are subject to restrictions imposed by WSMR's Title V Air Permit. This permit establishes specific limits on emissions which may not be exceeded by any combination of actions on WSMR. HELSTF is not expected to cause the emission levels established by this permit to be exceeded. The projected cumulative impacts to air quality due to the Proposed Action would be minimal in nature and would not require a change in WSMR's regulatory status.

## 4.2 AIRSPACE

The potential impacts to airspace are based on whether activities have the potential to result in an obstruction to air navigation; modification to or new requirements for special use airspace; changes to existing air routes; or additional restricted access to regional airfields and airports.

### 4.2.1 NO-ACTION ALTERNATIVE

Under the No-action Alternative, potential impacts consist of effects that could occur as a result of current levels of HELSTF program activities. The impacts of these activities have been previously analyzed in the HELSTF EA and THEL ACTD EA (U.S. Army Space and Missile Defense Command, 1998a; b) and are summarized below. Any changes to activities to HELSTF since the 1998 EAs were published are also addressed.

Ongoing laser operations would have the potential to affect current aerial activities within WSMR airspace. The foremost concern involves the potential for permanent eye damage to pilots as a result of exposure from direct or reflected beams. However, as previously mentioned in the HELSTF EA, coordination measures would be taken to minimize or avoid any adverse impacts.

Closure of the restricted airspace above HELSTF laser operations would ensure aircraft are not exposed to laser beams. This closure could have a potential operational impact on Holloman AFB by temporarily affecting approach and departure routes through closing restricted areas that are often used for advanced flight training. However, closures are generally for less than 1 hour, 15 to 20 times each year. In addition, military coordination efforts through prior notices of closure are required from WSMR to inform Holloman AFB or other airspace users. This coordination ensures minimization or avoidance of any adverse effects on aircraft operations.

The illumination of targets by laser operations does not present the potential for the laser beams to affect unrestricted airspace. All targets are positioned within the restricted airspace and no more than 3 miles from the test bed. In the unlikely event that the target should move out of contact with the laser beam, test parameters would ensure the immediate shutdown of the laser beam operation by targeting verification software. Also, through laser test design and safety parameters, beams would not exceed the restricted airspace boundaries at an altitude of less than 60,000 feet.

As stated in the THEL ACTD EA, a limited number of tests have the potential to affect a small portion of the narrow corridor of controlled (class E) airspace located between WSMR R-107B and Fort Bliss R-5103 B and C restricted areas. Laser beams are not anticipated to exceed any

restricted area that has not previously been cleared of non-participating aircraft. The FAA would provide notice to any potential affected aircraft through a Notice to Airmen in order to clear the airspace. Additionally, as specific test scenarios continue to develop, coordination between with the Deputy for Air Force, WSMR, and the FAA would continue to be essential in the minimization of any potential adverse conflicts of schedule between HELSTF and aircraft operations.

### 4.2.2 PROPOSED ACTION

The Proposed Action Alternative includes the use of solid state lasers, chemical lasers, and FEL, as well as additional targets and flight testing in conjunction with laser testing, and possible facility improvements.

#### 4.2.2.1 Lasers

Laser activities related to the Proposed Action would have the potential to impact current aerial activities within WSMR airspace. Depending on the individual test design and safety parameters, one or more of the restricted areas would have the potential to be recalled by WSMR. The foremost concern involves the potential for permanent eye damage to pilots as a result of exposure from direct or reflected beams. As mentioned under the No-action Alternative, radar approach control areas above Holloman AFB recalled by WSMR would temporarily affect approach and departure routes by closing restricted areas. However, generally closures exist for less than 1 hour per test. In addition, military coordination efforts through prior notices of closure are required from WSMR to inform Holloman AFB and other airspace users, ensuring minimization of any adverse effects on aircraft operations.

#### 4.2.2.2 Targets and Flight Testing

The foremost concern during lasing activities involves the potential for permanent eye damage to pilots as a result of exposure from direct or reflected beams. However, in the unlikely event that the target should move out of contact with the laser beam, test design and safety parameters would ensure that the laser beam would not exceed any restricted airspace at energy levels that could have the potential to result in eye damage or at altitudes less than 60,000 feet. Therefore, eye damage resulting from the exposure to laser beams would be avoided.

#### 4.2.2.3 Facility Improvements

Under the Proposed Action, facility improvements at HELSTF would have no effect on airspace. Thus, no adverse impacts to airspace would occur.

### 4.2.3 CUMULATIVE IMPACTS

No other airspace activities have been identified in the area that would result in cumulative impacts to aircraft operations when combined with the Proposed Action. The required scheduling process for the use of airspace within restricted areas would preclude the potential for cumulative impacts to existing airspace users. All laser operations would be in airspace that has been cleared of all non-participating aircraft. In the unlikely event that laser beams exceed

restricted airspace boundaries, laser beams would exist within eye-safe energy levels or at altitudes above 60,000 feet.

## 4.3 BIOLOGICAL RESOURCES

Typical HELSTF laser tests consist of guided lasing operations, launch of representative targets, and target payload and debris within designated impact areas. The potential exists for impacts to biological resources as a result of noise, laser operation, and debris from these activities. The Proposed Action could include facility improvements such as construction of a new FEL facility, which could impact biological resources. If new launch pads or target impact areas in undisturbed locations are required, additional environmental documentation would be prepared as needed.

### 4.3.1 NO-ACTION ALTERNATIVE

Potential impacts from the No-action Alternative consist of effects that could occur as a result of current levels of HELSTF program activities. These current activities occur within HELSTF's fenced boundary or nearby on WSMR land supported from HELSTF. These activities are directly involved with the use or production of a high energy laser beam. The impacts of these activities were analyzed in the HELSTF EA and THEL ACTD EA (U.S. Army Space and Missile Defense Command, 1998a; b) and are summarized below. Any changes to activities at HELSTF since the 1998 EAs were published are also addressed.

Continuing activities conducted within HELSTF's fenced boundary are not likely to affect biological resources since wildlife use of the area is limited to species such as birds and small forms of wildlife such as rabbits and lizards. No threatened or endangered plant or wildlife species have been observed within the fenced HELSTF site.

No listed or special-status plants, such as the Todsen's pennyroyal, have been identified at or adjacent to current launch sites or debris impact areas. Fire prevention and suppression plans would continue to be implemented to minimize the potential for impacts to biological resources. Any ground fire would be quickly extinguished, where possible, minimizing impacts to wildlife habitat.

Target launch noise at the launch sites would continue to cause startle effects in wildlife in the immediate and surrounding area; however, these effects would be localized and short-term. No adverse impacts to desert bighorn sheep from prior launch noise have been identified from the use of the Lola launch site, which at approximately 3,940 feet from the San Andres National Wildlife Refuge is the launch site closest to bighorn habitat. Desert bighorn sheep are not likely to be affected by continued activity at HELSTF. The least tern, bald eagle, Mexican spotted owl, and Aplomado falcon are transient or rarely seen on WSMR and are not likely to be adversely affected by intermittent launch noise or debris. No noise or debris impacts are anticipated to the southwestern willow flycatcher, which has not been observed on WSMR. The closest habitat for the state endangered White Sands pupfish is approximately 20 miles northwest of the laser site and would not be affected by continuing current HELSTF testing. The potential for debris to land on an individual cactus or wildlife species is possible; however, debris landing on an individual plant or animal would not be detrimental to the whole population.

As discussed in the prior EAs, laser light from the lasers used in HELSTF operations has a high potential for causing retinal damage in wildlife even at a considerable distance from the source. No laser beams are operated in such a manner that has the potential to strike the eyes of desert bighorn sheep located in the San Andres National Wildlife Refuge at power levels above 0.1 watts per square centimeter ($W/cm^2$) (the maximum permissible exposure level for human eye exposure). This is achieved by operating under one or a combination of the following conditions:

- Avoiding azimuths and elevation angles in the direction of bighorn sheep habitat
- Operating at reduced power levels, such that the power level would be below 0.1 $W/cm^2$ if the laser beam were to strike the eye of a bighorn sheep
- Operating with the beam focused distant enough from bighorn sheep habitat so that beam divergence would result in power levels below 0.1 $W/cm^2$ if the beam were to strike the eye of a bighorn sheep

The probability of a bird, especially a listed bird species such as the least tern, Mexican spotted owl, bald eagle, or Aplomado falcon, flying into or along the beam and being adversely impacted would continue to be considered remote.

MIRACL testing is anticipated to maintain the current testing schedule of six to eight tests per year as analyzed in the HELSTF EA. The MTHEL TB, located approximately 3.4 miles southwest of the main HELSTF complex, has been in operation at HELSTF since 1999. During numerous tests at WSMR, the system has successfully engaged tactical rockets and artillery projectiles. The energy of the laser causes intense heating of the target, which causes its warhead to explode. The debris from the target falls quickly to the ground. No adverse impacts have been identified.

LPCL is typically operated for 300 to 600 hours per year. The LDD typically operates 0 to 900 seconds per year. PLVTS would continue to be tested on average of 24 times per year. No impacts to biological resources are anticipated from the continued use of these devices.

### 4.3.2 PROPOSED ACTION

Enhanced testing at HELSTF could include the use of one or more of several types of existing experimental and conceptual laser systems. Proposed laser systems to be tested at HELSTF can be categorized into three basic technologies: solid state lasers, chemical lasers, and FELs. Various target launches and flight testing as described in section 2.2.3 would be performed in conjunction with laser testing. Facility improvements could also be required.

#### 4.3.2.1 Lasers

The enhanced SSHCL would be located and fired from within the HELSTF fenced boundary, with impacts similar to those identified in the HELSTF and THEL EAs as discussed above. Since the SSHCL is electrically generated, no effluents would be produced onsite.

Approximately 20 MTHEL tests would be conducted per year, starting in 2009. Testing would occur at the existing HELSTF Limor site with impacts similar to those identified in the HELSTF and THEL EAs as discussed above.

The MIRACL laser may be used to simulate the ABL and ATL before the actual systems are tested at WSMR. Operation of MIRACL at different wavelengths would not change effluents or necessitate significant changes in HELSTF infrastructure. Outside lasing would involve use of both static and dynamic targets and test areas similar to those currently in use. No additional impacts to biological resources are anticipated. Another potential test activity that could be considered for HELSTF includes use of HELSTF assets, such as the SLBD, for tracking targets during actual ABL or ATL engagements with ballistic missile targets with impacts similar to those discussed above.

Other carbon dioxide lasers would most likely have similar testing frequencies and use the same facilities as the PLVTS, which was previously analyzed in the HELSTF EA and is currently being tested at HELSTF. Impacts anticipated to occur to biological resources would be similar to those identified in the PLVTS discussion.

A FEL is an electric discharge laser that provides intense, powerful beams of laser light that can be tuned to a precise color or wavelength and can be controlled more precisely than conventional lasers. Testing would potentially be as frequent as several times per day. Operation of the laser would be expected to generate x-ray radiation hazards; however, lead shielding would be installed in test facilities to prevent radiation from escaping test cells thus negating the potential for impacts to biological resources.

Enhanced laser testing should have no effect on any listed or candidate species or critical habitat.

#### 4.3.2.2 Targets and Flight Testing

It is expected that the SSHCL would be tested against static targets located in existing sites with impacts similar to those identified in the HELSTF and THEL EAs. Additional targets would include artillery projectiles, tactical rockets, and aerial drones or UAVs. The system may also be tested on buried and unburied landmines, and Improvised Explosive Devices.

Potential targets for the ATL would be stationary vehicles and simulated communications towers on or near roads in existing HELSTF test areas, most likely on the existing road between the Laser Systems Test Center and the 2 Kilometer Site. ABL testing is anticipated to have impacts similar to those described above.

Launch activities would take place in previously disturbed areas and generally are not expected to adversely affect plant species. No listed or special-status plants, such as the Todsen's pennyroyal, have been identified in areas at or adjacent to the launch sites or impact areas. The use of existing sites would allow launches in areas where much of the vegetation has previously been disturbed or removed. The small amount of foraging habitat that could potentially be removed by program activities would not result in jeopardy to the continued existence of any listed species. The potential for debris to land on an individual cactus or wildlife species is possible; however, debris landing on an individual plant or animal would not be detrimental to the whole population. Fire prevention and suppression plans would continue to be implemented. Any ground fire would be quickly extinguished, where possible, minimizing impacts to vegetation remaining in the area. As discussed above, target launch noise at the launch sites could potentially cause startle effects in wildlife in the immediate and surrounding area; however, these

effects would be localized and short term. No adverse impacts to migratory birds; threatened, endangered, or candidate species; or other biological species are anticipated.

#### 4.3.2.3 Facility Improvements

The FEL testing may potentially require a new test facility. This facility would be built on a one-acre area that has been previously disturbed. A possible location could be an existing gravel parking lot that is adjacent to the MIRACL Pressure Recovery System. An additional electrical substation may be required to accommodate increased power demands for this new laser technology, but would be located in a previously disturbed area on HELSTF.

New sewage lagoons with perimeter fencing would be constructed, replacing existing lagoons. The proposed sewage lagoons would hold domestic sewage and sometimes receive non-hazardous chiller or process water that would either be sampled prior to putting it in the lagoons or known to be non-hazardous (Reynolds, 2005). No hazardous industrial waste would be placed into the lagoons. Injured birds as in the one past reported case would need assistance for removal. The only other wildlife that could potentially use the new lagoons would be small animals that could get through fencing. Historically there has been no observation by HELSTF personnel of harm to the occasionally observed migratory birds or other wildlife within the fenced area in the vicinity of the existing lagoons. A lagoon design incorporating gentle, roughened slopes or the installation/maintenance of floats that animals could use to climb out of the lagoon has been suggested as a possible measure to minimize the potential for wildlife impacts. Since the lagoon project design is not far enough along to determine cost versus effectiveness of such measures, implementation of the suggestion would be resolved by the decisionmaker. Thus, no adverse impacts to migratory birds or threatened, endangered, or candidate species that could be attracted to the lagoons to drink, rest, or forage are anticipated. Construction and operation of new facilities and the sewage lagoons should have no effect on any critical habitat.

No species that would be particularly sensitive to the construction-generated noise are expected to occur in the affected area. The bighorn sheep located approximately 7 miles west of the proposed construction areas are not likely to be adversely affected by construction noise. An effort would be made to dig trenches in sections so that cable could be buried the same day. Any trapped wildlife would be moved to a safe location away from the construction. All electrical poles would be designed to prevent raptor electrocution using standard techniques provided in White Sands Missile Range Commander's Guidance policy (appendix D), which addresses compliance with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. All wiring would be grounded, and any necessary guywires would be marked for visibility.

