Hill Air Force Base, Utah

***Final*:**

Operations and Environmental Conditions at the Utah Test and Training Range as of December 31, 2007

Prepared for:

Hill Air Force Base, Utah

March 30, 2008

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Air Force Materiel Command
Hill Air Force Base, Utah 84056

March 30, 2008

Prepared in accordance with the Department of the Air Force Environmental Impact Analysis Process (EIAP) 32 CFR Part 989, Effective July 6, 1999, which implements the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) regulations.

EXECUTIVE SUMMARY

Purpose of This Document

This document was prepared to document current operations and current environmental conditions at the Utah Test and Training Range (UTTR) as of December 31, 2007. It was prepared for managers of the Hill Air Force Base (AFB) National Environmental Policy Act (NEPA) program, but it is not an environmental assessment (EA), nor is it an environmental impact statement (EIS). It describes current conditions so that future proposed actions for UTTR will have a baseline against which those proposed actions might be compared.

Scope of the Review

During a scoping meeting and subsequent interactions, the following environmental issues were addressed:

- Air quality.
- Solid and hazardous wastes (including liquid waste streams).
- Biological resources.
- Geology and surface soils.
- Water quality.
- Cultural resources.
- Occupational safety and health.
- Air installation compatible use zone (AICUZ) (including noise).
- Socioeconomic resources.
- Environmental justice.

As explained in the body of this document, the issues that were identified for detailed consideration are: air quality; solid and hazardous wastes (including liquid waste streams); biological resources; surface soils; water quality; cultural resources; and AICUZ (including noise).

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LIST OF ACRONYMS AND CHEMICAL TERMS

AAA	Anti-Aircraft Artillery
ACC	Air Combat Command
AFB	Air Force Base
AFOSH	Air Force Occupational Safety and Health
AGL	Above Ground Level
AICUZ	Air Installation Compatible Use Zone
AGM	Air to Ground Missile
BLM	Bureau of Land Management
BLU	Bomb Live Unit
BMP	Best Management Practice
CATEX	Categorical Exclusion
CBU	Cluster Bomb Unit
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
COC	Contaminant of Concern
DAQ	Division of Air Quality (Utah)
dB	Decibels
dBA	Decibel (A-weighted)
dBP	Peak Decibels
DERR	Division of Environmental Response and Remediation (Utah)
DoD	Department of Defense
DSHW	Division of Solid and Hazardous Waste (Utah)
DWR	Division of Wildlife Resources (Utah)
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency (United States)
FAA	Federal Aviation Administration

FTS	Flight Termination System
FUDS	Formerly Utilized Defense Sites
FY	Fiscal Year
GAT	Ground Assault Target
GIS	Geographic Information System
HAG	Helicopter Air-to-Ground
HAP	Hazardous Air Pollutant
HE	High Explosive
HGM	Hydrogeomorphic
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
JLENS	Joint Land Attack Cruise Missile Defense Elevated Netted Sensors System
JTA	Joint Test Assembly
L_{dn}	Day-Night Average Sound Level
L_{dnmr}	Onset Rate Adjusted Monthly Day-Night Average Sound Levels
MMRP	Military Munitions Response Program
MOA	Military Operating Airspace
MRTFB	Major Range and Test Facility Base
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NEW	Net Explosive Weight
NO_x NO_2	Oxides of Nitrogen, Nitrogen Dioxide
NRHP	National Register of Historic Places
O_3	Ozone
OB	Open Burning
OD	Open Detonation
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
PGM	Precision Guided Munitions
pH	Power of Hydrogen (Negative Log of the Hydrogen Ion Concentration)

PM-10	Particulates Smaller Than 10 Microns in Diameter
PM-2.5	Particulates Smaller Than 2.5 Microns in Diameter
RANS	Range Squadron
RCO	Range Control Officer
RCRA	Resource Conservation and Recovery Act
RF	Radio Frequency
RHI	Range Health Index
RO	Reverse Osmosis
RSO	Range Safety Officer
SIP	State Implementation Plan
SO_x SO_2	Oxides of Sulfur, Sulfur Dioxide
TCP	Traditional Cultural Property
TTU	Thermal Treatment Unit
US	United States
USAF	United States Air Force
UTTR	Utah Test and Training Range
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound

1.0 INTRODUCTION

1.1 Purpose of This Document

This document was prepared to document current operations and current environmental conditions at the Utah Test and Training Range (UTTR) as of December 31, 2007. It was prepared for managers of the Hill Air Force Base (AFB) National Environmental Policy Act (NEPA) program, but it is not an environmental assessment (EA), nor is it an environmental impact statement (EIS). It describes current conditions so that future proposed actions for UTTR will have a baseline against which those proposed actions might be compared.

1.2 History and Current Use of the Utah Test and Training Range

The United States (US) military continually improves, updates, and tests weapons systems and training standards for both aircraft-based and land-based weapons. UTTR, associated with Hill AFB, Utah, offers unique and substantial airspace, land, and infrastructure resources to the US Air Force (USAF) and other users, contributing in many ways to maintaining modern, powerful, military capabilities for the US and allied forces. The test and training opportunities provided by UTTR are unique in that they provide a large overland airspace with extreme topographic variability and unusually diverse targets. These attributes are replicated at only a few locations worldwide and UTTR therefore provides a high-value training destination for aircraft-based and land-based units.

UTTR is located in Northwestern Utah, approximately 50 miles west of Hill AFB (Figure 1). UTTR has 12,574 square nautical miles of restricted airspace and military operations areas (MOAs). For land-based activities, the north range of UTTR (UTTR-North) consists of 369,014 acres of land (approximately 577 square miles), which USAF controls in its entirety. The area of the south range of UTTR (UTTR-South) controlled by USAF is 587,899 acres (approximately 919 square miles).

Activities at UTTR currently include but are not limited to: practice bombing and gunnery used by military aircraft; tests of new weapons or modifications to existing weapon systems; propagation testing; rocket motor test firing and dissection; rocket motor and munitions storage; small arms and machine-gun training; on-site treatment of hazardous waste explosives and military propellants; range cleanup and remediation measures; and support functions for the preceding activities.