### 4.3.3 CUMULATIVE IMPACTS

Impacts from HELSTF testing programs, when added to the impacts described and analyzed in the WSMR Range-Wide EIS and other WSMR environmental documents, include target or target debris impacts; repetitive reentry into debris recovery areas; noise effects of launches and debris recovery equipment; and emissions from missile and laser testing. Cumulative impacts have been identified to biological resources particularly, but not exclusively, associated with debris recovery operations. Several mitigations were proposed in the WSMR Range-Wide EIS to minimize individual project impacts as well as cumulative impacts. Activities are planned to avoid wetlands and adjacent areas when possible. No wetlands are expected to be affected

by the Proposed Action. Surveys are undertaken for threatened and endangered species. A Geographic Information System is used to assist in the selection of preferred and alternative sites that minimize adverse consequences to sensitive resources. Potential adverse impacts to these resources are then reviewed in NEPA documentation tiered to the WSMR Range-Wide EIS. Plant and wildlife surveys have been completed for areas that could potentially be affected by the Proposed Action, and no threatened or endangered species except those described above were identified.

To meet minimum environmental protection requirements under NEPA and the Endangered Species Act, proposed entry routes into debris recovery areas would continue to be selected to minimize the potential for adverse effects. Range Personnel would be instructed concerning the prohibition of taking, collecting, harassing, or otherwise injuring protected species. The debris recovery activities would be coordinated with WSMR and any applicable agencies to avoid or reduce the potential for cumulative impacts.

## 4.4 CULTURAL RESOURCES

Typical HELSTF laser tests consist of guided lasing operations, launch of representative targets, and target payload and debris within designated impact areas. As specified in the HELSTF EA, activities that could result in direct or indirect impacts on cultural resources include: (1) direct impacts due to missile or missile debris that could potentially disturb surface and subsurface remains, resulting in the loss of valuable spatial information; or direct laser impacts either to a cultural resource or resulting in fires; (2) raw missile fuel or fuel fires could contaminate soils, reducing the potential for obtaining accurate radiometric information valuable for determining dates of occupation; (3) debris recovery or firefighting efforts within impact areas could result in ground disturbance that could have the potential for damaging both surface and subsurface cultural remains; (4) construction efforts associated with the modification of existing facilities, or the building of new facilities; or (5) unauthorized removal of cultural artifacts. Effects to cultural resources are generally lessened or prevented by avoidance (travel only on the existing roads). No new target impact areas would be required for HELSTF laser testing.

### 4.4.1 NO-ACTION ALTERNATIVE

Under the No-action Alternative, the same laser test activities that currently occur at HELSTF and that were previously analyzed in the HELSTF EA and the THEL ACTD EA would continue. Any changes to activities at HELSTF since these EAs were published are also addressed. No additional enhanced laser activities would occur at HELSTF.

Continuing activities conducted within HELSTF's fenced boundary are not likely to affect cultural resources, since the area is asphalted or is previously disturbed; moreover, no traditional cultural resources, nor cultural resources that are NRHP-listed or –eligible or listed on New Mexico's State Register of Cultural Properties have been observed at the HELSTF site. Per WSMR's *Integrated Cultural Resources Management Plan,* March 2002, the majority of WSMR's cultural sites are surface sites; disturbed areas are generally considered free of cultural resources. Other onsite activities are not directly involved with the use or production of high-energy laser beams. These activities are not potentially destructive, and may have potential impact on only a limited environment. These activities are strictly controlled, and thus have the lowest level of environmental concern.

Laser activities would continue to take place within a fenced concrete pad area; thus, no adverse effects to cultural resources are expected as a result of laser facility operations.

Current plans indicate the MIRACL testing schedule would maintain the current level of six to eight annual tests. The chances of any impact on cultural resources from MIRACL-related activities would therefore be the same as previously analyzed in the HELSTF EA.

The MTHEL TB (formerly THEL ACTD) has been in operation at HELSTF since 1999. During several tests at WSMR, the system has successfully engaged tactical rockets and artillery projectiles. The energy of the laser causes intense heating of the target, which causes its warhead to explode. The debris from the target falls quickly to the ground. According to the THEL ACTD EA, no adverse impacts to cultural resources have been identified.

Activities involving the LPCL, LDD, and PLVTS are strictly controlled, and have the lowest level of environmental concern; under the No-action Alternative, the chances of any impact on cultural resources would remain minimal.

### 4.4.2 PROPOSED ACTION

Enhanced testing at HELSTF could include one or more of several types of existing experimental and conceptual laser systems. This section will describe these systems and their intended battlefield targets. Proposed laser systems to be tested at HELSTF can be categorized into three basic technologies: solid state lasers, chemical lasers, and FELs. Additionally, target and flight testing in conjunction with laser testing and possible facilities improvements could be performed.

#### 4.4.2.1 Lasers

The SSHCL would be located and fired from Test Cell 4 within the HELSTF fenced boundary. It is expected that the SSHCL would be tested against targets located in Test Cell B, the 500 Meter Site and the 2 Kilometer Site, all located within HELSTF boundaries. These sites are currently in use, with impacts similar to those identified in the HELSTF and THEL EAs. These activities are consistent with those currently being conducted at HELSTF; therefore, impacts to cultural resources would not occur.

Beginning in 2009, some 20 MTHEL mobile prototype tests would be conducted annually. This testing would occur at the HELSTF Limor site, although other sites could potentially be chosen based on the system's testing requirements. Per the THEL EA, the Limor site has previously been surveyed for the presence of cultural resources, and no such sites were located. Therefore, no impacts to cultural resources are expected from the increased testing at the Limor site.

As mentioned previously, neither traditional cultural resources, nor cultural resources that are NRHP-listed or –eligible or listed on New Mexico's State Register of Cultural Properties have been observed within the immediate area of HELSTF facilities.

The MIRACL laser may be used to simulate the ABL before the actual ABL is tested at WSMR. As discussed in the No-action Alternative, no impacts to cultural resources would be anticipated.

No new impacts are anticipated from low-power testing of the ATL at HELSTF as potential targets (e.g., vehicles and simulated communications towers) would be located on or near roads within existing HELSTF test areas.

Other carbon dioxide lasers would likely use the same facilities, and have the same impacts, as the PLVTS (previously analyzed in the HELSTF EA and currently being tested at HELSTF) and thus have similar testing frequencies. No impacts on cultural resources would occur.

#### 4.4.2.2 Targets and Flight Testing

In most cases, HELSTF-related target launch sites are located on already established and utilized areas as described in the 1998 WSMR Range-Wide EIS, the 1998 THEL ACTD EA, and the 1998 HELSTF EA. Since neither construction nor ground disturbance would be required for existing launch sites, no cultural resources surveys are required. Targets and flight testing would produce no impacts on cultural resources.

Any new launch areas utilized in laser operations and testing activities may require a survey for cultural resources. Some launches would occur from launch vehicles parked on existing dirt roads and trails. Launches from this type of site would require an Explosive Launch Permit from the WSMR Environmental Office. Appropriate archaeological surveys would be conducted prior to the issuance of the Explosive Launch Permit.

Successful flight testing would result in targets falling into designated debris impact areas. However, the very nature of flight testing makes the exact impact point difficult to predict accurately, and there is a remote possibility that missile debris could land on a cultural resource. Although the probability of debris striking the ground where surface or subsurface cultural resources are located is extremely remote, an archaeological monitor would be included on the debris recovery team to assist in the selection of an entry path, ensure that no inadvertent impacts arise from the recovery of missile debris, and that any cultural resources are avoided. A single access road to each recovery site would be marked, rubber-tired vehicles would be used to locate the debris, and impact sites would be entered and exited in single file. All actual retrieval would be routine. Off-road travel during debris recovery would be kept to a minimum.

For some laser tests involving longer-range artillery rocket targets, launches from Fort Bliss's Doña Ana Range would be required. Launches of large artillery rockets were previously analyzed in the *Fort Bliss Texas and New Mexico, Mission and Master Plan Programmatic EIS,* December, 2000. Only established launch points would be used at Fort Bliss.

Should avoidance measures fail and an inert missile directly impacts an archaeological site, the missile would likely be left in place to avoid the ground disturbance impacts associated with debris recovery. This would be determined through consultation with the New Mexico State Historic Preservation Office. As discussed in section 3.4, previous cultural surveys within the immediate HELSTF area revealed no cultural resources present and there are no Natural Historic Landmarks, National Natural Landmarks, or National or State Register-listed or –eligible cultural properties within the ROI. A live missile could impact an archaeological site and cause

serious adverse effects, but given the scarcity of known sites in the immediate area, and the unlikely event of an errant missile striking an unknown cultural resource, the possibility is considered extremely remote. However, if such an event occurred, a damage assessment would be conducted and coordinated with the New Mexico State Historic Preservation Office.

#### 4.4.2.3 Facility Improvements

As stated, certain improvements or amendments to HELSTF infrastructure would potentially be required to enhance current activities or to facilitate new activities. The FEL's higher power requirements could require the construction of a new substation, if the current proves inadequate, as well as a potential new building for the laser. Additionally, new sewage lagoons with perimeter fencing would be constructed, replacing existing lagoons.

In the event of any new ground disturbance, a cultural resources survey could be required. However, that event is unlikely, as construction of the FEL building, substation, and new sewage lagoons would take place within previously disturbed areas. Therefore, no impacts to cultural resources are anticipated.

### 4.4.3 CUMULATIVE IMPACTS

Cultural Resource impacts from HELSTF Enhanced Laser and Ranger Operations testing programs, when added to the impacts described and analyzed in the HELSTF EA and the THEL ACTD EA, include missile or missile debris impacts; repetitive use of entryways into missile- or missile debris recovery areas; compaction and surface pressure from the recovery team and equipment affecting fragile resources (for example, ceramics); and unauthorized artifact collection. Cumulatively these types of impacts have the potential to adversely affect cultural resources; however, following the current standard operating procedures, the potential for cumulative impacts would be reduced.

To meet minimum environmental protection requirements under NEPA and related cultural resources legislation, proposed entry routes into debris recovery areas would continue to be selected to minimize the potential for adverse effects. Range personnel would be instructed concerning the prohibition of collecting (pothunting) or otherwise damaging cultural resources. Debris recovery activities would be coordinated with WSMR and any applicable agencies to avoid or reduce the potential for cumulative impacts.

## 4.5 HAZARDOUS MATERIALS AND HAZARDOUS WASTE

This section addresses potential environmental impacts caused by changes to the hazardous materials and hazardous waste environment due to the continuing No-action Alternative or the Proposed Action.

### 4.5.1 NO-ACTION ALTERNATIVE

Potential impacts from the No-action Alternative consist of effects that could occur as a result of current levels of HELSTF program activities. These current activities occur within HELSTF's fenced boundary or nearby on WSMR land supported from HELSTF. These activities are

directly involved with the use or production of a high energy laser beam. The impacts of these activities were analyzed in the HELSTF EA and THEL ACTD EA (U.S. Army Space and Missile Defense Command, 1998a; b) and are summarized below. Any changes to activities to HELSTF since the 1998 EAs were published are also addressed.

HELSTF approved a Hazardous Material Management Policy (U.S. Army Space and Missile Defense Command, 2003b), which details the responsibility of every individual, including the HELSTF Director, the HELSTF Environmental and Safety Manager, HELSTF individuals, and contractors. The Hazardous Material Management Policy has requirements for issuing, controlling, storing, and disposing of hazardous material. As an enhancement to the Hazardous Material Management Policy, HELSTF would occasionally evaluate the existing industrial processes and systems to reduce the existing hazardous materials that are used in an effort to avoid, reduce, mitigate, or eliminate the use of hazardous material and the generation of solid or hazardous waste.

Table 4-3 lists the hazardous materials used by MIRACL, LDD, PLVTS, LPCL, and MTHEL TB.

**Table 4-3: Hazardous Material Used by Laser**

| Laser | Hazardous Material | Average Amount Used Per Run (pounds) |
|---|---|---|
| MIRACL | Deuterium | 35 |
| | Fluorine | 1 |
| | Ethylene | 10 |
| | Nitrogen trifluoride | 840 |
| LDD | Deuterium | 0.036 per second |
| | Ethylene | 0.017 per second |
| | Fluorine | 0.19 per second |
| PLVTS | None | None |
| LPCL | Deuterium | 1.8 |
| | Sulfur hexafluoride | 130 |
| | Oxygen | 25 |
| MTHEL TB | Deuterium | 200 |
| | Ethylene | 550 |
| | Nitrogen trifluoride | 4,100 |
| | 71 to 85 percent hydrogen peroxide | 20,000 |

Source: U.S. Army Space and Missile Defense Command, 1998a;b

Appendix A of the Integrated Contingency Plan, the Hazardous Chemical Spill/Release Response Plan, details responsibility, outlines personnel duties, and provides resources and guidelines for use in control, clean-up, and emergency response for any spills of hazardous materials or wastes at HELSTF. (U.S. Army Space and Missile Defense Command, 2003c)

All routine hazardous wastes generated at HELSTF are managed in temporary less than 90-day accumulation sites. Each site is emptied weekly by the HELSTF Hazardous Waste Contractor, and the waste is transferred to hazardous waste management facilities at WSMR. Non-routine and large quantity one-time wastes are managed as needed by the hazardous waste contractor. No long term storage of hazardous waste occurs at HELSTF. (Reynolds, 2004)

The primary byproduct of environmental concern produced by the MIRACL is DF, which is chemically equivalent to HF. The DF, which is gaseous, makes up a part of the MIRACL exhaust. The exhaust is chemically scrubbed to remove the hazardous nature of the fluoride. Accumulated after each run is sodium fluoride, consisting of approximately 1 percent sodium hydroxide, which is corrosive. The system is designed for no less than 85 percent of the DF to be removed from the exhaust by the scrubber (U.S. Department of the Army, 1995). However, emission testing has not previously detected DF in the exhaust following scrubbing.

The resulting sodium fluoride solution is accumulated onsite in a tank that circulates the solution repeatedly until disposal is required. The sodium fluoride solution is disposed of in two ways. The method currently used due to a tank maintenance problem is to accumulate the sodium fluoride solution along with the sodium hydroxide and have it transported and disposed of by a licensed hazardous waste handler. Disposal occurs after every six to eight lasing events and includes approximately 20,000 gallons of untreated DF solution.

The previously used method is to treat the solution with lime to generate a non-hazardous solid waste, a calcium fluoride sludge commonly known as fluorspar. Thus, the potentially hazardous fluorine from the DF is chemically transformed into a non-hazardous form. Approximately 1,390 pounds of fluorspar sludge are produced for every MIRACL run. The fluorspar-water mixture is discharged into an open concrete bed, where the fluorspar settles to the bottom and the water evaporates. Fluorspar is disposed of, as necessary, through WSMR, using established WSMR solid waste management procedures.