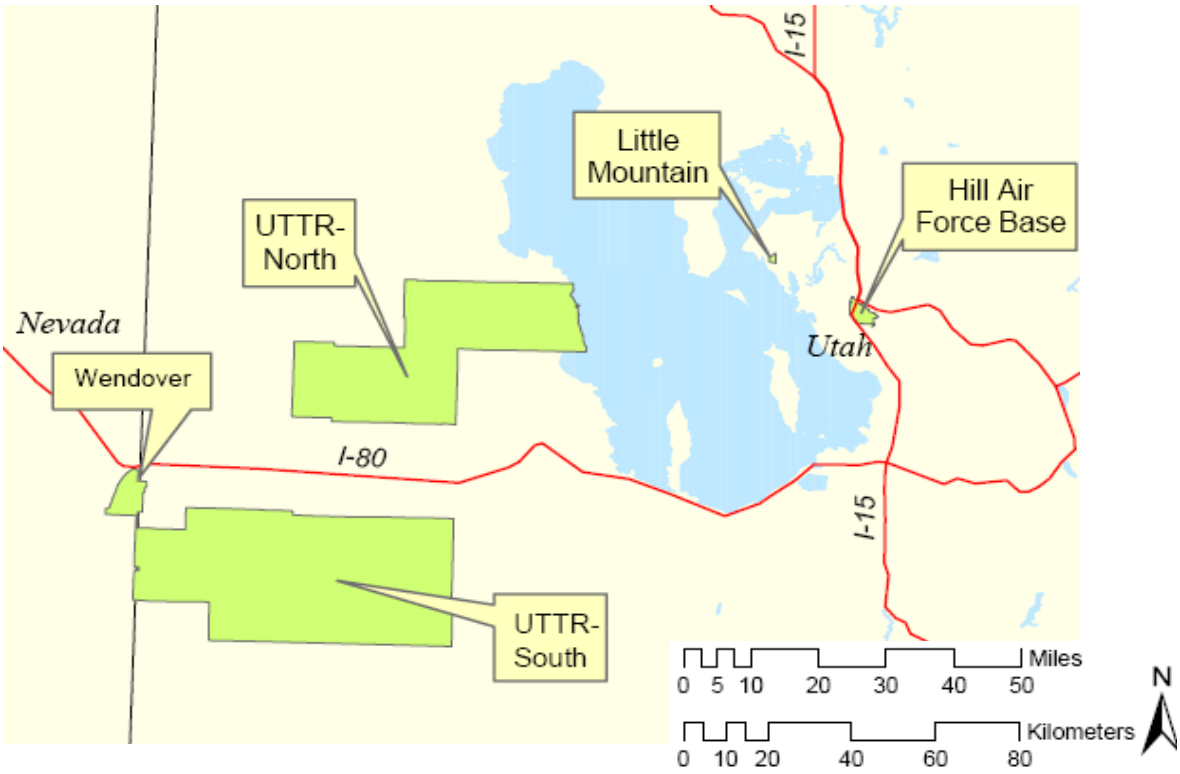

Figure 1: Location of UTTR-North, UTTR-South, Hill AFB

1.3 Scope of the Environmental Description

The scope of the description of current environmental conditions was limited to environmental issues that would be assessed related to future proposed actions for UTTR.

1.3.1 History of the Planning and Scoping Process

Scoping discussions were held: to identify potential environmental concerns; to facilitate an efficient environmental analysis process related to future proposed actions for UTTR; to identify issues to be described in detail while devoting less attention and time to less important issues; and to save time in future NEPA analyses by helping to ensure that draft documents adequately address relevant issues, thereby reducing the possibility that comments would cause a draft document to be substantially rewritten.

On June 20, 2007, an initial scoping meeting was conducted in Building 1274, Hill AFB. Attendees included the 388th Range Squadron (RANS), managers of Hill AFB's NEPA program, other environmental program managers, and the authors of this document.

During this meeting and subsequent scoping interaction, the following environmental issues were discussed:

- air quality;

- solid and hazardous wastes (including liquid waste streams);
- biological resources;
- geology and surface soils;
- water quality;
- cultural resources;
- occupational safety and health;
- air installation compatible use zone (AICUZ);
- socioeconomic resources; and
- environmental justice.

1.3.2 Issues Described in Detail

The issues that were identified for detailed presentation in this document are:

- **Air Quality** (attainment status, emissions, Utah's state implementation plan [SIP])

  Air emissions are produced by aircraft, long-term vehicle use of unpaved roads, burns, detonations, firing rocket motors, and operating equipment at UTTR.

- **Solid and Hazardous Wastes** (materials used, stored, recycled, disposed, including liquid waste streams; existing asbestos, lead-based paint, mercury, and polychlorinated biphenyls [PCBs])

  Operations at UTTR create solid and hazardous wastes (including solid and liquid wastes).

- **Biological Resources** (threatened, endangered, sensitive species, wetlands, floodplains)

  No federal or state plants or animal species listed as threatened or endangered are known to occur on UTTR. However, there are eight Tier II species and twelve Tier III species as identified in the Utah Comprehensive Wildlife Conservation Strategy (2005), now known as the State Wildlife Action Plan. There are approximately 15,000 acres of wetlands near Blue Lake.

- **Surface Soils** (land disturbance, known pre-existing contamination)

  Surface soils at UTTR have been disturbed to accommodate target areas, roads, railroad access, and facilities. Excavations have occurred to install: footings; foundations; drainage structures; and miscellaneous cables, conduit, and pipes.

Contamination of surface soils is known to exist in specific, limited areas of UTTR. Hill AFB environmental managers are investigating and/or remediating these areas exhibiting contaminated soils (see the discussion for remedial projects in Section 1.3.3).

- **Water Quality** (surface water, groundwater, water quantity, wellhead protection zones)

  Existing activities that could contribute to surface water pollution at UTTR include loading and unloading operations; outdoor storage activities; outdoor recycling activities; activities that generate dust or particulates; and waste disposal practices.

  Reverse osmosis (RO) and sewage treatment facilities exist at the Oasis operations facility.

  Groundwater is extracted to provide potable water, and non-potable water for fugitive dust control.

  The scoping discussions did not identify any issues related to wellhead protection zones.

  Discussions relating to wetlands are contained in the biological resources sections of this document.

- **Cultural Resources** (archaeological, architectural, traditional cultural properties)

  Approximately 240,000 acres of UTTR-North, UTTR-South, and Wendover Auxiliary Area have been inventoried for cultural resources to date. During those inventories, 444 prehistoric sites, 37 historic sites, and two multi-component sites were identified. There are 231 historic properties (eligible or unevaluated archaeological sites) on UTTR. There are 252 ineligible sites on UTTR.

- **AICUZ** (noise, accident potential, airfield encroachment)

  Noise sources on UTTR consist primarily of two activities: aircraft and detonations. Aircraft flight operations occur on both UTTR-North and UTTR-South, and flight altitudes at times extend nearly to the surface. Detonations may occur as the result of expending live ordnance at designated target zones and destruction of large solid rocket motors at the Thermal Treatment Unit (TTU).

  The scoping discussions did not identify any issues related to aircraft accident potential that would not be addressed by USAF flight safety policies and procedures. The scoping discussions did not identify any issues related to airfield encroachment.

1.3.3 Issues Eliminated From Further Study

The issues that were not carried forward for detailed consideration in Section 2 are:

- **Geology** (seismicity, topography, minerals, geothermal resources)

The scoping discussions did not identify any issues related to seismicity, topography, minerals, or geothermal resources.

- **Occupational Safety and Health** (physical and chemical hazards, radiation, explosives, bird and wildlife hazards to aircraft)

  At UTTR, Hill AFB contractors follow Occupational Safety and Health Administration (OSHA) safety guidelines as presented in the Code of Federal Regulations (CFR).

  Related to Hill AFB military personnel and civilian employees, the Bio-environmental Engineering Flight is responsible for implementing Air Force Occupational Safety and Health (AFOSH) standards. The AFOSH program addresses (partial list): hazard abatement; hazard communication; training; personal protective equipment and other controls to ensure that occupational exposures to hazardous agents do not adversely affect health and safety; and acquisition of new systems.

  The scoping discussions did not identify any issues related to occupational safety and health that would not be routinely addressed by OSHA rules and/or the Bio-environmental Engineering Flight. Hazardous materials are addressed in the discussions related to solid and hazardous wastes.

- **Remedial Projects** (site investigations and remedial actions related to Resource Conservation and Recovery Act [RCRA], Comprehensive Environmental Response Compensation and Liability Act [CERCLA], the military munitions response program [MMRP], and formerly utilized defense sites[FUDS]).

  Prior activities performed at UTTR have caused contamination. Testing of herbicide orange was performed from 1972-1974, impacting a limited area of surface soils. Historic use of former TTU disposal trenches included disposal of ordnance, rocket motors, and munition-related residues. Chemical Disposal Pit 4 was used to dispose waste oil, solvents, and diesel fuel. Other areas of possible contamination at UTTR include the fire training area, sewage lagoons, surface impoundments, and disposal sites.

  Hill AFB has initiated site investigations and in some cases remedial actions at UTTR locations that have been contaminated by past activities. Each site is being addressed by Hill AFB environmental managers in accordance with provisions of a federal facility agreement (with the US Environmental Protection Agency [EPA] and Utah's Divisions of Solid and Hazardous Waste [DSHW] and Environmental Response and Remediation [DERR]) to complete one or more of the following activities:

  - characterize the degree and extent of contamination;
  - assess risk to human health and the environment;
  - if warranted, plan and implement remedial action; and
  - implement site management plans.

- **Socioeconomic Resources** (local fiscal effects including employment; population projections; schools)

The primary users of UTTR are USAF personnel, other Department of Defense (DoD) forces, law enforcement agencies, and allied forces, all of whom are present on a temporary basis. Few long-term jobs exist at UTTR. The scoping discussions did not identify any issues related to population projections or schools.

- **Environmental Justice** (minority and low income populations)

  Environmental justice analyses are intended to identify and address disproportionately high and adverse human health or environmental effects of federal actions on minority populations and low income populations. Demographic data presented by the Economic Development Corporation of Utah (Economic 2007a, Economic 2007b) reveal the estimated 2007 populations in Tooele and Box Elder Counties consist of predominantly Caucasian residents.

Ethnic Group	Tooele County	Box Elder County
Caucasian	90%	93%
African American	1%	0%
American Indian or Alaska Native	2%	1%
Asian or Pacific Islander	1%	1%
Some Other Race	4%	3%
Two or More Races	2%	2%

1.4 Relevant Previous Documents

A comprehensive EA for UTTR was published in 1997 (Hill 1997). Since the publication of that document, environmental analyses have been performed for a wide variety of proposed actions at UTTR. Each proposed action resulted in either a categorical exclusion (CATEX), or if a CATEX was not appropriate, a project-specific EA was completed. Table 1 contains a list of these EAs, beginning in 1997, for which a final EA was the result (and a Finding of No Significant Impact was signed).

Table 1: Final Environmental Assessments, 1997 Through 2007

Year Published	Final Environmental Assessments
1997	Hill Air Force Range and the Wendover Air Force Range of the Utah Test and Training Range, Version 3.1
1998	ICBM Motor Dissection Capability at UTTR
1998	Operation of Landfills at the Utah Test and Training Range
1998	Stardust Mission
1998	Tomahawk Flight Test Ops - Navy
1998	TTU # 2
1999	Noise and Supersonic Effects at the Utah Test and Training Range
1999	Treatment of 42,000 Pounds Net Explosive Weight (NEW) at the Thermal Treatment Unit, Utah Test and Training Range
1999	V-22 Aircraft in the Western United States
2000	Cruise Missile Test Operations at the Utah Test and Training Range, Final Report
2000	Expansion of the Use of Self-Protection Chaff and Flares at the Utah Test and Training Range
2000	Multiple Targets TS-5, UTTR-South
2001	Aerial Spray for Vegetation Control on UTTR Target Unbound
2001	Rocket Motor Open Burning at the TTU/UTTR
2002	Beehive Telephone Fiber Installation West Desert
2002	Development and Demonstration of the Long Range Air Launch Target System
2003	Questar Natural Gas Pipeline UTTR
2004	No Drop Target Array
2005	Fiber Optic Cable, Wendover Radar Site, Wendover, Utah
2005	Nextel Towers Hornet and Grassy Mountain Sites
2005	Pond Target Array at UTTR South
2007	Joint Land Attack Cruise Missile Defense Elevated Netted Sensors System (JLENS)

1.5 Overview of the Organization of the Document

The remainder of this document consists of the following sections:

Section 2 discusses the existing conditions of the UTTR environment, establishing a resource baseline against which the effects of future proposed actions can be evaluated. It presents relevant facilities and operations, affected environmental issues, and pre-existing environmental factors at UTTR.

Section 3 is the list of persons who primarily prepared or assisted in preparing this EA.

Section 4 is the list of agencies, organizations, and persons consulted during preparation of this EA.

Section 5 contains a list of references used to prepare this document.

2.0 AFFECTED ENVIRONMENT

2.1 Introduction

Section 2 of this document discusses the existing conditions of the UTTR environment, establishing a resource baseline against which the effects of future proposed actions can be evaluated. It presents relevant facilities and operations, environmental issues, existing environmental factors, and existing cumulative effects due to human activities at UTTR.

Issues discussed during scoping meetings, but eliminated from detailed consideration (see Section 1.7.3) include:

- geology (seismicity, topography, minerals, geothermal resources);
- occupational safety and health (physical and chemical hazards, radiation, explosives, bird and wildlife hazards to aircraft);
- remedial projects (site investigations and remedial actions related to RCRA, CERCLA, and the military munitions response program);
- socioeconomic resources (local fiscal effects including employment; population projections; schools); and
- environmental justice.

2.2 Description of Relevant Facilities and Operations

2.2.1 Aircraft

Aircraft using UTTR fly an average of 16,000 sorties per year. In fiscal year (FY) 2006, a total of 15,788 sorties were flown on UTTR. The following is a breakout of FY 2005 UTTR utilization:

- Total Sorties = 12,661;
- USAF Fighters = 11,428;
- Bombers (B-1, B-2, and B-52) = 786;
- Test = 373; and
- Army, Navy, and Marine Corps = 74.

FY 05 range utilization equates to 52 percent utilization of available range time.

A three-dimensional representation of UTTR airspace is provided in Figure 2. The pink areas represent MOAs, where military aircraft operate, but civilian aircraft are allowed and can safely traverse the airspace. The blue areas represent restricted airspace, where the bulk of military test and training missions occur. Civilian aircraft are normally prohibited from using restricted airspace, but could be granted special permission to traverse the airspace by UTTR airspace managers.