The test bed version of the MTHEL would continue to produce similar hazardous materials and hazardous waste as analyzed in the THEL ACTD EA. These are similar to the MIRACL with the exception of a hydrogen peroxide feed system and the use of hydrogen instead of fluorine. The hydrogen peroxide system would continue to require the use of a 71- to 73-percent hydrogen peroxide solution, pressurized nitrogen, and pressurized helium. Handling, storage, and use of these hazardous materials would continue to be done in accordance with the existing MTHEL Hydrogen Peroxide Management Plan and MTHEL Test Bed Laser Subsystem Hydrogen Peroxide Transfer Procedure.

In addition, the residual, off-specification and decomposing hydrogen peroxide used for the test bed version of the MTHEL must be safe for handling, transfer or disposal. This hydrogen peroxide must be reduced (by a concentration of dilution or normal decomposition) to less than 5 percent concentration by weight prior to transfer out or before additional hydrogen peroxide can be added to the run tank. This reduction of hydrogen peroxide concentration is performed to ensure that the process continues to operate without generating a hazardous waste. (Northrop Grumman Space Technology, 2002)

Operation of the LPCL would continue as previously analyzed, and would not impact the use, storage, transportation, or disposal of hazardous materials at HELSTF. However, the emission

scrubber system of the LPCL has been changed and improved since the 1998 HELSTF EA. The new system allows the HF to be collected and sent to a temporary less than 90-day accumulation site for proper disposal.

The chemicals previously analyzed for the LDD—helium, nitrogen, ethylene, deuterium, and fluorine—would continue to be used at HELSTF. Hydrogen has been added as part of the new HF optics; it is anticipated this will not significantly increase the hazardous material levels at HELSTF. Currently the LDD is not in use. If the LDD is not reactivated, there would be a decrease in the amount of hazardous materials used. In the event the LDD is reactivated, new emission scrubbers would be installed. The LDD could potentially return to its previous capacity. In the event the LDD is updated and put back into use, hazardous wastes would be as previously analyzed and would not impact the levels of hazardous wastes produced by HELSTF.

Operation of the PLVTS would continue as described previously with the exception of the Pulse-Forming Network. Previously, the excess or contaminated Pulse Forming Network oil and minerals were disposed of through the HELSTF hazardous waste collection and disposal system. Currently a coalescing filter separates the oil and the oil is reused; therefore, there is a minor decrease in hazardous waste generated. Operation of the PLVTS would not impact the use, storage, transportation, or disposal of hazardous materials at HELSTF.

Current operation of the APT requires the use of aircraft hydraulic fluid. The hydraulic fluid is continually cleaned and cooled as it circulates through the system. Only during maintenance procedures does any of the hydraulic fluid escape and require cleanup with paper towels. These towels are disposed of through the HELSTF hazardous waste collection/disposal. Previously, analysis determined that operation of the APT would not impact the use, storage, transportation, or disposal of hazardous materials at HELSTF.

The HELSTF Chemistry Laboratory performs quality control analysis of the fluids used at HELSTF as well as a wide variety of analyses in support of test operations, customer requests, and environmental and safety tasks. Previous analysis in the HELSTF EA and the THEL ACTD EA determined the activities at the Chemistry Laboratory would not increase the hazardous materials used or hazardous waste produced at HELSTF.

Hazardous materials typically used for HELSTF support activities (as listed in section 2.1.14) would include solvents, paints, lubricants, oils, and similar materials. Handling, storage, and use of these materials would continue to be done in accordance with the existing HELSTF Hazardous Material Management Policy, and any generation of hazardous waste would handled in compliance with the HELSTF Hazardous Waste Management Plan.

### 4.5.2 PROPOSED ACTION

The Proposed Action Alternative includes the use of solid state lasers, chemical lasers, and FEL, as well as additional targets and flight testing in conjunction with laser testing, and possible facility improvements.

#### 4.5.2.1 Lasers

The SSHCL would require lithium ion batteries to be powered. It is not anticipated that these batteries would be replaced once brought to HELSTF; however, in the event that the lithium ion batteries would require disposal, they would be managed as needed by the hazardous waste contractor at HELSTF. Other hazardous materials or hazardous waste is not anticipated.

The use of a mobile prototype MTHEL would include the use of the following hazardous materials: ethylene, nitrogen trifluoride, deuterium, helium, liquid oxygen, and JP-8 fuel. It is anticipated that the levels of these materials used would be similar to the previously described MTHEL TB and would not significantly increase the hazardous material levels at HELSTF. The MTHEL mobile prototype would also produce hazardous waste if a scrubber is used to clean potential emissions. The levels of hazardous wastes anticipated would also be similar to those of the MTHEL TB and would be handled in accordance with guidelines set in the HELSTF Hazardous Waste Management Plan.

The MIRACL laser may be used to simulate the ABL before the actual ABL is tested at HELSTF. Operation of the MIRACL would be at different wavelengths; however, this would not change current hazardous material use or production of hazardous waste. The MIRACL laser could also be used to simulate ATL testing. The change in wavelengths for this testing would require the conversion of HF to DF. Although this is not a minor conversion, it is anticipated that hazardous materials and hazardous waste would be similar to levels currently produced by the MIRACL and would not significantly impact hazardous material and hazardous waste levels at HELSTF.

Other high powered carbon dioxide lasers similar to the existing PLVTS could also be tested at HELSTF. It is anticipated that they would use the PLVTS facilities, have similar testing frequencies, and similar levels of hazardous materials and hazardous waste. As addressed in the PLVTS discussion, these levels are not anticipated to affect hazardous material and hazardous waste levels at HELSTF.

A FEL could be considered for use as a test device at HELSTF; however, this is only practicable in the long term and only if FEL technology advances allow reliable operation of high-power devices well in excess of 100 kW. Hazardous material and hazardous waste levels are anticipated to be minimal as the FEL is an electric discharge laser.

#### 4.5.2.2 Targets and Flight Testing

In addition to laser activities, the assembly and flight testing of targets has the potential to involve hazardous materials and to generate hazardous waste. Any potential effects would be minimized by following appropriate standard operating procedures and regulations, including the HELSTF Hazardous Material Management Policy, Hazardous Chemical Spill/Release Response Plan, and Hazardous Material Management Policy, as well as WSMR hazardous material and hazardous waste management procedures. In addition, previous analysis in the HELSTF EA and the THEL ACTD EA determined that target and flight testing would not impact hazardous material and hazardous waste levels at HELSTF or WSMR.

#### 4.5.2.3 Facility Improvements

The current cooling system used for the MIRACL is an 11,000-gallon closed-loop system. The system is monitored and additional water and/or corrosion inhibitors are added as needed. Current planning includes the possible replacement of the cooling system with a system not using chromates. This replacement, if it occurs, would require the disposal of the chromates.

Some infrastructure improvements at HELSTF would potentially be required for some new activities, or existing facilities would potentially be improved to enhance current activities. Included in these improvements could be a test facility for the proposed FEL, along with an additional electrical substation to accommodate increased power demands for this new laser technology. Additionally, new sewage lagoons with perimeter fencing would be constructed, replacing existing lagoons. Any hazardous materials used for or hazardous waste generated by construction for facility improvements would be handled in compliance with HELSTF and WSMR standard operating procedures.

### 4.5.3 CUMULATIVE IMPACTS

Any increase in hazardous materials and hazardous waste at HELSTF from the No-action Alternative or the Proposed Action would not be expected to cause cumulative impacts to hazardous material or hazardous waste management. Management practices are implemented during all phases of operation. Through this approach, hazardous materials or hazardous waste impacts would be avoided, minimizing the potential for cumulative impacts.

## 4.6 HEALTH AND SAFETY

This section describes the potential impacts of the No-action Alternative and the Proposed Action Alternative to worker and public safety.

### 4.6.1 NO-ACTION ALTERNATIVE

Potential impacts from the No-action Alternative consist of effects that could occur as a result of current levels of HELSTF program activities. These current activities occur within HELSTF's fenced boundary or nearby on WSMR land supported from HELSTF. These activities are directly involved with the use or production of a high energy laser beam. The impacts of these activities were analyzed in the HELSTF EA and THEL ACTD EA (U.S. Army Space and Missile Defense Command, 1998a; b) and are summarized below. Any changes to activities to HELSTF since the 1998 EAs were published are also addressed.

HELSTF utilizes several safety systems, security systems, and procedures to ensure the protection of personnel, public, and equipment during preparation for and conducting of all laser testing. Included in these features are hardwire abort systems, fire protection, Hazardous Atmosphere Monitor and Detection System, dedicated safety intercom net, and medical support.

The hardwire abort system includes over 200 software, hardware, and man-in-the-loop aborts, including a built in automatic abort system and manual aborts. The fire protection system at HELSTF includes sprinkler and water deluge systems, Halon 1301 fire suppression systems,

fire hoses, and extinguisher stations. WSMR also provides fire protection support through constant protection and remote monitoring of HELSTF fire alarms. The Hazardous Atmosphere Monitor and Detection System has the ability to purge toxic gases from selected areas exposed to leaks. This system continuously operates for the detection of toxic, flammable, or asphyxiating gases. The dedicated safety intercom net notifies HELSTF personnel before the start of any hazardous activity and in the event of an emergency. Medical support at HELSTF includes the HELSTF fire department's emergency medical technician and a fully equipped ambulance.

The *HELSTF Safety Standard Operating Procedures and Laser Safety Information* consolidates the standard operating procedures for all lasers at HELSTF. It provides for evacuation of personnel, surveillance of laser beam path, fluorine handling procedures, restrictive signage, establishment of safety zones, personnel protection from intermediate power laser radiation, control of low power laser radiation, and evacuation of non-mission essential persons prior to lasing activities. The standard operating procedures are updated annually or as needed for new and updated operations. In addition, a full time Safety Officer is onsite at HELSTF to oversee all hazardous fluid transfers and laser testing.

To further reduce impacts to health and safety, HELSTF Environmental and Safety Orientation training is provided annually to all HELSTF employees. Included in the Environmental and Safety training are an environmental and an asbestos awareness component. Further training is provided for handling and packaging of hazardous wastes at temporary less than 90-day accumulation sites and for the HELSTF Emergency Response Team.

Typically tests conducted at HELSTF are also approved by WSMR Flight Safety. Approval is based on analysis of all hazards and the information submitted according to the *Range Users Handbook* and WSMR regulations concerning laser beam and flight safety.

Specific standard operating procedures associated with the No-action Alternative include the requirement of WSMR firefighters and equipment to be onsite during MIRACL lasing activities and the continued measurement by the WSMR Radiation Protection Office of x-ray radiation emitted by the PLVTS.

### 4.6.2 PROPOSED ACTION

The Proposed Action Alternative includes the use of solid state lasers, chemical lasers, and FEL, as well as additional targets and flight testing in conjunction with laser testing, and possible facility improvements.

#### 4.6.2.1 Lasers

Health and safety concerns associated with laser operation and activities of the Proposed Action are anticipated to be similar to those of the No-action Alternative. Similar standard operating procedures would be developed for each proposed laser and included in the *HELSTF Safety Standard Operating Procedures and Laser Safety Information.*

Specific health and safety concerns include MTHEL activities, operational communication towers as targets for the ATL, and operation of a FEL. Due to fluorine emission, a stand-off

distance would be required during operation of the proposed mobile prototype MTHEL; this would be addressed through standard operating procedures that would minimize any impact to the health and safety of the public and workers.

Potential targets for the ATL would include operational communications towers on or near roads in existing HELSTF test areas. It is anticipated that these towers could emit EMR to ensure realistic testing. EMR is a potential hazard to humans and a potential source of interference with other communications and sensing equipment. While specific levels of EMR are not known, implementation of operational safety procedures, including establishment of controlled areas, would preclude any potential safety hazard to either the public or workforce exposure.

A FEL is expected to generate x-ray radiation hazards (Stanford University, 1990) significant enough to require protection, including lead shielding in buildings. However, these concerns would be expected to be addressed through standard operating procedures that would minimize any impact to the health and safety of the public and workers.

#### 4.6.2.2 Targets and Flight Testing

In addition to laser operation, target flight testing has the potential to affect the health and safety of personnel and the public. Any potential effects would be minimized by following appropriate standard operating procedures and regulations and establishing appropriate on-base roadblocks prior to lasing activities.

Personnel located inside any launch hazard area would be limited to those considered mission essential; such personnel would remain within facilities rated to provide adequate blast and debris protection and to which communications would be maintained at all times. All nonessential personnel would be evacuated. The implementation of such safety practices would limit the number of personnel exposed to increased hazards and, as a result, no health and safety impacts are expected.

Debris recovery would be conducted in accordance with WSMR Regulation 70-8, *Security, Recovery, and Disposition of Classified and Unclassified Test Material Impacting On-Range and Off-Range*, and would pose no impact on health and safety.

#### 4.6.2.3 Facility Improvements

Some infrastructure improvements at HELSTF would potentially be required for some new activities, or existing facilities would potentially be improved to enhance current activities. Included in these improvements could be a test facility for the proposed FEL, along with an additional electrical substation to accommodate increased power demands for this new laser technology. Additionally, new sewage lagoons with perimeter fencing would be constructed, replacing existing lagoons. It is anticipated that any construction activity would be done in accordance with all HELSTF and WSMR regulations and would not pose an impact to the health and safety of personnel or the public.

### 4.6.3 CUMULATIVE IMPACTS

No cumulative impacts are anticipated because appropriate standard operating procedures would be followed for each lasing operation and in accordance with HELSTF, WSMR, and other applicable regulations in such a manner as to minimize potential impacts. However, if necessary, radiation would be measured and monitored by the WSMR Radiation Protection Office during FEL operations to reduce any or all impacts to personnel or the public.

## 4.7 INFRASTRUCTURE AND TRANSPORTATION

Typical HELSTF laser tests consist of guided lasing operations, launch of representative targets, and target payload and debris within designated impact areas.

### 4.7.1 NO-ACTION ALTERNATIVE

Under the No-action Alternative, the current levels of activity within the HELSTF ROI would be maintained. Infrastructure and transportation demands would remain at current levels, as would the requirement for periodic routine maintenance and repair. Infrastructure and transportation resources exceed current needs. As such, they can readily support the No-action Alternative with no additional impacts.

The same laser test activities that currently occur at HELSTF and that were previously analyzed in the 1998 HELSTF EA, and the 1998 THEL ACTD EA, would continue. No additional enhanced laser activities would occur at HELSTF. Continuing activities conducted within HELSTF's fenced boundary are not likely to affect infrastructure and transportation capacities.

Under the No-action alternative, current laser operation and testing activities would continue to require the movement of personnel outside and within WSMR. Test-related road closures, a common procedure, would continue as required.