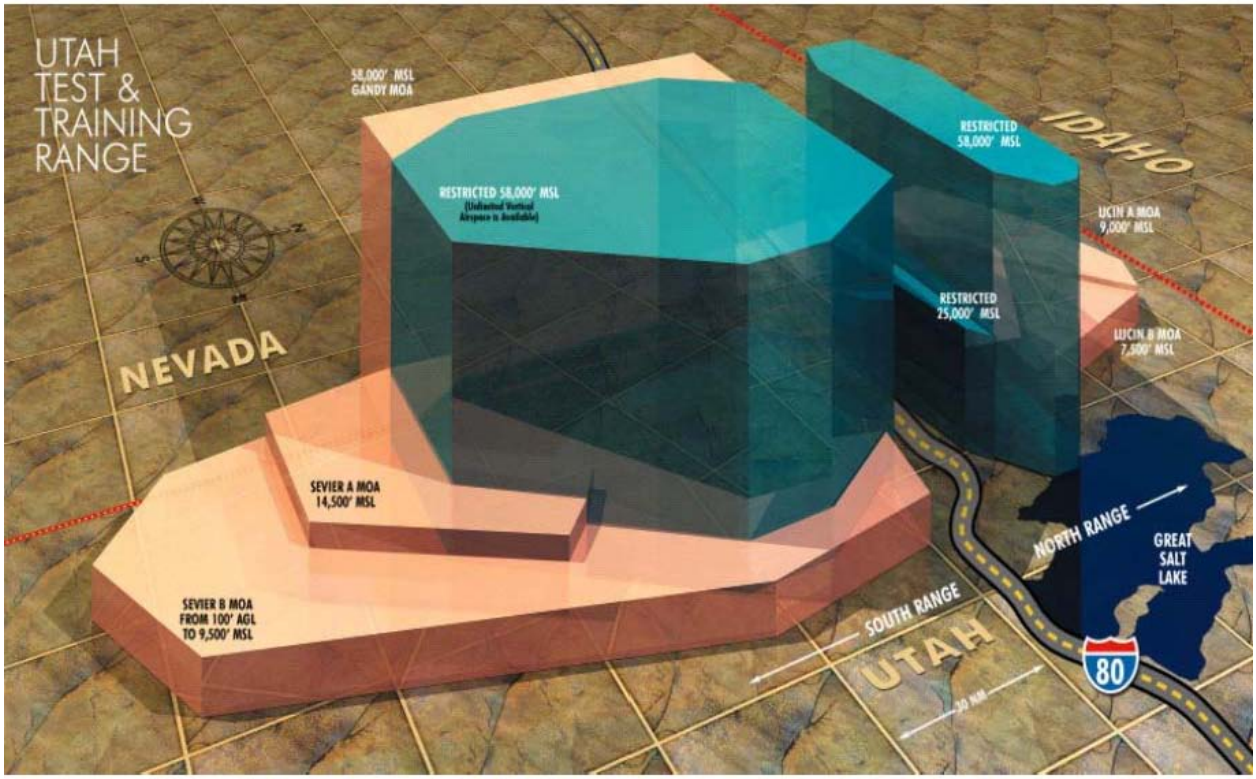

Figure 2: UTTR Airspace

Figures 3 and 4 show the land-based boundaries of UTTR-North and UTTR-South within the blue borders. Roads used by military and civilian personnel to access the land-based facilities are shown using brown lines in Figures 3 and 4.

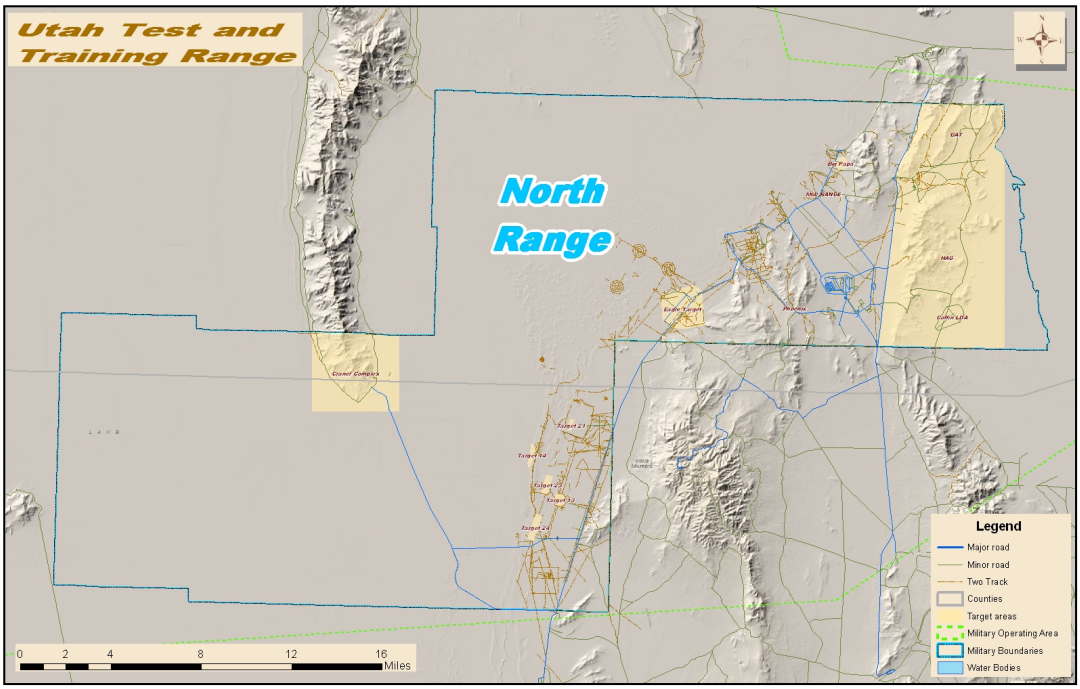

Figure 3: UTTR-North

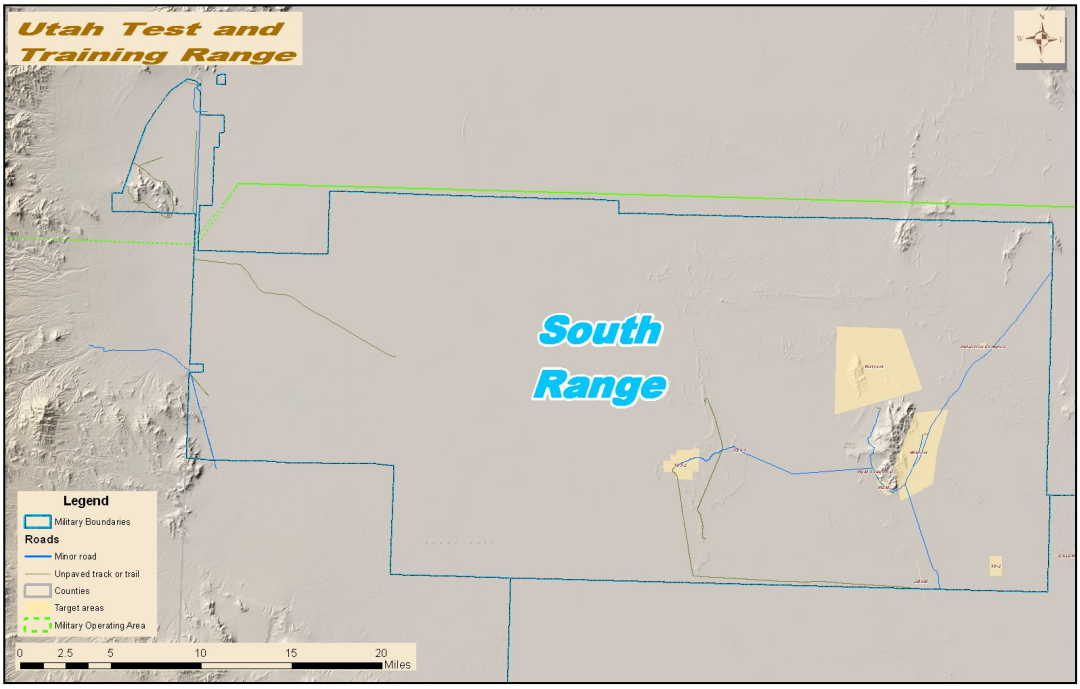

Figure 4: UTTR-South

2.2.2 UTTR-North

Training Target Zones

Note: For the purposes of this document, a target is a single item such as a vehicle, tank, or structure; a target area contains several targets within a defined boundary; and a target zone contains multiple target areas that are not contiguous.

Eagle Range Complex: Eagle Range is a manned, scored, Class A/B/C air-to-ground target zone. Deliveries with inert/training ordnance are authorized. Class A denotes a manned, ground scoring capable range with a range control officer (RCO) present on range and controlling aircraft operations. Class B denotes a manned or unmanned ground scoring capable range where no RCO is present on range for controlling aircraft operations (note, Class B ranges include ranges where a remotely sited RCO or range safety officer [RSO] actively controls aircraft operations). Class C denotes an unmanned range with no scoring and no RCO control of aircraft.

Helicopter Air-to-Ground (HAG) Tactical Complex: The HAG Target Complex is a Class C, unmanned air-to-ground target zone with multiple targets. There is an area within the HAG that is designated by a graded perimeter. The area within the graded perimeter is the only area of the HAG utilized for live heavy case high explosive (HE) bombs.

Craner's Tactical Target Complex: Craner's Tactical Target Complex is a Class C, unmanned air-to-ground target zone located on UTTR-North. The area is designed to track the accuracy and stability of laser designation over the duration of a normal targeting scenario.

Ground Assault Target (GAT) Zone: The GAT borders the HAG on the north and is designed for ground troops to use in developing their assault capabilities. The GAT may be scheduled for use in conjunction with the HAG to facilitate cross-service training.

Test Target Areas

Target 14: Target Area 14 is non-hardened with a chain-link fence radar reflector on the target center and four adjacent dumpsters 100 yards apart. The target area is used for live (explosive) munitions testing. Types of mission activity scheduled on this target area include: low and high altitude bombing, skip bombing, loft bombing, air-to-surface gunnery and rocketry, radar bomb scoring, ground test of high explosives, laser guided munitions, munitions disposal and shelf life service tests.

Target 21: Target Area 21 is available for live cluster bomb unit (CBU) testing with delay fusing. It is 5,000 feet wide and 7,800 feet long. It can be used in 6 sectors (west side north to south are A, B, C - east side north to south are D, E, F); or four sectors (northwest, southwest, southeast, and northeast).

Target 24: Target Area 24 is normally used for CBU munitions with impact fusing. This is a hardened rectangular target area approximately 1,500 feet wide and 6,000 feet long. It is divided into four separate sectors labeled north to south.

Target 82: Target Area 82 is used only for testing bomb live unit (BLU) -82 daisy cutter weapons. It is a 450 foot diameter circle with 4 vehicles at clock positions 3, 6, 9, and 12 located west of Target Area 23.

Special Use Target Areas: There are eight special-use target areas on UTTR-North available for various purposes, including the NORD landing zone.

Non-Target Facilities

UTTR-North includes facilities on USAF and leased Bureau of Land Management (BLM) property. Multiple test and training target areas also exist on UTTR-North. Roads, fiber optic lines, copper communications lines, and buried electrical distribution lines that support target areas are present.

Oasis is an operations facility that includes various billeting, dining, recreational, storage, and office facilities. Oasis provides an equipment maintenance work center, generators for emergency backup power to UTTR-North, and is home to civil engineering support functions including storage, test firing, and dissection of rocket motors.

The TTU is located approximately five miles northeast of Oasis. Employees at the TTU routinely destroy rocket motors in excess of 10,000 pounds net explosive weight (NEW) in compliance with permits issued by the state of Utah's Division of Solid and Hazardous Waste (UTTR RCRA Part B Permit) and Division of Air Quality (DAQ) (UTTR Title V Operating Permit).

Eagle Compound is a manned, air-to-ground gunnery range with main and flank observation and scoring towers and other facilities for administration, maintenance, storage, and backup power.

Diddle Knoll is the location of a close-circuit television range security video system. A communications tower and small facility are at the site.

Grassy Mountain is situated on acreage leased from BLM on two peaks called Grassy Mountain East and West. It is located southwest of Oasis and south of Eagle Range. Grassy Mountain is a fixed telemetry acquisition and communications site with several towers and facilities for communications and power. Grassy Mountain East is manned as required for mission support.

Delle Peak is an unmanned microwave communications repeater site located just north of the Delle exit from Interstate Highway 80. This site is owned by the Federal Aviation Administration (FAA) and shared with UTTR. Several towers and two facilities for communications and backup generator equipment are at this site.

2.2.3 UTTR-South

Training Target Zones

Kittycat Live Tactical Target Complex: Kittycat Live Tactical Target Complex is a Class B air-to-ground target zone located three miles northwest of Wildcat Mountain with target areas located south and southeast of Kittycat Mountain. It contains multiple armored

targets, precision guided munitions (PGM) targets, and simulated munitions storage bunkers. Conventional deliveries of HE ordnance with impact fusing are authorized.

Wildcat Tactical Target Complex: Wildcat Tactical Target Complex is a Class B air-to-ground target zone located east, north, and northwest of Wildcat Mountain. The complex simulates an airfield with support facilities and area defenses. Conventional and simulated nuclear deliveries with inert heavy case bombs and similar inert/training ordnance are authorized. The complex consists of a simulated facilities for all of the following: airfield; rail yard; petroleum, oil and lubricant storage area; convoys; headquarters/command post; SA-2; 155 millimeter anti-aircraft artillery (AAA); storage area; industrial complex; bridge; assault strip; urban village; motor park; tunnel; power substation; maintenance facility; and chemical plant/production facility.

Test Target Areas

TS2: Target Area TS2 is a 1,500 foot wide by 3,000 foot long hardened surface. This target area is normally used for inert guided weapons, inert CBUs, and live HE weapons.

TS3: Target Area TS3 is used for collecting ballistic data on all conventional munitions in the Air Force inventory such as laser guided bombs and guided bomb units. The target area consists of two targets, each made from compacted earth pads measuring 150 feet by 250 feet.

TS4: Target Area TS4 is a sophisticated, multi-spectral target area. This is a live fire area that can accommodate radio frequency (RF), laser-guided, or infrared seeking weapons with a host of targets. Targets include remote control armored vehicles, air defense radars, communications transmitters, and others as required by projects. Twenty target pads are available within a four-square mile area. TS4 is designed to provide a live fire test environment that realistically simulates the offensive or defensive threats an aircraft could experience in the modern battlefield. This target area may be used to subject attacking aircraft to a realistic threat environment. Weapon systems tested could include all those that seek out and destroy threat systems and those that could be attacked by ground threats. A variety of unmanned weapon systems such as cruise missiles, unmanned air vehicles, air-to-ground missiles, and smart munitions can be accommodated.

TS5: Target Area TS5 is a target complex designed to accommodate large footprint weapons. It provides targets that are fixed, high priority, and heavily defended, for defense suppression in an operational test environment. The TS5 complex offers a 360 degree attack axis. It will accommodate weapons that have a maximum energy footprint in excess of 20 nautical miles, which will eliminate the need for a flight termination system (FTS) on many weapons.

J Target: The J Target Area is used for collecting impact data on joint direct attack munitions, wind corrected munitions dispensers, sensor fuse weapons, and high-speed anti-radiation missiles. The area is a compacted pad measuring 1 mile in length and 60 feet in width. A variety of remote control applications can be configured for the target including RF threat

emitter control. In addition, heat plate augmented tank bodies can be fabricated and placed along the eastern edge of the roadway when requested by customers.

PGM Area: The PGM area is used to collect ballistic data on various air-to-ground (AGM) missiles such as AGM-65, AGM-88, and AGM-130. In addition to customer-specific targets, a static array of tanks and storage containers is available. The area is also capable of supporting a remote controlled moving tank. A variety of remote control applications can be configured for the target including RF threat emitter control.

Non-Target Facilities

UTTR-South includes facilities at the following locations on USAF and leased BLM land. Multiple test and training target areas exist on UTTR-South. As with UTTR-North, roads, fiber optic lines, copper communications lines, and buried electrical distribution lines that support target areas are present.

Wendover Field is an instrumentation radar facility and communications site. It is located on Air Force property near the town of Wendover, Utah. This site has an administrative building for radar operations, two electrical buildings, and a communications shelter for the radar system. A maintenance facility supports operations at Bovine Mountain and Trout Creek.

Wendover Peak is a primary telemetry and communications support site located within Danger Cave State Historical Monument. Several towers, a communications facility, and a backup generator facility are present at this site. It is manned during normal duty hours and as needed for mission support. Range control equipment is stored at this site.

A recycling yard is located at the northeastern boundary of UTTR-South. It serves as a salvage area for recyclable components of destroyed targets and inert munitions. Several facilities including a storage shed, an operations trailer, and a commercial truck scale are located at this site.

2.3 Description of Relevant Affected Issues

2.3.1 Air Quality

General

Areas of the country where air pollution levels persistently exceed the national ambient air quality standards (NAAQS) for one or more of the criteria pollutants may be designated as nonattainment areas. The criteria pollutants are: nitrogen dioxide (NO_2), oxides of sulfur (SOx), ozone (O_3), particulates less than 10 microns in diameter (PM-10), particulates less than 2.5 microns in diameter (PM-2.5), carbon monoxide (CO), and lead.