### 4.7.2 PROPOSED ACTION

Enhanced testing at HELSTF could include one or more of several types of existing experimental and conceptual laser systems. Proposed laser systems to be tested at HELSTF can be categorized into three basic technologies: solid state lasers, chemical lasers, and FELs. Additionally, target and flight testing in conjunction with laser testing and possible facilities improvements could be performed.

The Proposed Action would be compatible with ongoing test programs and procedures at HELSTF. No adverse impacts on infrastructure or transportation within the HELSTF ROI are expected to occur as a result of the Proposed Action.

#### 4.7.2.1 Lasers

**Electricity**

Depending on the laser involved, laser operation and testing activities would have minimal or no requirement for electrical power. Many lasers are dependent on self-contained generator, gas, or rechargeable battery power. Transformers at HELSTF are operating below capacity, and it is anticipated that a project-related increase in current electricity demand would be met without overloading current resources (Reynolds, 2004c). The possible exception is in the case of the FEL, as discussed below.

Power needs for the 10-kW flash-lamp pumped SSHCL would be provided by standard commercial electric power already available in Test Cell 4. A 25-kW diode-pumped SSHCL module and a 100-kW diode-pumped SSHCL could possibly be developed and tested as part of a sequence of SSHCL development and would be onsite at HELSTF by 2006. The 100-kW diode pumped system would be integrated with a more robust beam director to perform dynamic, full range testing, but would be tested in the same facility as the 10-kW laser. The 25-kW and the 100-kW would be fired from lithium ion batteries, which would be recharged with commercial power. Although increased usage would cause a minimal demand for diesel fuel for the SSHCL's generator, the need for additional batteries should have no impact on current power levels.

Approximately 20 MTHEL tests would be conducted per year, starting in 2009. Testing would occur at the HELSTF Limor site.

The MIRACL laser may be used to simulate ABL and ATL performance before the actual testing at WSMR.

High-power carbon dioxide lasers have low electricity (power) requirements, and predominately utilize gases (helium, oxygen, and carbon dioxide). As with the PLVTS, no impacts on electricity usage levels or capacity are anticipated.

As discussed in section 4.7.2.3, higher power requirements for the FEL could require the construction of a new substation, if current facilities were to prove inadequate.

**Water**

Due to increased personnel and activity levels, annual water usage would increase, but this usage would not stress the aquifer or overload the HELSTF infrastructure. The current resources are sufficient to meet the demands of the Proposed Action. Laser operation and testing activities would have little or no impact on current potable water levels or capacity.

**Wastewater**

Laser operation and testing activities would produce a very small increase in wastewater. Wastewater treatment facilities are currently operating at less than capacity; the sanitary system is designed to handle personnel totaling 250 and currently, personnel total between 100-150 (Reynolds, 2004a). Additional wastewater generated as a result of the anticipated increase in personnel would be negligible. Total wastewater discharges would be minimal and would not change the character and location of the HELSTF discharge.

**Solid Waste**

Additional demands on solid waste disposal resulting from the anticipated personnel increase at HELSTF would be negligible. Existing facilities are sufficient to handle any increased service demands. Existing facilities are sufficient to handle any increased service demands. All solid waste disposal is coordinated with WSMR proper. In the event of a temporary increase in waste levels, the vendor is scheduled for an additional pickup (Reynolds, 2004). No impacts are anticipated.

**Transportation**

Laser operation and testing activities would require the movement of personnel outside and within WSMR/HELSTF. The scale of laser operation and testing activities is relatively small, and would be largely contained within HELSTF boundaries; therefore, such activities would have little or no impact on existing low-usage range roads, either within or outside WSMR.

### 4.7.2.2 Targets and Flight Testing

In the event that test activities cause damage to commercial and/or WSMR power lines, repairs would be funded by the test program. Additional demands on the HELSTF electrical system by targets and flight testing activities, many of which utilize rechargeable batteries or self-contained generators, would be relatively low and could easily be accommodated by the existing electrical generation facilities, with no impacts on power resources. No impacts to electricity levels, capacity, or capability are expected (Reynolds, 2004c).

Due to increased personnel and activity levels, water usage, and wastewater and solid waste production would increase slightly, but these levels would not overload the HELSTF infrastructure. The current resources are sufficient to meet the demands of targets and flight testing activities. Targets and flight testing activities, therefore, would have little or no impact on current water, wastewater, or solid waste handling capacity or levels.

Targets and flight testing activities would require the movement of personnel outside and within WSMR. Thus the Proposed Action would cause a slight increase in traffic levels on WSMR range roads. These roads have restricted access and current traffic levels are low. Transient personnel attending the Proposed Action would add very little to these current traffic volumes. There would be little or no impact on existing roads, either within or outside WSMR.

### 4.7.2.3 Facility Improvements

Certain infrastructure improvements at HELSTF would potentially be required for some new activities, or existing facilities would potentially be improved to enhance current activities. For example, the FEL's higher power requirements could require the construction of a new substation, if current facilities prove inadequate. While construction would result in an increase in demand placed on HELSTF infrastructure, the limited duration of construction would produce no lasting effect; in addition, such construction would increase the capacity of available electric distribution within the area.

An associated FEL building, if required, would be connected with HELSTF's established power, water, and wastewater lines. Any new power lines at WSMR are subject to updated guidelines

for the protection of birds of prey from injury and death from electrocution. The addition of a new substation would have a positive impact on electrical capacity at HELSTF.

Additionally, new sewage lagoons with perimeter fencing would be constructed, replacing existing lagoons. It is anticipated that the capacity of the proposed lagoons will not exceed the combined current wastewater demands (Reynolds, 2004b). Potential impacts to current water, water, or solid waste handling capacity would not be expected. Due to increased personnel utilized for facility improvements, water usage, wastewater and solid waste production would likely increase slightly, but these levels would not overload the HELSTF infrastructure. The current resources are sufficient to meet the demands of facilities improvement activities. As referenced in section 4.7.2.1, adequate infrastructure exists for increased personnel levels. Such activities, therefore, would have little or no impact on current water, wastewater, or solid waste handling capacity or levels.

Facility improvements at HELSTF would require the movement of personnel outside and within WSMR. The WSMR road network comprises low-usage range roads. The scale of facility improvement activities is relatively small and would have little or no impact on existing roads, either within or outside WSMR.

### 4.7.3 CUMULATIVE IMPACTS

Proposed activities are compatible with ongoing test programs and procedures at HELSTF. No impacts on infrastructure within the HELSTF ROI are expected to occur as a result. The addition, on a transient basis, of program-specific personnel would make little or no impact on the local community and would increase road traffic minimally, with little or no degradation of roads or increase in travel times.

When added to the existing impacts as described and analyzed in the HELSTF and THEL ACTD EAs, cumulative infrastructure and transportation impacts are anticipated to be minimal or nonexistent.

## 4.8 WATER RESOURCES

Water resources within the ROI could potentially be affected by HELSTF operations, construction activities, accidental spills of hazardous materials, and target impact and debris recovery areas.

### 4.8.1 NO-ACTION ALTERNATIVE

Potential impacts from the No-action Alternative consist of effects that could occur as a result of current levels of HELSTF program activities. These current activities occur within HELSTF's fenced boundary or nearby on WSMR land supported from HELSTF. These activities are directly involved with the use or production of a high energy laser beam. The impacts of these activities were analyzed in the HELSTF EA and THEL ACTD EA (U.S. Army Space and Missile Defense Command, 1998a; b) and are summarized below. Any changes to activities to HELSTF since the 1998 EAs were published are also addressed.

Under the No-action Alternative water usage would not increase at HELSTF. Since it is estimated that each MIRACL test uses approximately 110,000 gallons of water primarily for steam generation, water usage at HELSTF corresponds primarily to the number of MIRACL tests. Based on the total number of laser tests analyzed in the HELSTF EA and THEL ACTD EA, water usage was approximately 17.6 million gallons per year. Under the No-action Alternative, water usage would be expected to remain the same, and therefore water availability or quality are unlikely to be affected.

Potential impacts to surface water and groundwater resulting from accidental spills of hazardous materials during HELSTF operations or target debris recovery would be minimized as activities would follow all standard operating procedures involving spill prevention, control, cleanup, and emergency response measures. Moreover, compliance with the applicable portions of the New Mexico Water Quality Act and the Clean Water Act would protect the quality of surface water and groundwater during HELSTF related activities.

Little if any changes to the surface drainage would occur from debris recovery. Potential target debris would be recovered in accordance with WSMR Regulation 70-8, *Security, Recovery, and Disposition of Classified and Unclassified Test Material Impacting On-Range and Off-Range*. Impacts to the soil from debris recovery or fire containment would be minimized by following various standard operating procedures, which include but are not limited to: using existing roads to the maximum extent possible, traveling single file to the recovery site, restricting recovery efforts in areas with wet or saturated soil, and utilizing an environmental monitor to accompany the recovery team to ensure minimal impact to vegetation.

### 4.8.2 PROPOSED ACTION

The Proposed Action Alternative includes the use of solid state lasers, chemical lasers, and FEL, as well as additional targets and flight testing in conjunction with laser testing, and possible facility improvements.

#### 4.8.2.1 Lasers

Possible impacts exist resulting from the potential overdraft of fresh water aquifers causing declining water tables and degraded water quality. However, based on the anticipated number of tests and minimal water demand by the proposed new laser systems, the total HELSTF usage would not increase under the Proposed Action. Thus, the proposed activities would not be expected to affect water availability or quality. In addition, monitoring of water levels and water quality sampling at the MAR wells would continue and preclude significant effects on the aquifer.

All tests are designed to avoid the only perennial surface water body within the ROI, Lake Lucero. Although a potential impact to water resources could occur in the event of an accidental fuel spill, potential target debris or fluids coming in contact with groundwater resources, fluids would be rapidly buffered by the desert soil minimizing any significant adverse effects. Also, all activities would follow standard operating procedures involving spill prevention, control, cleanup, and emergency response measures. Accordingly, any potential impacts to surface water and groundwater would be significantly minimized or entirely avoided.

#### 4.8.2.2 Targets and Flight Testing

All target impacts and/or debris occurring as a result of laser operations would generally be of nominal concern at WSMR in regard to its potential to adversely affect a water resource. Potential target debris would be recovered in accordance with WSMR Regulation 70-8, *Security, Recovery, and Disposition of Classified and Unclassified Test Material Impacting On and Off Range*. In addition, impacts to water resources from debris recovery efforts or fire containment would be minimized by following standard operating procedures.

#### 4.8.2.3 Facility Improvements

All construction activities would utilize standard operating procedures to curtail any potential dust generation and erosion during construction. For dust suppression and site preparation, only minimal water requirements would be necessary. Water provisions would be supplied by HELSTF main installation area. No significant impacts to the water supply are expected to be produced as a result of the construction water requirements. In addition, through maintaining effective grading and drainage controls, impacts due to erosion from construction would not occur.

### 4.8.3 CUMULATIVE IMPACTS

The Proposed Action is not expected to combine with related past, ongoing, or reasonably foreseeable actions to cause any substantial cumulative impacts to water resources. While water supply sources are a critical concern throughout the Tularosa Basin and in many areas of WSMR, monitoring of water levels and water quality sampling at the MAR wells would continue and preclude significant effects and prevent any unforeseeable impacts.

## 4.9 CUMULATIVE IMPACTS

The Proposed Action would consist of developing and further enhancing the capability to conduct laser testing at HELSTF through the testing of one or more of the new laser technologies or completion of any of the new range operations described in the Proposed Action section 2.2. Proposed HELSTF activities, in combination with past, current, and foreseeable future activities, such as the Motor Deflagration and Rupture Effects on Payloads Program (MUDPACK), would not be expected to result in cumulative impacts. MUDPACK would use the PLVTS laser or other existing HELSTF laser systems for static testing. A standalone environmental assessment is being prepared to address the MUDPACK activities and is expected to be completed in Spring 2005. Additionally, potential military training exercises could be performed in the vicinity of HELSTF and would require program coordination.

The Proposed Action would not contravene any WSMR permit restrictions or air quality regulatory status. In addition, due to the intervals between discrete testing events, emission products would be dispersed, further minimizing the potential for impacts to air quality, biological resources, and public health and safety. Using the required scheduling process for the use of airspace within the restricted areas would preclude the potential for cumulative impacts to existing airspace users. No significant cumulative impacts to biological resources or cultural resources have been identified as a result of prior or current HELSTF related activities, and no cumulative impacts are expected as a result of the Proposed Action. Any potential increase in

hazardous materials and hazardous waste would not be expected to cause cumulative impacts to hazardous material or hazardous waste management as management practices and procedures are implemented during all phases of operation. Adherence to the high safety standards at HELSTF would serve to keep any cumulative safety impacts attributable to all HELSTF operations within acceptable standards to both workers and the public. Additional demands on electrical, wastewater, solid waste, and water systems to support program specific personnel are expected to be within the current infrastructure capacity of HELSTF. Adherence to established hazardous waste and spill prevention procedures and both monitoring of water levels and water quality sampling of the MAR wells would preclude the potential for cumulative impacts to water resources.

## 4.10 ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

Adverse environmental effects that cannot be avoided include the release of small amounts of pollutants into the atmosphere; minor noise impacts on wildlife; short-term impact to vegetation; minor increased generation of hazardous materials; and increased noise levels at program-related sites. However, through implementation of the program actions described within this document, these effects would be minimized. Overall, no significant individual or cumulative adverse environmental impacts are anticipated to result from the No-action or Proposed Action alternative.

## 4.11 CONFLICTS WITH FEDERAL, STATE, AND LOCAL LAND USE PLANS, POLICIES, AND CONTROLS FOR THE AREA CONCERNED

All of the proposed program activities would take place in existing facilities and at dedicated laser and missile testing locations on DoD installations. These activities would not alter the uses of the sites, which were used in the past or are currently used to support laser and missile testing. No conflicts with land use plans, policies, and controls would be anticipated.

## 4.12 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Anticipated energy requirements of the HELSTF activities would be well within the energy supply capacity of all facilities. Energy requirements would be subject to any established energy conservation practices at each facility.

## 4.13 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

The proposed activities would result in no loss of threatened or endangered species, and no loss of cultural resources such as archaeological or historic sites. Moreover, there would be no changes in land use or preclusion of development of underground resources that were not already precluded.

The amount of materials required for any program-related activities and energy used during the project would be small. Although the proposed activities would result in some irreversible or irretrievable commitment of resources such as various metallic materials, minerals, and labor, this commitment of resources is not significantly different from that necessary for many other defense research and development programs carried out over the past several years. Proposed activities would not commit natural resources in significant quantities.