UTTR is located in Box Elder and Tooele Counties, Utah, and Elko County, Nevada. All three of these counties are in attainment status with federal clean air standards. In Nevada, the only nonattainment areas are:

- Clark County (Las Vegas Area) for O_3, PM-10, and CO; and

- Washoe County (Reno Area) for PM-10 and CO.

Utah nonattainment and air quality maintenance areas are shown in Figure 5.

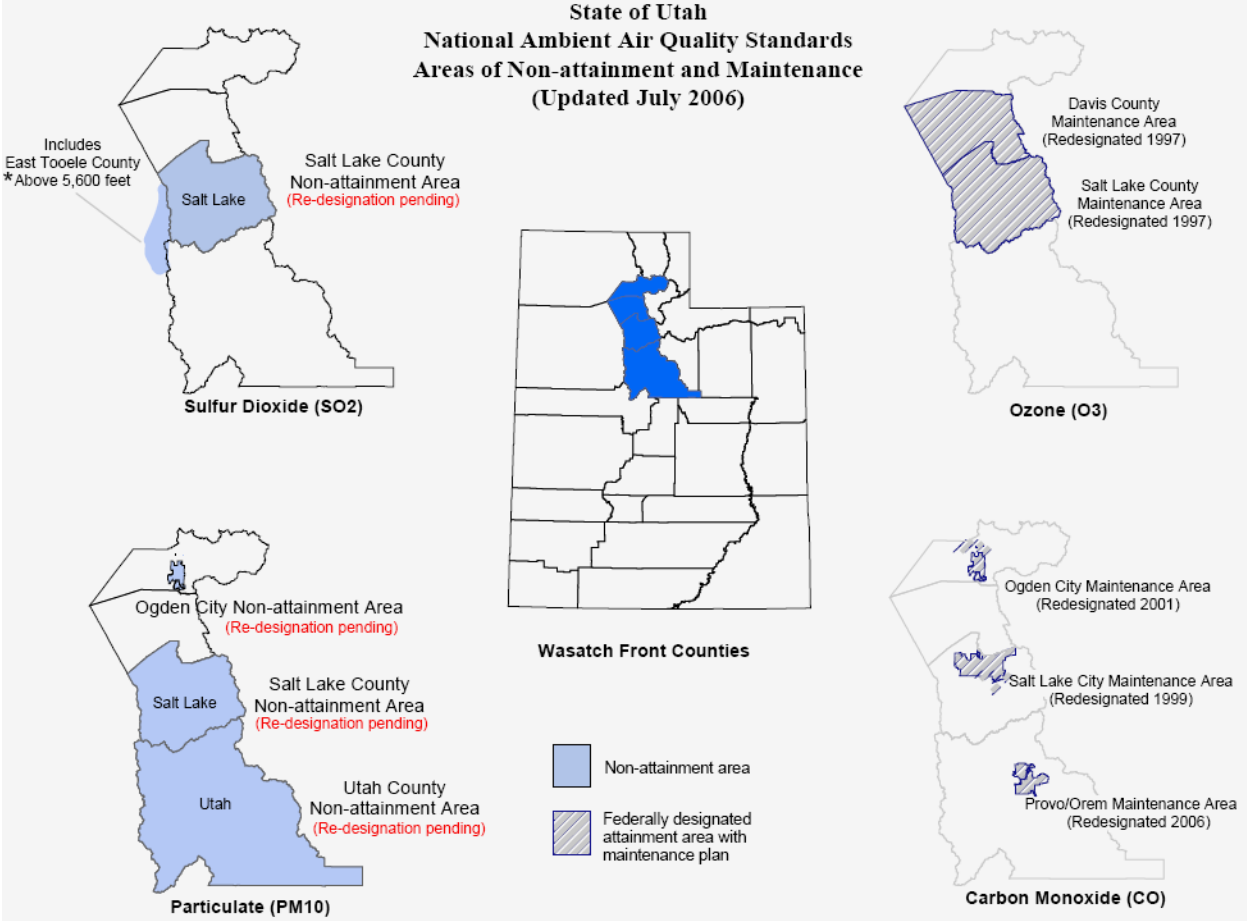

Figure 5: State of Utah National Ambient Air Quality Standards, Areas of Non-Attainment and Maintenance

Aircraft-Based Activities

Air emissions produced by aircraft in flight are rapidly dispersed in the atmosphere. Conservative analyses conducted by FAA (FAA 2000) show downwind, ground level concentrations for various air pollutants decrease rapidly when aircraft are flying at 400 feet above ground level (AGL) and above, even for very large commercial jet airplanes such as the Boeing 747SP (see Figures 6, 7, and 8). Very few sorties at UTTR are conducted lower than 400 feet AGL.

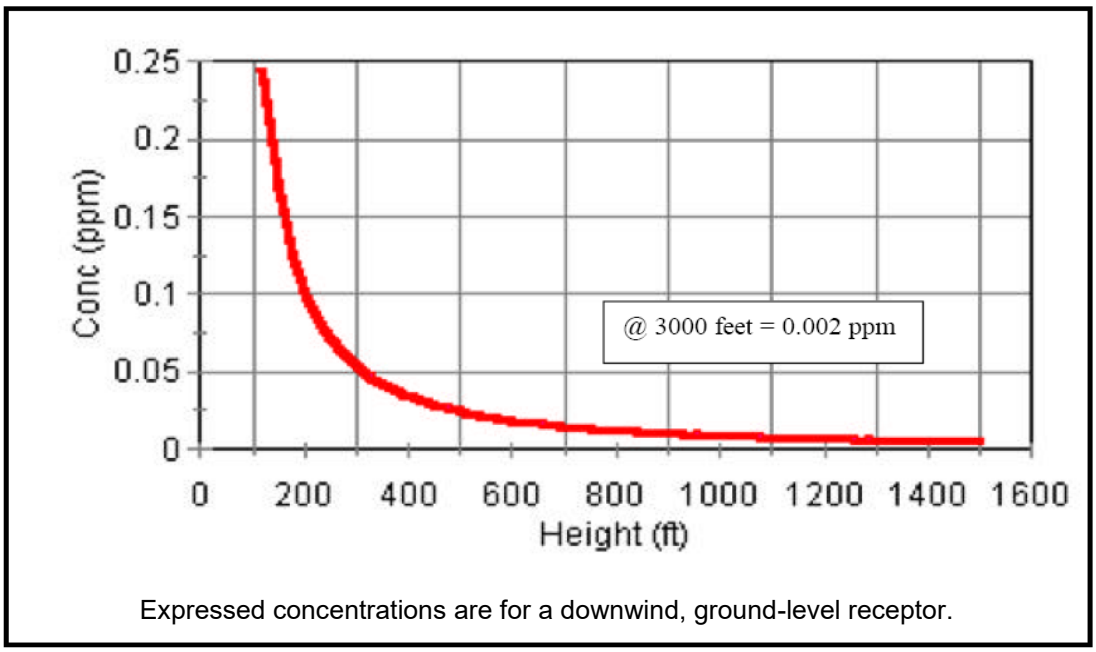

Figure 6: Hydrocarbon Concentration Compared to Airplane Elevation AGL

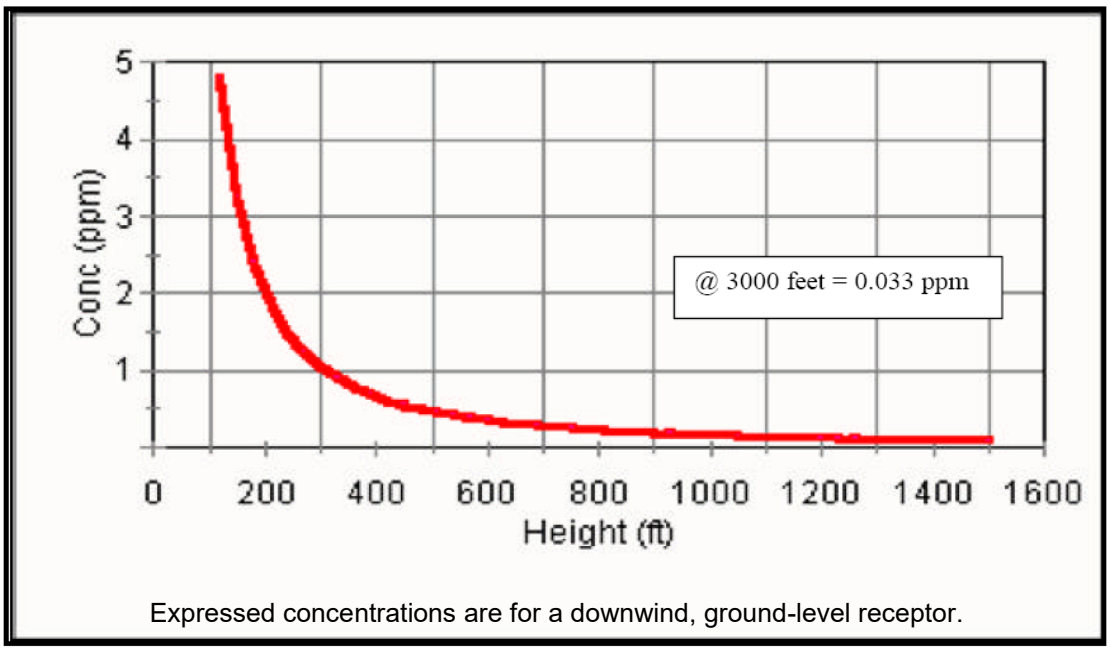

Figure 7: Carbon Monoxide Concentration Compared to Airplane Elevation AGL

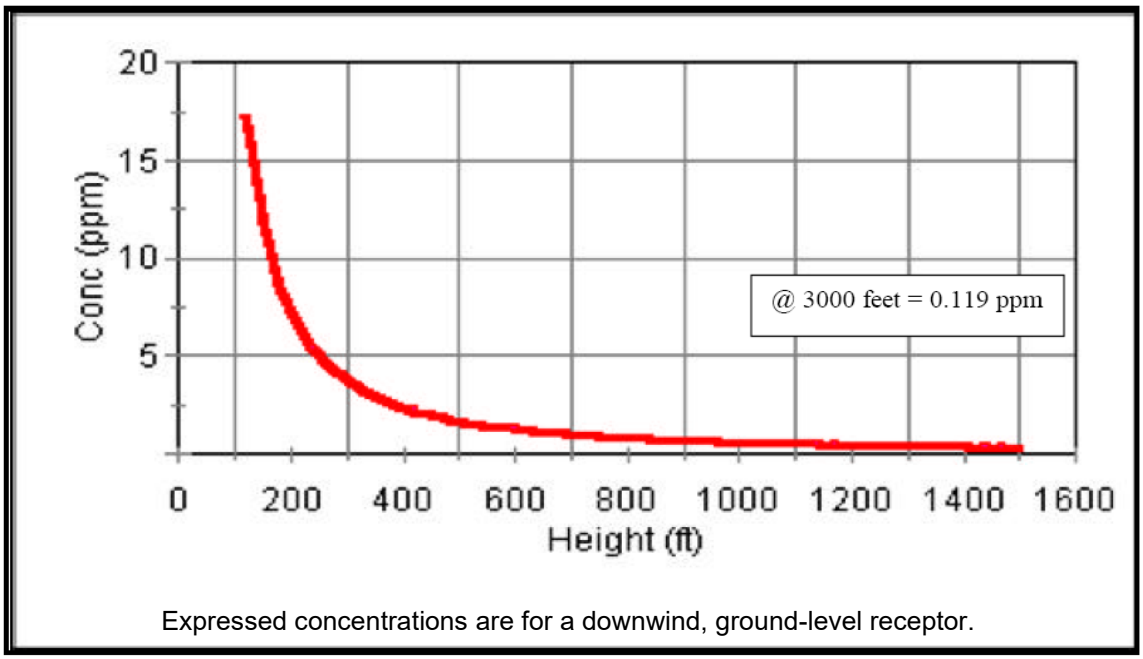

Figure 8: Nitrogen Oxide Concentration Compared to Airplane Elevation AGL

EPA believes emissions from aircraft are a concern during landings and take-offs for the potential effects at ground level. Related to effects on regional air quality, EPA considers only landings, take-offs, and ground operations at urban airports with a high number of flights per day (EPA 2007). These conditions do not exist at UTTR. Further reducing the effects to air quality for potential receptors on the ground, military flights are restricted by the establishment of flight avoidance areas in the vicinity of occupied communities and Fish Springs National Wildlife Refuge. The flight avoidance areas prohibit flight below an altitude of 3,000 feet above the highest obstacle within a horizontal radius of 1.7 miles of populated areas and also below 3,000 feet AGL over the entire Fish Springs area.

Land-Based Activities

Related to the alternatives discussed in this document, various land-based activities that produce regulated air emissions are currently conducted at UTTR. All of these activities comply with EPA and DAQ regulations, and with the UTTR's Title V air quality permit (No. 300036002, last revised on June 19, 2006). The UTTR Title V air quality permit references the following emission units.

Open Detonation (OD), Propellant (designated as Emission unit #1) An activity detonating rocket motors containing Hazard Class 1.1 propellant in TTU area. Fugitive emission source. Current OD limits are NEW of 84,000 pounds per calendar day or 6,552,000 pounds per calendar year. Currently, no detonation of hazard class 1.1 propellants occurs after December 19 of each year, or before February 22 of each year.

OB/OD, Munitions (designated as Emission unit #2 - Fugitive Emission) Activity of destroying obsolete or unserviceable munitions (whole or partial munitions, miscellaneous ordnances

and explosive material, rocket motors) by OB/OD. Exempt from general burning regulation R307-202.

Internal Combustion Sources (designated as Emission unit #6) Includes stationary diesel generators, emergency diesel power generators, and numerous portable generators used to supply temporary power in remote locations in support of test and training activities.

Fuel Dispensing (designated as Emission unit #8) Includes 4 fuel dispensing pumps. No unit-specific applicable requirements.

Fuel Loading Stands (designated as Emission unit #9) Includes 3 fuel loading stands. No unit-specific applicable requirements.

Missile Testing (designated as Emission unit #10) Combustion products from tie down tests of rocket motors, a fugitive emission source. No unit-specific applicable requirements.

General Solvent Use (designated as Emission unit #11) Includes incidental and non-production surface coating throughout the UTTR. No unit-specific applicable requirements.

Testing and Training Activities (designated as Emission unit #12) Fugitive emission sources, includes Kittycat, Wildcat, Eagle Range, numerous test sites, numerous Test Targets, and Craner's Complex. Testing of and training with DoD munitions and weapon systems. No unit-specific applicable requirements.

Fuel Storage Tanks (designated as Emission unit #13) Include underground and aboveground storage tanks. No unit-specific applicable requirements.

Waste Solvent Reclamation (designated as Emission unit #14) Includes 3 Freon Reclaimers. No unit-specific applicable requirements.

Welding and Soldering (designated as Emission unit #15) Includes spot welding for vehicle repair and target manufacturing and soldering performed for missile operation and deactivation processes. No unit-specific applicable requirements.

Landfill (designated as Emission unit #16) Class II and Class IV landfill with a design capacity of 120,000 tons. Contains a wood collection, nonhazardous scrap waste from munitions, scrap building material, and construction debris. No unit-specific applicable requirements.