## 4.14 RELATIONSHIP BETWEEN SHORT-TERM USE OF THE HUMAN ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Proposed HELSTF activities would take advantage of existing facilities and infrastructure. The proposed upgrades to these facilities or locations would not alter the uses of the sites, which were or are to support laser facilities and testing. Therefore, the Proposed Action does not eliminate any options for future use of the environment for the locations under consideration.

## 4.15 NATURAL OR DEPLETABLE RESOURCE REQUIREMENTS AND CONSERVATION POTENTIAL

Other than various structural materials and fuels, the program would require no significant natural or depletable resources.

## 4.16 FEDERAL ACTIONS TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS (EXECUTIVE ORDER 12898)

Proposed activities would be conducted in a manner that would not substantially affect human health and the environment. This EA has identified no effects that would result in disproportionately high or adverse effect on minority or low-income populations in the area. The activities would also be conducted in a manner that would not exclude persons from participating in, deny persons the benefits of, or subject persons to discrimination because of their race, color, national origin, or socioeconomic status.

## 4.17 FEDERAL ACTIONS TO ADDRESS PROTECTION OF CHILDREN FROM ENVIRONMENTAL HEALTH RISKS AND SAFETY RISKS (EXECUTIVE ORDER 13045, AS AMENDED BY EXECUTIVE ORDER 13229)

This EA has not identified any environmental health and safety risks that may disproportionately affect children, in compliance with Executive Order 13045, as amended by Executive Order 13229.

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# 5.0
# REFERENCES

# 5.0 REFERENCES


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# 6.0
# LIST OF PREPARERS

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# 7.0
# AGENCIES AND INDIVIDUALS CONTACTED

# 7.0 AGENCIES AND INDIVIDUALS CONTACTED

Missile Defense Agency

State of New Mexico
- Department of Game and Fish
- Energy, Minerals, and Natural Resources Department
- Environment Department

U.S. Army Air Defense Center and Fort Bliss
- Directorate of Environment

U.S. Army Space and Missile Defense Command
- HELSTF Directorate

U.S. Department of Agriculture
- Forest Service

U.S. Department of the Interior
- Director, Office of Environmental Policy and Compliance

U.S. Fish and Wildlife Service

White Sands Missile Range
- SFIM-SW-WS-EF-C

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# APPENDIX A
# DISTRIBUTION LIST

# APPENDIX A
# DISTRIBUTION LIST

New Mexico Department of Game and Fish
Santa Fe, New Mexico

New Mexico Energy, Minerals, and Natural
Resources Department
Santa Fe, New Mexico

New Mexico Environment Department
Santa Fe, New Mexico

U.S. Army Air Defense Center and Fort Bliss
Directorate of Environment
ATTN: ATZC-DOE-C
Fort Bliss, Texas

U.S. Army Space and Missile Defense Command
HELSTF Directorate, SMDC-AC-H
White Sands Missile Range, New Mexico

U.S. Department of Agriculture, Forest Service
Magdalena, New Mexico

Director, Office of Environmental Policy and Compliance
U.S. Department of the Interior
Washington, D.C.

U.S. Fish and Wildlife Service
Albuquerque, New Mexico

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White Sands Missile Range, New Mexico

Alamogordo Public Library
Alamogordo, New Mexico

Albuquerque Public Library
Albuquerque, New Mexico

Defense Technical Information Center
Fort Belvoir, VA

Thomas Branigan Memorial Library
Las Cruces, New Mexico

# APPENDIX B
# CORRESPONDENCE

**DEPARTMENT OF THE ARMY**
U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO
ATTENTION OF

SMDC-EN-V

17 DEC 2004

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: High Energy Laser Systems Test Facility (HELSTF) Enhanced Laser and Range Operations Environmental Assessment (EA) - Coordinating Draft

1. The U.S. Army Space and Missile Defense Command is preparing an Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality regulations implementing NEPA. This EA is in support of the Enhanced Laser and Range Operations at HELSTF on White Sands Missile Range, NM.

2. The Coordinating Draft EA describes the potential environmental impacts of enhancing the capabilities and the operation of the HELSTF. Enhancement activities would include the testing of one or more of the new laser technologies or completion of one or more new range operations. These laser technologies are from various DoD and civilian agencies. Enhanced testing would begin in the second quarter of fiscal year 2005, and occur concurrent with existing activities. This Coordinating Draft EA is being provided to the state and federal agencies.

3. Please review the enclosed Coordinating Draft EA and provide comments by 28 JAN 05 to:

U.S. Army Space and Missile Defense Command
SMDC-EN-V/Ms. Julia Elliott
P.O. Box 1500, Huntsville, AL 35807-3801
Or by data facsimile: (256) 955-5074

17 DEC 2004

SMDC-EN-V
SUBJECT: High Energy Laser Systems Test Facility (HELSTF) Enhanced Laser and Range Operations Environmental Assessment (EA) - Coordinating Draft

4. If you have any questions or comments, please contact Julia Elliott (256) 955-4822, DSN 645-4822.

Encl

JEFFREY C. SMITH
COL, EN,
Deputy Chief of Staff,
Engineer

DISTRIBUTION:
U.S. Army Space and Missile Defense Command, HELSTF Directorate, Mr. Lionel Brown, U.S. Highway 70, White Sands Missile Range, NM 88002-5148
New Mexico Department of Game and Fish, P.O. Box 25112, Santa Fe, NM 87504
New Mexico Energy, Minerals, and Natural Resources Department, P.O. Box 1948, Santa Fe, NM 87504
New Mexico Environment Department, 2905 Rodeo Park Drive East, Building 1, Santa Fe, NM 87505-6303
U.S. Army Air Defense Center and Fort Bliss, Directorate of Environment, ATZC-DOE-C, Fort Bliss, TX 79916
U.S. Department of Agriculture, Forest Service, Magdalena, Box 45, Magdalena, NM 87825
Office of Environmental Policy and Compliance, U.S. Department of the Interior, Main Interior Building, MS 2342, 1849 C Street, NW, Washington, D.C. 20240
U.S. Fish and Wildlife Service, 2105 Osuna Road NE, Albuquerque, NM 87113
White Sands Missile Range, SFIM-SW-WS-EF-C Building 163, White Sands Missile Range, NM 88002

# United States Department of the Interior

U. S. GEOLOGICAL SURVEY

WATER RESOURCES DISCIPLINE

January 25, 2005

SMDC-EN-V

SMDC-EN-V/Ms. Julia Elliott
U.S. Army Space Missile Defense Command
P.O. Box 1500,
Huntsville, AL 35807-3801

RE: High Energy Laser Systems Test Facility, Enhanced Laser and Range Operations Environmental Assessment

Dear Ms. Elliott,

The U.S. Geological Survey has reviewed the environmental assessment and has no comments.

Sincerely,

Lloyd H. Woosley, Jr., P.E.
Chief, Environmental Affairs Program

Cc: EAP Chron, MS 423
USGS:WRD:LWOOSLEY:bjjohnso:x6832:1/25/05

GOVERNOR
Bill Richardson

# STATE OF NEW MEXICO
# DEPARTMENT OF GAME & FISH

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Bruce C. Thompson

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For basic information or to order free publications: 1-800-862-9310.

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Silver City, NM

Peter Pino
Zia Pueblo, NM

Dr. Tom Arvas
Albuquerque, NM

Leo Sims
Hobbs, NM

January 28, 2005

U.S. Army Space and Missile Defense Command
SMDC-EN-V/ Ms. Julia Elliott
P.O. Box 1500, Huntsville, AL 35807-3801
*

Re: High Energy Laser System Test Facility Enhanced Laser and Range Operations Environmental Assessment
NMGF No. 9797

Dear Ms. Elliott:

In response to your letter dated 17 December 2004 regarding the above referenced project, the Department of Game and Fish (Department) does not anticipate significant impacts to wildlife or sensitive habitats. For your information, we have enclosed a list of sensitive, threatened and endangered species that occur in Otero County.

For more information on listed and other species of concern, contact the following sources:

1. Species Accounts: http://fwie.fw.vt.edu/states/nm.htm
2. Species Searches: http://nmnhp.unm.edu/bisonm/bisonquery.php
3. New Mexico Wildlife of Concern by Counties List: http://www.wildlife.state.nm.us/conservation/share_with_wildlife/documents/speciesofconcern.pdf
4. Habitat Handbook Project Guidelines: http://wildlife.state.nm.us/conservation/habitat_handbook/index.htm
5. For custom, site-specific database searches on plants and wildlife. Go to Data then to Free On-Line Data and follow the directions go to: http://nmnhp.unm.edu
6. New Mexico State Forestry Division (505-827-5830) or http://nmrareplants.unm.edu/index.html for state-listed plants
7. For the most current listing of federally listed species **always** check the U.S. Fish and Wildlife Service at (505-346-2525) or http://ifw2es.fws.gov/EndangeredSpecies/lists/ .

Thank you for the opportunity to review and comment on your project. If you have any questions, please contact Mark Watson, Habitat Specialist of my staff at(505) 476-8115 or <mwatson@state.nm.us>.

Sincerely,

For Janell Ward, Assistant Chief
Conservation Services Division

JW/MLW
xc: Susan MacMullin, New Mexico Ecological Services, USFWS
Southeast Area Operations Chief, NMGF

# New Mexico Species of Concern - Otero County



| Common Name | SCIENTIFIC NAME | FWS. ESA | NM... WCA | FS. R3 | BLM.. NM | NM... Sen | FWS. SOC |
|---|---|---|---|---|---|---|---|
| Rio Grande Cutthroat Trout | Oncorhynchus clarki virginalis | - | - | s | - | s m | s |
| Rio Grande Chub | Gila pandora | - | - | - | - | s | - |
| White Sands Pupfish | Cyprinodon tularosa | g | T | - | - | n | s |
| Sacramento Mountain Salamander | Aneides hardii | - | T | s | s | n | s |
| Northern Leopard Frog | Rana pipiens | - | - | s | - | - | - |
| Bleached Earless Lizard | Holbrookia maculata ruthveni | - | - | - | - | s n | - |
| Texas Horned Lizard | Phrynosoma cornutum | - | - | s | s | - | - |
| White Sands Prairie Lizard | Sceloporus undulatus cowlesi | - | - | - | - | s n | - |
| Little White Whiptail | Cnemidophorus gypsi | - | - | - | - | s n | - |
| Desert Kingsnake | Lampropeltis getula splendida | - | - | s | - | - | - |
| Mottled Rock Rattlesnake | Crotalus lepidus lepidus | - | T | s | - | - | - |
| Brown Pelican | Pelecanus occidentalis carolinensis | E | E | s | - | - | - |
| Neotropic Cormorant | Phalacrocorax brasilianus | - | T | s | - | - | - |
| American Bittern | Botaurus lentiginosus | - | - | s | - | - | - |
| Snowy Egret | Egretta thula brewsteri | - | - | s | - | - | - |
| Black-crowned Night-Heron | Nycticorax nycticorax hoactli | - | - | s | - | - | - |
| White-faced Ibis | Plegadis chihi | - | - | s | s | - | - |
| Osprey | Pandion haliaetus carolinensis | - | - | s | - | - | - |
| Mississippi Kite | Ictinia mississippiensis | - | - | s | - | - | - |
| Bald Eagle | Haliaeetus leucocephalus | AD,T mg | T | s | - | - | - |
| Northern Goshawk | Accipiter gentilis | - | - | s | s | s | s |
| Common Black-Hawk | Buteogallus anthracinus anthracinus | - | T | s | - | - | - |
| Swainson's Hawk | Buteo swainsoni | - | - | s | - | - | - |
| Ferruginous Hawk | Buteo regalis | - | - | s | s | - | - |
| Aplomado Falcon | Falco femoralis septentrionalis | E mg | E | s | - | - | - |
| American Peregrine Falcon | Falco peregrinus anatum | DM m | T | s | - | - | s |
| Sora | Porzana carolina | - | - | s | - | - | - |
| Western Snowy Plover | Charadrius alexandrinus nivosus | - | - | s | - | - | - |
| Mountain Plover | Charadrius montanus | PT | - | s | - | s | - |
| Black-necked Stilt | Himantopus mexicanus | - | - | s | - | - | - |
| Long-billed Curlew | Numenius americanus americanus | - | - | s | - | - | - |
| Interior Least Tern | Sterna antillarum athalassos | E mg | E | s | - | - | - |
| Black Tern | Chlidonias niger surinamensis | - | - | - | s | - | s |
| Common Ground-dove | Columbina passerina pallescens | - | E | s | - | - | - |
| Flammulated Owl | Otus flammeolus | - | - | s | - | - | - |
| Burrowing Owl | Athene cunicularia hypugaea | - | - | - | s | - | s |
| Mexican Spotted Owl | Strix occidentalis lucida | T hmg | - | s | - | s | - |
| Elegant Trogon | Trogon elegans canescens | - | E | s | - | - | - |
| Belted Kingfisher | Ceryle alcyon | - | - | s | - | - | - |
| Southwestern Willow Flycatcher | Empidonax traillii extimus | E h | E | s | - | - | - |
| Loggerhead Shrike | Lanius ludovicianus | - | - | - | s | s | - |
| Bell's Vireo | Vireo bellii | - | T | s | - | - | s |
| Gray Vireo | Vireo vicinior | - | T | s | - | - | - |
| Gray Catbird | Dumetella carolinensis ruficrissa | - | - | s | - | - | - |
| American Redstart | Setophaga ruticilla tricolora | - | - | s | - | - | - |
| Baird's Sparrow | Ammodramus bairdii | - | T | s | s | - | s |
| Sprague's Pipit (no data) | Anthus spragueii | - | - | s | - | - | - |
| Varied Bunting | Passerina versicolor | - | T | s | - | - | - |
| Western Small-footed Myotis Bat | Myotis ciliolabrum melanorhinus | - | - | - | s | s | - |
| Occult Little Brown Myotis Bat | Myotis lucifugus occultus | - | - | s | s | s | - |

# New Mexico Species of Concern - Otero County



| Common Name | SCIENTIFIC NAME | FWS.. ESA | NM... WCA | FS. R3 | BLM.. NM | NM... Sen | FWS. SOC |
|---|---|---|---|---|---|---|---|
| Cave Myotis Bat | Myotis velifer | - | - | s | s | s | - |
| Long-legged Myotis Bat | Myotis volans interior | - | - | - | s | s | - |
| Fringed Myotis Bat | Myotis thysanodes thysanodes | - | - | - | s | s | - |
| Spotted Bat | Euderma maculatum | - | T | s | s | - | - |
| Pale Townsend's Big-eared Bat | Plecotus townsendii pallescens | - | - | s | s | s | s |
| Big Free-tailed Bat | Nyctinomops macrotis | - | - | - | s | s | - |
| Penasco Least Chipmunk | Tamias minimus atristriatus | - | E | s | - | n | s |
| Gray-footed Chipmunk | Tamias canipes canipes | - | - | - | s | - | - |
| Gray-footed Chipmunk | Tamias canipes sacramentoensis | - | - | - | s | s n | - |
| Rock Squirrel | Spermophilus variegatus tularosae | - | - | - | - | s n | - |
| AZ Black-tailed Prairie Dog | Cynomys ludovicianus arizonensis | C m | - | s | s | s | - |
| Guadalupe Pocket Gopher | Thomomys bottae guadalupensis | - | - | s | s | s | s |
| Botta's Pocket Gopher | Thomomys bottae tularosae | - | - | - | - | s n | - |
| Desert Pocket Gopher | Geomys arenarius arenarius | - | - | - | s | - | s |
| Desert Pocket Gopher | Geomys arenarius brevirostris | - | - | - | - | s n | - |
| Plains Pocket Mouse | Perognathus flavescens gypsi | - | - | - | - | s n | - |
| Rock Pocket Mouse | Chaetodipus intermedius ater | - | - | - | - | s n | - |
| New Mexican Jumping Mouse | Zapus hudsonius luteus | - | T | s | s | - | s |
| Ringtail | Bassariscus astutus | - | - | s | - | s | - |
| Western Spotted Skunk | Spilogale gracilis | - | - | - | - | s | - |
| Common Hog-nosed Skunk | Conepatus mesoleucus | - | - | - | - | s | - |
| Socorro Mountainsnail | Oreohelix neomexicana | - | - | - | - | s n | - |
| Woodlandsnail | Ashmunella amblya cornudasensis | - | - | - | s | n | - |
| Cloudcroft Checkerspot Butterfly | Occidryas anicia cloudcrofti | PE | - | - | - | s n | - |

NATIVE SPECIES APPARENTLY NO LONGER OCCURRING IN OTERO COUNTY

| | | |
|---|---|---|
| Mexican Gray Wolf | Canis lupus baileyi | |
| Grizzly Bear | Ursus arctos | (extirpated from NM) |
| Jaguar | Panthera onca arizonensis | |
| Merriam's Elk | Cervus elaphus merriami | (extinct) |
| Desert Bighorn Sheep | Ovis canadensis mexicana | |

# United States Department of the Interior

FISH AND WILDLIFE SERVICE

P.O. Box 1306
Albuquerque, New Mexico 87103
http://ifw2es.fws.gov

In Reply Refer To:
R2/ES-HC/EC
CL 1-17

JAN 3 1 2005

Ms. Julia Elliott
U.S. Army Space and Missile Defense Command
SMDC-EN-V
P.O. Box 1500
Huntsville, Alabama 35807-3801

Dear Ms. Elliott:

The U.S. Fish and Wildlife Service (Service) has reviewed the Draft Environmental Assessment (EA) for the High Energy Laser Systems Test Facility (HELSTF) Enhanced Laser and Range Operations. The following comments are provided for your use as you prepare the final document.

To ensure that wildlife resources are protected, we recommend that the avoidance and minimization measures on pages 2-19, 4-7 through 4-10, 4-14 through 4-18, and 4-24 through 4-27 be implemented. Page 4-10 of the EA states that new sewage lagoons with perimeter fencing would be constructed to replace existing lagoons. Structures such as wastewater lagoons, tanks, and evaporation ponds often provide injurious conditions to threatened or endangered species, migratory birds, or other wildlife. During flight, migratory birds may not distinguish between artificial water bodies and natural water bodies, and could be attracted to these artificial water bodies to drink, rest, and forage. Artificial water bodies could serve as an "attractive nuisance" if measures are not taken to exclude migratory birds (and other wildlife) from access to injurious waters or conditions. These waters may have elevated concentrations of salts, trace elements, nutrients or fertilizers, heavy metals, organic chemicals, petroleum or solvent-derived residues, pesticide residues, antibiotics, veterinary chemicals, and human or animal pathogenic microorganisms, which can pose a risk to the health of migratory birds and other wildlife.

We recommend that potentially harmful open lagoons, ponds, and/or tanks be constructed using appropriate exclusion methods (e.g., nets, fences, enclosed tanks, etc.) to prevent access by migratory birds and other wildlife. These comments are made with the intent to inform you before any migratory bird deaths occur, since these birds constitute a legally protected resource under the Migratory Bird Treaty Act. An "illegal take" of migratory birds can include the accidental poisoning or accumulation of harmful concentrations of contaminants, even if the contamination event was accidental. If the operation of such structures as lagoons, ponds, and tanks results in migratory bird deaths and the problem is not addressed, the operators could be held liable under the enforcement provisions of the Migratory Bird Treaty Act. The Service offers assistance to prevent problems that could result from migratory bird access to contaminated or injurious waters. Facilities that are designed to safeguard migratory birds, and that incorporate preventative measures, also protect other wildlife. We encourage the operator to solicit comments from the New Mexico Department of Game and Fish.

Page 4-10 of the EA also states that all electrical poles would be designed to minimize the possibility of avian electrocution, and that all wiring would be grounded. Eagles, hawks, owls, and other birds of prey frequently use power lines and support structures for perching and nesting. Standard techniques have been developed to prevent raptor electrocutions at electric distribution lines. Guidance is in Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996, by the Avian Power Line Interaction Committee. The document may be requested from the following sources: Edison Electric Institute, P.O. Box 266, Waldorf, Maryland, 20604-0266, telephone 800-334-5453; or the Raptor Research Foundation at 12805 St. Croix Trail, Hastings, Minnesota 55033, phone 612-437-4359 or by e-mail to JMFITZPTRK@aol.com.

We appreciate the opportunity to review and comment on this Draft EA. If you have questions, please contact John Branstetter, New Mexico Ecological Services Field Office, at 505-761-4753.

Sincerely,

Acting Regional Director

cc: Assistant Regional Director, Migratory Birds, Region 2
Supervisor, Ecological Services Field Office, Albuquerque, NM
New Mexico State Administrator, Albuquerque, NM

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

Environmental Division

JUN 16 2005

Mr. John Branstetter
U.S. Fish and Wildlife Service
New Mexico Ecological Services Field Office
2105 Osuna Road NE
Albuquerque, New Mexico 87113

SUBJECT: High Energy Laser Systems Test Facility (HELSTF) Enhanced Laser and Range Operations Environmental Assessment (EA) - Coordinating Draft Comments (R2/ES-HC/EC CL 1-17) and Section 7 Consultation

Dear Mr. Branstetter:

The U.S. Army Space and Missile Defense Command would like to thank you for your comments on the Coordinating Draft Environmental Assessment (EA) for the HELSTF Enhanced Laser and Range Operations on White Sands Missile Range, New Mexico.

Your comments on the Coordinating Draft EA at Enclosure 1 included the concern regarding the proposed sewage lagoon and the potential injurious conditions to threatened or endangered species, migratory birds, or other wildlife. These comments are addressed in Section 4.3.2.3 of the Final EA.

You encouraged the solicitation of comments from the New Mexico Department of Game and Fish. The Coordinating Draft EA was provided to the Department of Game and Fish, and comments were received 28 January 2005. The Department of Game and Fish "does not anticipate significant impacts to wildlife or sensitive habitats." A copy of their comment letter is at Enclosure 2.

We have addressed your comment regarding consideration of standard techniques to prevent raptor electrocutions at electric distribution lines. The Final EA references in Section 4.3.2.3, and includes as appendix D, the White Sands Missile Range Commander's Guidance policy that addresses the Migratory Bird

Treaty Act and the Bald and Golden Eagle Protection Act. The WSMR guidance references the same citation that you provided - Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996 (Avian Power Line Committee).

In accordance with Section 7 of the Endangered Species Act, the U.S. Army Space and Missile Defense Command is initiating informal consultation for the proposed HELSTF Enhanced Laser and Range Operations as addressed in the EA. Based on the analysis as presented in the EA, SMDC has concluded that the proposed activities would not be likely to adversely affect any listed or candidate species or critical habitat. Formal consultation under Section 7 of the Endangered Species Act does not appear to be warranted for these activities. SMDC has also concluded that the proposed action will have no significant impact on other biological resources. Request your concurrence on these determinations. Please submit all correspondence to:

U.S. Army Space and Missile Defense Command
SMDC-EN-V/Ms. Julia Elliott
P.O. Box 1500
Huntsville, AL 35807-3801
Or by data facsimile: 256-955-5074

This office is forwarding a copy of this letter to U.S. Army Space and Missile Defense Command, HELSTF Directorate, Mr. Lionel Brown, and to White Sands Missile Range, SFIM-SW-WS-EF-C/Mr. Russ Koch. If you have any questions or comments, please contact Julia Elliott, 256-955-4822.

Sincerely,

Jeffrey C. Smith
Colonel, U.S. Army
Deputy Chief of Staff,
Engineer

Enclosures

# APPENDIX C
# RELATED NEPA DECISION DOCUMENT

## HIGH ENERGY LASER SYSTEMS TEST FACILITY (HELSTF)
## ENVIRONMENTAL ASSESSMENT

## UNITED STATES ARMY SPACE AND MISSILE DEFENSE COMMAND

**AGENCY**: U. S. Army Space and Missile Defense Command (USASMDC)

**ACTION**: Finding of No Significant Impact

**BACKGROUND**: Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (40 CFR 1500-1508), Department of Defense Directive 6050.1, and Army Regulation 200-2, the USASMDC has conducted an Environmental Assessment (EA) of the potential environmental consequences of the HELSTF program activities at White Sands Missile Range, New Mexico.

HELSTF is the Department of Defense National Test Range for high energy laser device testing which began in 1985. The facility also tests laser lethality, damage and vulnerability for a broad spectrum of U.S. Government, industry, foreign government, research and academic institutions. Among the activities supported by HELSTF are: the Ballistic Missile Defense Organization (BMDO) and its predecessor organization, the Strategic Defense Initiative Organization, the Department of Defense, and the National Aeronautics and Space Administration (NASA). The HELSTF program represents a national investment of approximately $800 million in high energy laser research and technology. Continued research, development, testing and evaluation of new and existing laser technology is necessary in order for the United States to remain economically and technologically competitive. National defense also requires that foreign laser technology be evaluated for threats to U.S. and Allied military forces, and that potential military applications of existing and emerging laser technologies be assessed.

**DESCRIPTION OF THE PROPOSED ACTION**: The purpose of the proposed Army action is to moderately increase the level of on-site laser activities, other on-site activities, and off-site activities at HELSTF. This moderately increased activity level would be characterized by the following:

- continued Nautilus program testing at HELSTF for both on-site static tests and off-site dynamic tests;
- the addition of Tactical High Energy Laser (THEL) program activities at HELSTF, which would consist of minor construction and the tracking of dynamic targets;
- adding the Apache, Checker, Chuck, Geri, and Laura sites to the Lola site for the delivery (e.g., by launch) of representative threat targets;
- up to approximately 25 targets (or their debris) would fall into the Nautilus Impact Area (NIA) per year;
- a general increase of HELSTF activities by approximately 150 percent, with, for example, the MIRACL being operated 15 to 20 times per year.
- an increase in HELSTF personnel to approximately 600 full-time staff with the addition of 20 to 50 program personnel during program tests;

- program tests occurring approximately 15 to 20 times per year.

The Proposed Action by the Army would occur within the HELSTF's normal areas of operation at the White Sands Missile Range (WSMR), New Mexico.

**ALTERNATIVES CONSIDERED**: In addition to the Proposed Action Alternative, the HELSTF EA considers a No Action Alternative and a High Level of Activity Alternative. The No Action Alternative considers continuation of on-site laser, other on-site, and off-site activities at HELSTF at the current level of intensity and frequency. This includes six to eight MIRACL runs per year, the impact of up to approximately 10 targets (or their debris) into the NIA per year, approximately 250 full-time staff, and continued Nautilus program testing. The No Action Alternative, however, does not consider discontinuation of laser testing activities at HELSTF.

The High Level of Activity Alternative would include all the activities of the Proposed Action Alternative, but at even higher levels of intensity and frequency. This would include 30 to 50 MIRACL runs per year, the impact of up to approximately 150 targets (or their debris) into the NIA per year, approximately 1,500 full-time staff, and the simultaneous occurrence of four or more testing programs similar to Nautilus.

A number of alternative actions were examined but were eliminated from further consideration due to operational or technical considerations. Evaluation of closure or realignment of HELSTF was not carried forward due to the unique laser testing capabilities that exist at HELSTF and are not available elsewhere in the nation.

The Addition of Free Electron Laser to HELSTF was an alternative action considered but deferred. The free electron laser technology under development by Boeing has not matured sufficiently to evaluate potential environmental consequences. USASMDC, therefore, has deferred further consideration of this alternative until information necessary for analysis becomes available.

**ENVIRONMENTAL EFFECTS**: To assess the significance of potential direct, indirect and cumulative environmental impacts, ten broad environmental resource areas were identified. The HELSTF program includes three categories of activities: on-site laser activities that occur within the fenced boundaries of the HELSTF Operating Area; other on-site activities not directly involved with the use or production of high energy laser beams; and off-site activities for which a high energy laser beam or target occurs outside the HELSTF fenced boundary. The on-site laser, other on-site, and off-site activities were then evaluated in ten environmental resources areas to determine the potential effects of the proposed action, and alternative actions.

The 10 broad environmental resources are as follows: air quality, airspace, biological resources, cultural resources, geology and soils, hazardous materials and waste, health and safety, infrastructure and transportation, noise, and water resources.

Table 1 depicts the summary of analyses made for each of the 10 environmental resources areas for each of the three alternative actions.

**CONCLUSION**: The resulting environmental analysis shows that no significant impacts would occur from the proposed HELSTF laser testing program. Preparation of an Environmental Impact Statement, therefore, is not required.

**DEADLINE FOR RECEIPT OF WRITTEN COMMENTS:** March 21, 1998

**POINT OF CONTACT:** Submit written comments or requests for a copy of the HELSTF EA to:

U.S. Army Space and Missile Defense Command
Attention: SMDC-EN-V
Post Office Box 1500
Huntsville, Alabama 35807-3801

PROPONENT: _____ DATE: 11 February 1998

Larry D. Anderson
COL, OD
Director, HELSTF

APPROVED:

_____ DATE: 17 FEB 98

Jerry Laws
Brigadier General, USA
Commanding

# Table 1: HELSTF Proposed Action and Alternatives Activities and Environmental Issues

| Activity | No-Action Alternative | Proposed Action | High Level Alternative | Air Quality | Airspace | Biological Resources | Cultural Resources | Geology and Soils | Hazardous Materials and Waste | Health and Safety | Infrastructure and Transportation | Noise | Water Resources |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ON-SITE LASER ACTIVITIES | | | | | | | | | | | | | |
| MIRACL | ◆ | ◆ | ◆ | Mitigated Impact | Mitigated Impact | Mitigated Impact | Mitigated Impact | Insignificant Impact | Insignificant Impact | No Impact | No Impact | No Impact | No Impact |
| LPCL | ◆ | ◆ | ◆ | Insignificant Impact | No Impact | No Impact | No Impact | No Impact | Insignificant Impact | No Impact | No Impact | No Impact | No Impact |
| LDD | ◆ | ◆ | ◆ | Insignificant Impact | No Impact | No Impact | No Impact | No Impact | Insignificant Impact | No Impact | No Impact | No Impact | No Impact |
| PLVTS | ◆ | ◆ | ◆ | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact |
| Beam Transfer Area | ◆ | ◆ | ◆ | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact |
| Effects Test Area | ◆ | ◆ | ◆ | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact |
| Hazard Test Area | ◆ | ◆ | ◆ | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact |
| Vacuum Test System | ◆ | ◆ | ◆ | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact |
| OTHER ON-SITE ACTIVITIES | | | | | | | | | | | | | |
| Vacuum Test System | ◆ | ◆ | ◆ | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact |
| Sea-Lite Beam Director | ◆ | ◆ | ◆ | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact |
| Safety Systems | ◆ | ◆ | ◆ | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact |
| Chemistry Laboratory | ◆ | ◆ | ◆ | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact |
| Technical Support Activities | ◆ | ◆ | ◆ | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact | No Impact |
| OFF-SITE ACTIVITIES | | | | | | | | | | | | | |
| Sea-lite Beam Director | ◆ | ◆ | ◆ | No Impact | Mitigated Impact | Mitigated Impact | Mitigated Impact | Insignificant Impact | Insignificant Impact | No Impact | No Impact | No Impact | No Impact |
| Nautilus Program Testing | ◆ | ◆ | ◆ | Insignificant Impact | Mitigated Impact | Mitigated Impact | Mitigated Impact | Insignificant Impact | Insignificant Impact | No Impact | Insignificant Impact | No Impact | No Impact |
| Increased Nautilus or two or more Nautilus-like programs | | ◆ | ◆ | Insignificant Impact | Mitigated Impact | Mitigated Impact | Mitigated Impact | Insignificant Impact | Insignificant Impact | No Impact | Insignificant Impact | No Impact | No Impact |
| Four or more Nautilus-like Programs | | | ◆ | Mitigated Impact | Mitigated Impact | Mitigated Impact | Mitigated Impact | Insignificant Impact | Insignificant Impact | No Impact | Insignificant Impact | No Impact | No Impact |

**TACTICAL HIGH ENERGY LASER**
**ADVANCED CONCEPT TECHNOLOGY DEMONSTRATION**
**ENVIRONMENTAL ASSESSMENT**

**UNITED STATES ARMY SPACE AND MISSILE DEFENSE COMMAND**

**AGENCY**: U. S. Army Space and Missile Defense Command (USASMDC)

**ACTION**: Finding of No Significant Impact

**BACKGROUND**: Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (40 CFR 1500-1508), Department of Defense Directive 6050.1, and Army Regulation 200-2, the USASMDC has conducted an Environmental Assessment (EA) of the potential environmental consequences of the Tactical High Energy Laser (THEL) Advanced Concept Technology Demonstration (ACTD) program activities.

The purpose of the THEL ACTD program is to develop a tactical laser capable of defending against artillery rockets and other projectiles by means of a directed energy defensive weapons system. For several years, the U.S. Army Space and Missile Defense Command (USASMDC) has pursued development of a tactical high energy laser concept that could provide new air and missile defense capability. Numerous Department of Defense (DOD) high-energy laser development programs over the last 20 years have proven and demonstrated that beam generation and beam pointing technologies can support the THEL concept.

In April 1996, Shimon Peres, then Prime Minister of Israel, met with President Clinton. During the meeting, the U.S. made a commitment to assist Israel in the development of a tactical laser to help negate the Katyusha rocket threat to Israel. In May 1996 the DOD committed to work with the Israeli Ministry of Defense to structure an ACTD to evaluate the effectiveness of a THEL.

**DESCRIPTION OF THE PROPOSED ACTION**: The THEL ACTD prototype is a transportable, defensive weapon designed to defend against artillery rockets and projectiles through the use of a high energy laser to damage or destroy the munition before it can reach its target, denying the enemy full use of their weapon. The THEL ACTD prototype consists of the following components:

- A Command, Control, Communications, and Intelligence Subsystem to serve as a central control station and communications hub for the complete system
- A Laser Subsystem to generate a high power laser beam
- A Pointer Tracker Subsystem (PTS) to acquire, track, and target appropriate threats

The THEL ACTD program would involve production and testing of the laser subsystem and PTS and field testing and system integration of the THEL ACTD prototype. Production and testing of the Laser Subsystem and PTS would take place at contractor facilities at the

following locations: El Segundo, Redondo Beach, and San Juan Capistrano, California; Boulder, Colorado; and Pittsburgh, Pennsylvania. Field-testing and system integration of the THEL ACTD prototype would take place at White Sands Missile Range (WSMR), New Mexico.

Testing of the PTS and Laser Subsystem would involve:

- At Redondo Beach, the testing of the PTS by use of a low-power, eye-safe laser
- At CTS, hot flow and limited integration testing for 1 minute per day or less
- At CTS, propagation of a high energy laser beam onto a block of acrylic plastic and into a calorimeter, both of which would be less than 3 meters (10 feet) away

Field-testing and integration of the THEL ACTD prototype at WSMR would involve:

- Construction of an equipment area to support the Laser Subsystem
- Lasing of targets by the THEL ACTD Fire Unit (Laser Subsystem and PTS)
- Use of 24 existing paved areas as launch points
- Use of 4 impact areas, 3 of which are in previously bladed areas
- Use of area between launch and aim points as debris impact area
- Launch of up to approximately 300 live and 80 inert target missiles during the first phase of testing (first 9 months)
- Launch of up to approximately 220 rockets and 620 artillery projectiles during the second phase of testing (subsequent 4 years)

**ALTERNATIVES CONSIDERED:** A number of alternative actions were examined but were eliminated from further consideration due to operational or technical considerations. Static testing at TRW's Capistrano Test Site with dynamic testing at Camp Pendleton was not carried forward due to ground-to-air laser permitting restrictions at Camp Pendleton. THEL ACTD prototype testing at the High Energy Laser Systems Test Facility (HELSTF) at WSMR was eliminated from further consideration due to the cost impacts of additional construction, operation, safety, and environmental mitigation. After determining that WSMR would offer a more comprehensive testing base and provide a more cost effective location, the alternative of shipping the THEL ACTD prototype to Israel without integrated testing at WSMR was eliminated from further consideration. Under the no-action alternative, the testing proposed for WSMR would not be conducted and the THEL ACTD prototype would not be tested or forwarded to Israel. The alternative to terminate the THEL program after ACTD testing at WSMR was deferred for later decision. At that time, options for termination of the program would be reevaluated and additional environmental analysis performed as needed.

**ENVIRONMENTAL EFFECTS**: To provide a context for understanding the potential effects of the proposed action and a basis for assessing the significance of potential impacts, several environmental resource areas were evaluated. The resource areas were as follows: air quality, airspace, biological resources, cultural resources, geology and soils, hazardous materials and waste, health and safety, infrastructure, land use, noise, and water resources. Each environmental resource was evaluated according to a list of activities that were determined to be necessary to accomplish the proposed action.

Table 1 depicts the summary of analyses made for each of the eleven environmental resource areas for the activities associated with the proposed action. Under the no-action alternative, no environmental consequences associated with the THEL ACTD prototype production, development, and testing are anticipated.

**CONCLUSION**: The resulting environmental analysis shows that no significant impacts would occur from the proposed THEL ACTD program. Preparation of an Environmental Impact Statement, therefore, is not required.

## Table 1: THEL ACTD Proposed Action Activities and Environmental Issues

| Activity | Air Quality | Airspace | Biological Resources | Cultural Resources | Geology and Soils | Hazardous Materials and Waste | Health and Safety | Infra-structure | Land Use | Noise | Water Resources |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fabrication and Assembly | | | | | | | | | | | |
| TRW, Inc. El Segundo / Redondo Beach, CA | No Impact | No Impact | No Impact | No Impact | No Impact | Insignificant Impact | No Impact | No Impact | No Impact | No Impact | No Impact |
| TRW, Inc. Redondo Beach, CA | No Impact | No Impact | No Impact | No Impact | No Impact | Insignificant Impact | No Impact | No Impact | No Impact | No Impact | No Impact |
| Ball Aerospace Boulder, CO | No Impact | No Impact | No Impact | No Impact | No Impact | Insignificant Impact | No Impact | No Impact | No Impact | No Impact | No Impact |
| Contraves-Brashears Pittsburgh, PA | No Impact | No Impact | No Impact | No Impact | No Impact | Insignificant Impact | No Impact | No Impact | No Impact | No Impact | No Impact |
| TRW, Inc. San Juan Capistrano | No Impact | No Impact | No Impact | No Impact | No Impact | Insignificant Impact | No Impact | No Impact | No Impact | No Impact | No Impact |
| Component Testing | | | | | | | | | | | |
| TRW, Inc. Space Park Facility El Segundo / Redondo Beach, CA | No Impact | No Impact | No Impact | No Impact | No Impact | Insignificant Impact | No Impact | No Impact | No Impact | No Impact | No Impact |
| TRW, Inc. San Juan Capistrano, CA | Mitigated Impact | No Impact | Insignificant Impact | No Impact | No Impact | Insignificant Impact | No Impact | No Impact | No Impact | No Impact | No Impact |
| Field testing and Integration | | | | | | | | | | | |
| WSMR, NM | Mitigated Impact | Mitigated Impact | Mitigated Impact | Mitigated Impact | Insignificant Impact | Insignificant Impact | No Impact | Mitigated Impact | No Impact | No Impact | No Impact |

**DEADLINE FOR RECEIPT OF WRITTEN COMMENTS:** 28 May 1998

**POINT OF CONTACT:** Submit written comments or requests for a copy of the THEL ACTD EA to:

U.S. Army Space and Missile Defense Command
Attention: SMDC-EN-V (Thomas Craven)
Post Office Box 1500
Huntsville, Alabama 35807-3801

PROPONENT:

DATE: 15 Apr 98

RICHARD J. BRADSHAW, JR.
Program Manager
THEL Program Office

APPROVED:

DATE: 20 Apr 98

EDWARD G. ANDERSON III
Lieutenant General, U.S. Army
Commanding Officer

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# APPENDIX D
# COMMANDER'S GUIDANCE

U.S. Army White Sands Missile Range

# Commander's Guidance

CG-02-02

JAN 2 4 2002

## THE MIGRATORY BIRD TREATY ACT AND THE BALD AND GOLDEN EAGLE PROTECTION ACT - CONSERVATION

1. Environmental stewardship is vitally important to the accomplishment of the White Sands Missile Range (WSMR) test and evaluation mission. "America's Range" fully supports and implements the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Many actions taking place on WSMR have the potential to "take" migratory birds, including raptors (birds of prey, such as hawks, eagles, and owls). All directors, tenants, Range customers, civilian employees, military personnel, and contractors must ensure that actions which may result in the "taking" of a migratory bird are properly identified and addressed in the environmental coordination document associated with project planning, execution, and follow up. Addressing bird protection measures in this manner is not only consistent with the Commander's Guidance on National Environmental Policy Act (NEPA) Compliance, but will ensure they become part of the administrative record for all proposed actions, are properly coordinated with the U.S. Fish and Wildlife Service, and appropriate permits are obtained.

2. All but three species of wild birds are protected in the United States under federal and/or state laws. Pursuant to the MBTA it is illegal to "take" any migratory bird without a federal permit, excluding only three non-native species: the rock dove (pigeon), English (house) sparrow, and starling. The BGEPA extends additional protections to bald and golden eagles.

3. Under both the MBTA and BGEPA, "take" includes "pursue, shoot, shoot at, wound, kill, capture, collect, molest, or disturb...," or to attempt any of these actions. Additionally, these acts make it illegal to "take," transport, or possess any part of a protected bird without a permit, including the feathers, feet, beak, nest, eggs, etc. Any action at WSMR that may "take" birds must be coordinated with the U.S. Fish and Wildlife Service prior to implementation. The White Sands Environment and Safety Directorate is responsible for assisting activities in accomplishing this coordination.

4. Among the most preventable potential sources of "take" are improperly designed power lines and poles that electrocute large birds and the intentional, unpermitted nest destruction to remedy nuisance bird concerns. To alleviate these problems, it is White Sands policy to:

- Design all new power lines, poles, and other power distribution facilities in accordance with the guidance provided in the publication entitled, Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996 (Avian Power Line Committee (APLIC), Edison Electric Institute/Raptor Research Foundation, Washington, D.C.). Any

exception to this guidance must be coordinated through the Environment and Safety Directorate with the U.S. Fish and Wildlife Service which may delay project execution.

- Promptly report and remediate any power lines and poles found to electrocute birds in accordance with the above standards. Plans for these actions will be coordinated with the Environment and Safety Directorate prior to implementation.

- Incorporate the above standards in all proposed actions involving power lines, including line and pole modifications, maintenance and repair activities, and pole removal. Plans for these actions will be coordinated with the Environment and Safety Directorate prior to implementation.

- Identify power lines and poles that have or are suspected to have electrocuted birds to the Environment and Safety Directorate for record-keeping and reporting purposes in accordance with Army policy. Also, report the location of carcasses of birds suspected of having been electrocuted to the Environment and Safety Directorate for action.

- Refrain from any action involving the removal or disturbance of bird nests until the Environment and Safety Directorate has been consulted to determine if a federal permit is required.

5. The Environment and Safety Directorate has copies of the cited publication for reference and can provide the source information for those who wish to obtain individual copies. Where permits are required, the proponent of the action applying for the permit will provide the necessary information to the Environment and Safety Directorate. The proponent is responsible for ensuring compliance with all permit conditions.

6. For additional information regarding this guidance or for further assistance in integrating environmental stewardship in your activities, contact the Directorate of Environment and Safety, at 678-2224/8731.

WILLIAM F. ENGEL
Brigadier General, USA
Commanding

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# HIGH ENERGY LASER SYSTEMS TEST FACILITY (HELSTF) ENHANCED LASER AND RANGE OPERATIONS

## ENVIRONMENTAL ASSESSMENT

**AGENCY:** U.S. Army Space and Missile Defense Command

**ACTION:** Finding of No Significant Impact

**BACKGROUND:** The U.S. Army Space and Missile Defense Command (USASMDC) has prepared the attached Environmental Assessment (EA) to analyze the potential environmental consequences of enhancing the capabilities and the operation of the High Energy Laser Systems Test Facility (HELSTF), White Sands Missile Range (WSMR), New Mexico. The environmental resource areas analyzed herein reflect the unique features of HELSTF and its environmental setting.

The purpose of the Proposed Action is to enhance the capability of HELSTF to better accommodate a more comprehensive suite of lasers, beam directors, sensors, associated equipment, meteorological equipment, multiple test areas, and pointing and tracking systems. The Proposed Action is needed for HELSTF to remain technologically competitive in laser development and to provide a comprehensive test facility for all aspects of military laser technology. Based on the analysis in the EA, USASMDC has determined that proposed activities are not expected to result in significant impacts to the environment.

## ALTERNATIVES CONSIDERED

### No-Action

Under the No-action Alternative, the same laser test activities that currently occur at HELSTF and that were previously analyzed in the 1998 HELSTF EA and the 1998 Tactical High Energy Laser (THEL) Advanced Concept Technology Demonstration (ACTD) EA would continue. These current activities are those that occur within HELSTF's fenced boundary, or on nearby WSMR land and supported from HELSTF. These activities are directly involved with the use or production of a high energy laser beam. Table 1 lists the laser systems and the changes in activities since previous analysis was completed. Under the No-action Alternative, no other enhanced laser activities would occur.

**DESCRIPTION OF THE PROPOSED ACTION:** The USASMDC proposes to develop a fully enhanced capability to conduct laser testing at HELSTF, including associated range operations. The enhancement would include the testing of one or more new laser technologies or completion of one or more new range operations. These laser technologies are from various Department of Defense and civilian agencies. Enhanced testing would begin in the fourth quarter of fiscal year 2005 and would occur

concurrently with existing activities at HELSTF. Table 2 summarizes the proposed activities involving the enhancements of current lasers and the addition of new laser technologies at HELSTF.

**Table 1: No-Action Alternative**

| Lasers | Changes in Activities |
|---|---|
| Mid-Infrared Advanced Chemical Laser (MIRACL) | • Fluorspar process not in use<br>• Testing level expected to remain the same or decrease |
| Mobile Tactical High Energy Laser Test Bed (MTHEL TB) | • No change in activities (formerly named THEL ACTD) |
| Low-Power Chemical Laser (LPCL) | • Emission scrubber improved<br>• Hydrogen fluoride now collected and sent to a temporary less than 90-day accumulation site<br>• Testing level expected to remain the same or decrease |
| Laser Device Demonstration (LDD) | • Not currently in use<br>• Hydrogen added as part of new hydrogen fluoride optics<br>• Restarting would require refurbishment of emission scrubber system |
| Pulsed Laser Vulnerability Test System (PLVTS) | • Coalescing filter now separates and reuses oil that was previously disposed |

**Table 2: Proposed Action**

| Lasers | Proposed Activities |
|---|---|
| Solid State Heat Capacity Laser (SSHCL) | Program intended to develop a lightweight, high-average-power, high-pulse-energy solid state laser technology |
| Mobile Tactical High Energy Laser (MTHEL) Prototype | MTHEL TB technology on a mobile platform at the Limor site |
| Airborne Laser (ABL) | Program would use the Mid-Infrared Advanced Chemical Laser (MIRACL) to simulate the ABL by altering wavelengths |
| Advanced Tactical Laser (ATL) | The ATL could use HELSTF test areas for targets; also, would use the MIRACL to simulate the ATL by altering wavelengths |
| High Power Carbon Dioxide Lasers | Similar to the Pulsed Laser Vulnerability Test System |
| Free-Electron Laser (FEL) | An electric discharge laser that represents an alternative to conventional lasers with flexibility and high power |
| **Targets and Flight Testing** | Most target launches would occur at established launch sites and artillery firing points; others would occur from launch vehicles parked on existing dirt roads and trails. |
| **Facility and System Improvements** | Implementation of a new closed-loop cooling system for the MIRACL that would eliminate the use of chromates<br>Improvements that would occur on previously disturbed land include:<br>▪ New sewage lagoons<br>▪ FEL facility<br>▪ Additional electrical substation |

### Possible Future Laser Technology/Systems Development and Testing

Enhanced testing at HELSTF could include one or more of several types of existing experimental and conceptual laser systems. Proposed laser systems to be tested at HELSTF can be categorized into three basic technologies: solid state lasers, chemical lasers, and free electron lasers (FELs).

### Components of Test and Evaluation of Laser Technologies and Weapons Systems

The U.S. Army Space and Missile Defense Technical Center, which is part of the USASMDC, has a requirement to conduct all types of test and evaluation of high energy lasers. Those tests that would be conducted at HELSTF under the Proposed Action include lethality test and evaluation, beam characterization, beam pointing, relay mirror system, and high energy laser low aspect target tracking.

### Target Launches in Support of Dynamic Testing

Several classes of dynamic targets would be used for laser testing at HELSTF. These targets fall within four classes: tactical rockets, artillery projectiles, aerial drones (unmanned aerial vehicles), and ground targets. These types of rockets are routinely tested or used as targets at WSMR.

### Target Launch and Firing Points

Most target launches and artillery firings would occur at established launch sites and artillery firing points as described in the 1998 WSMR Range-Wide Environmental Impact Statement and the 1998 HELSTF EA. Some launches would occur from launch vehicles parked on existing dirt roads and trails. Launches from this type of site would require an Explosive Launch Permit from the WSMR Environmental Office. For some laser tests involving longer-range artillery rocket targets, launches from Doña Ana Range at Fort Bliss would be required as described in the 2000 *Fort Bliss Texas and New Mexico, Mission and Master Plan Programmatic Environmental Impact Statement.*

### Facility and System Improvements

Some infrastructure improvements at HELSTF would be required for some new activities, or existing facilities would be improved to enhance current activities. Potential activities could include redesign of the Mid-Infrared Advanced Chemical Laser (MIRACL) laser optics chromate closed-loop cooling system, new sewage lagoons, a new test facility for the FEL, and an additional electrical substation.

## ENVIRONMENTAL EFFECTS

### Methodology

Thirteen broad resource areas were considered to provide a context for understanding the potential effects of the No-action Alternative and the Proposed Action and to provide a

basis for assessing their severity. Resource areas that are not expected to be affected sufficiently to warrant further discussion and/or that are already analyzed in the referenced HELSTF documents include geology and soils, land use, noise, socioeconomics, and environmental justice. The areas determined to warrant analysis are air quality, airspace, biological resources, cultural resources, hazardous materials and waste, health and safety, infrastructure and transportation, and water resources.

USASMDC determined that implementation of the Proposed Action at WSMR would not result in significant impacts to any of the resource areas listed above. All activities would be carried out in compliance with applicable federal, state, and local regulations and requirements.

**Air Quality**

Under the No-action Alternative, HELSTF emission levels would continue to be monitored and maintained according to WSMR's Title V Air Permit. Air pollution dispersion modeling is conducted prior to operation or refueling of any chemical laser system on HELSTF.

It is anticipated that the proposed laser systems would either have no air pollutants, or emission levels produced would be similar to the existing systems and would remain within the existing parameters of WSMR's Title V Permit.

Due to the intervals between testing events, target launches associated with each test are discrete events. The prevailing conditions at WSMR lend themselves to the rocket emissions rising and dispersing, causing no overall impact on local air quality.

Although minor short-term impacts associated with construction activities for facility improvements may occur, no exceedances of ambient air quality standards would be anticipated.

**Airspace**

Laser activities would have the potential to impact current aerial activities within WSMR airspace. Depending on the individual test design and safety parameters, the standard procedure of one or more of the restricted areas being recalled by WSMR is possible. In addition, military coordination efforts through prior notices of closure are required from WSMR to inform Holloman Air Force Base and other potential airspace users, ensuring minimization of any adverse effects on aircraft operations.

In the unlikely event that the target should move out of contact with the laser beam, test design and safety parameters would ensure that the laser beam would not exceed any

restricted airspace at energy levels that could have the potential to result in eye damage to pilots.

**Biological Resources**

Continuing and proposed laser activities conducted within HELSTF's fenced boundary are not likely to affect biological resources since wildlife use of the area is limited to species such as birds and small forms of wildlife such as rabbits and lizards. No threatened or endangered plant or wildlife species have been observed within the fenced HELSTF site.

Launch activities would take place in previously disturbed areas and generally are not expected to adversely affect plant species or wildlife. The potential for debris to land on an individual cactus or wildlife species is possible; however, debris landing on an individual plant or animal would not be detrimental to the whole population. No impacts to migratory birds; threatened, endangered, or candidate species; or other biological species are anticipated.

No impacts to biological resources are anticipated from facility improvements since the area proposed for use is previously disturbed with little vegetation and thus provides no substantial wildlife habitat. There has been no observation of harm to the occasionally observed migratory birds in the vicinity of the existing lagoons. Injured birds as in the one past reported case would need assistance for removal. No adverse impacts to migratory birds; threatened, endangered, or candidate species; or other wildlife that could be attracted to the lagoons to drink, rest, or forage are anticipated as a result of the new sewage lagoons since they would hold domestic sewage and no hazardous industrial waste. All electrical poles would be designed to prevent raptor electrocution using standard techniques provided in White Sands Missile Range Commander's Guidance policy, which addresses the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

**Cultural Resources**

Continuing and proposed activities conducted at HELSTF are not likely to affect cultural resources, since the area is covered by asphalt or is previously disturbed; moreover, no traditional cultural resources, nor cultural resources that are National Register of Historic Places-listed or –eligible or listed on New Mexico's State Register of Cultural Properties have been observed within the immediate area of HELSTF facilities.

In the event that previously undisturbed areas are identified for facility improvements, a cultural resources survey could be required. However, construction of the FEL building, substation, and new sewage lagoons are planned to take place within previously disturbed areas.

**Hazardous Material and Waste**

Operation of the existing systems would not impact the use, storage, transportation, or disposal of hazardous materials at HELSTF. All routine hazardous wastes generated at HELSTF are managed in temporary less than 90-day accumulation sites. Non-routine and large quantity one-time wastes are managed as needed by the hazardous waste contractor. No long term storage of hazardous waste occurs at HELSTF.

In addition to laser activities, the assembly and flight testing of targets has the potential to involve hazardous materials and to generate hazardous waste. Any potential effects would be minimized by following appropriate standard operating procedures and regulations, including the HELSTF Hazardous Material Management Policy, Hazardous Chemical Spill/Release Response Plan, and Hazardous Material Management Policy, as well as WSMR hazardous material and hazardous waste management procedures.

Any hazardous materials used or hazardous waste generated during construction for facility improvements would be handled in compliance with appropriate HELSTF and WSMR standard operating procedures.

**Health and Safety**

Health and safety concerns associated with laser operation and activities of the Proposed Action are anticipated to be similar to those of the No-action Alternative. Similar standard operating procedures would be developed for each proposed laser and included in the HELSTF Safety Standard Operating Procedures and Laser Safety Information.

In addition to laser operation, target flight testing has the potential to affect the health and safety of personnel and the public. Any potential effects would be minimized by following appropriate standard operating procedures and regulations and establishing appropriate on-base roadblocks prior to lasing activities. The implementation of personnel safety practices would limit the number of people exposed to increased hazards and, as a result, no health and safety impacts are expected.

It is anticipated that any construction activity associated with facility improvements would be done in accordance with all HELSTF and WSMR regulations and would not pose an impact to the health and safety of personnel or the public.

**Infrastructure and Transportation**

Under the No-action Alternative, infrastructure and transportation demands would remain at current levels, as would the requirement for periodic routine maintenance and repair. Infrastructure and transportation resources exceed current needs.

The Proposed Action would be compatible with ongoing test programs and procedures at HELSTF. No adverse impacts on infrastructure or transportation within the HELSTF region of influence are expected to occur as a result of the Proposed Action. This includes electrical power, water usage, wastewater, and solid waste.

The current resources are sufficient to meet the demands of facilities improvement activities. Adequate infrastructure exists for increased personnel levels. Such activities, including the new substation, FEL building, and new sewage lagoons, would have little or no impact on current water, wastewater, or solid waste handling capacity or levels. The possible exception is in the case of the FEL. Higher power requirements for the FEL could require the construction of a new substation, if current facilities are determined to be inadequate.

**Water Resources**

Under the No-action Alternative water usage would not increase at HELSTF and therefore, water availability or quality is unlikely to be affected.

Based on the anticipated number of tests and minimal water demand by the proposed new laser systems, the total HELSTF usage would not increase under the Proposed Action. Thus, the proposed activities would not be expected to affect water availability or quality.

All construction activities for facility improvements would utilize standard operating procedures to curtail any potential dust generation and erosion during construction. No significant impacts to the water supply are expected as a result of construction water requirements. In addition, through maintaining effective grading and drainage controls, impacts due to erosion from construction would not occur.

**Cumulative Impacts**

Proposed activities, in combination with past, current, and foreseeable future activities, would not be expected to result in cumulative impacts. No activities have been identified offsite of WSMR that when combined with the Proposed Action would result in cumulative impacts.

**CONCLUSION:** The resulting environmental analysis shows that no significant impacts would occur from the proposed HELSTF activities. Preparation of an Environmental Impact Statement, therefore, is not required. A follow-up action list will be developed and completed by the Executing Agent to ensure compliance with the actions described in the EA.

**DEADLINE FOR RECEIPT OF WRITTEN COMMENTS:** July 18, 2005

**POINT OF CONTACT:** Submit written comments or requests for a copy of the High Energy Laser Systems Test Facility (HELSTF) Enhanced Laser and Range Operations EA to:

ATTN: SMDC-EN-V (Ms. Julia Elliott)
U.S. Army Space and Missile Defense Command
Post Office Box 1500
Huntsville, AL 35807-3801

**HIGH ENERGY LASER SYSTEMS TEST FACILITY (HELSTF)**
**ENHANCED LASER AND RANGE OPERATIONS**

**U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND**

**ACTION:** Finding of No Significant Impact

**CONCURRED:**

White Sands Missile Range

DATE: 29 JUL 2005

DONALD E. GENTRY
Colonel, U.S. Army
Garrison Commander

**HIGH ENERGY LASER SYSTEMS TEST FACILITY (HELSTF)**
**ENHANCED LASER AND RANGE OPERATIONS**

**U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND**

**ACTION**: Finding of No Significant Impact

**APPROVED**:

U.S. Army Space and Missile Defense Command
High Energy Laser Systems Test Facility

DATE: 19 July 05

THOMAS D. HODGE
Director, HELSTF
U.S. Army Space and Missile Defense Command
High Energy Laser Systems Test Facility