Range Maintenance - Fugitive Emission Sources (designated as Emission unit #18) Includes range wide destruction of unexploded ordnance (UXO) and operation of gravel pits. Vegetation controls for wildfire prevention on the TTU, firebreaks, targets and test areas. Maintenance of firebreaks, access roads, targets and test areas. No unit-specific applicable requirements.

UTTR Emissions Inventory

Hill AFB air quality managers publish a voluntary air emissions inventory on an annual basis. The results for calendar year 2006 are presented in Table 2. The process-based emission values

in Table 2 include all emissions from land-based activities at UTTR, but the process names do not exactly match the UTTR emission unit names. This is due to the manner in which the computer database program defines processes and performs its calculations.

Table 2: Criteria Pollutant and HAP Emissions for UTTR in 2006

Process	PM-10 (Tons)	PM-2.5 (Tons)	SO_X (Tons)	NO_X (Tons)	VOC (Tons)	CO (Tons)	Lead (Tons)	Total HAPs (Pounds)
External Combustion	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.07
Fuel Dispensing	0.00	0.00	0.00	0.00	0.19	0.00	0.00	16.62
Fuel Storage	0.00	0.00	0.00	0.00	2.25	0.00	0.00	333.02
General Solvent	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.28
Gravel Pits	8.27	2.89	0.00	0.00	0.00	0.00	0.00	0.00
Internal Combustion	0.36	0.36	0.34	5.13	0.41	1.10	0.00	8.84
Missile Testing (Static Fire)	2.72	2.72	0.00	0.24	0.00	0.01	0.00	0.71
Open Burn	12.62	12.62	0.00	1.46	2.61	0.05	0.00	0.00
Open Detonation	21.21	18.80	0.00	6.05	2.93	1.18	0.00	0.00
Ozone Depleting Chemicals	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roads	3.28	0.31	0.00	0.00	0.00	0.00	0.00	0.00
Surface Coating	0.04	0.00	0.00	0.00	0.20	0.00	0.00	145.70
Test and Training	29.13	13.44	0.00	0.16	0.00	0.00	0.00	21.28
Waste Solvent Reclamation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals	**77.62**	**51.14**	**0.34**	**13.05**	**8.58**	**2.34**	**0.00**	**534.51**

PM-10 = particulates less than 10 microns in diameter
PM-2.5 = particulates less than 2.5 microns in diameter
SOx = oxides of sulfur
NOx = oxides of nitrogen
VOC = volatile organic compounds
CO = carbon monoxide
HAPs = hazardous air pollutants

2.3.2 Solid and Hazardous Wastes

Hazardous materials are stored and used at UTTR in support of mission activities. Fuels, oils, solvents, paints, thinners, lithium batteries, chlorine, and sulfuric acid are examples of hazardous materials that are typically used to support operations. Hill AFB operates a hazardous materials management program to track materials from purchase through end use or disposal.

Hazardous wastes include substances that are no longer useful, but because of their concentration, physical, chemical, or other characteristics, may present substantial danger to human health or the environment when released or otherwise improperly managed. Potentially hazardous and hazardous wastes generated at UTTR are managed as specified in the *Hill AFB Hazardous Waste Management Plan* with oversight by personnel from the Environmental Management Division and the Defense Reutilization and Marketing Office. Hazardous wastes at UTTR are properly stored during characterization, and then manifested and transported off site for recycling if available, and if not, then treatment and/or disposal.

Related to the alternatives discussed in this document, UTTR accomplishes OB/OD of hazardous waste explosives and military propellants at the TTU, in accordance with a RCRA Part B Permit.

UTTR has an inactive hazardous waste landfill being addressed by a post-closure permit, and one operational landfill that is permitted to accept Class II and Class IV solid waste.

To mitigate the effects of waste accumulation on target areas, most targets are closed once per year to be cleared of ammunition, explosives, and other dangerous articles, as well as other range residue from active and inactive targets and target complexes. The process includes three types of range clearance. A clearance is conducted within 1,000 meters around each target approximately every five years. Annually, similar clearance is completed within a radius of 300 meters of the target and within 30 meters of all access ways. Periodic clearances require that target areas (within 100 meters of target) are cleared after 75 use days and not more frequently than every 3 months.

Rocket Motors

During static firing of rocket motors, the propellant is consumed. Spent rocket motor casings that are found to contain residual propellant are considered reactive hazardous waste and treated by open burning (OB) at the TTU. All spent casings ultimately become nonhazardous solid waste, and are therefore disposed in the Oasis Class II and Class IV landfills.

TTU OB/OD

The TTU is located approximately five miles northeast of Oasis. The TTU occupies a 2-square mile area and contains three sites used for treating waste munitions by OB/OD. Site 1 is the rocket motor and bulk propellant OB pad. Site 2 consists of three OB/OD pads for treating rocket motors as well as other waste munitions. The pads are used as treatment areas and staging areas for off-loading munitions to be treated on the desert floor immediately to the west of the pads. Site 3 is an inactive munitions burn pan where cartridge-actuated devices and propellant-actuated devices, flares, and small arms ammunition were formerly treated by OB.

In Module III of the RCRA Part B Permit, Section III.B .4, the following NEW limits are placed on each OB/OD event when treating hazardous wastes at TTU Sites 1 and 2.

TTU Site	EPA Waste Code	OB (pounds/event)	OD (pounds/event)
1	DO03 (reactive)	320,000	not applicable
2 (Pads 1,2 and 3)	DO03 (reactive)	320,000	149,900

At the TTU, residues from OB are collected and removed after each event. Metallic waste is separated from the ash and other residue and recycled whenever feasible. The RCRA Part B permit contains specific language regarding how the post-treatment residue and ash must be stored, sampled, determined to be hazardous or nonhazardous, then disposed accordingly. With the exception of large metal fragments, no waste materials, ash, or other residue remains after the OD treatment process. Post-treatment residues from OD activities are not analyzed, but instead taken directly to the Oasis Class II and Class IV landfill for disposal.

Routine soil sampling is conducted at the TTU to confirm treatment effectiveness. Soil, ash, and munitions residue were collected from the TTU treatment sites following OB/OD of propellant and other munitions from February 1994 through July 1996. Of the 107 samples collected, 56 had detectable levels of RCRA-listed metals, with 10 of the samples for soil combined with ash having one or more metals at levels higher than regulatory thresholds for lead and cadmium. At the time of RCRA Part B Permit issuance, a sampling plan was submitted to DSHW to quantify organic, inorganic and explosive constituents in the TTU soils. Reported results from soil sampling events include validated analytical data, a sampling location map, a detailed analysis of data and other pertinent information to determine if future remediation of the soils is necessary.

Inactive Hazardous Waste Landfill 5

Former Landfill 5 is located approximately five miles northeast of Oasis (Figure 1). Landfill 5 consists of six cells in which a variety of hazardous wastes were deposited between 1976 and 1983. The location of the landfill was chosen because of the low soil permeability, low annual precipitation, high evapotranspiration, and remoteness of the site. The wide variety of wastes deposited in Landfill 5 were generated at Hill AFB. Types of waste found in the landfill include but are not limited to: chlorinated and non-chlorinated solvents, heavy metals, PCBs, paints and paint strippers, industrial wastewater sludge, cadmium-contaminated blast media, mercury, and asbestos.

UTTR Class II and Class IV Landfill

One landfill is currently permitted by the State of Utah to operate at UTTR, in the vicinity of Oasis. Both Class II and Class IV waste are disposed at this landfill.

Class II landfills are allowed to contain the following types of waste:

- municipal solid waste;
- any other nonhazardous solid waste, not otherwise limited by rule or solid waste permit; or
- in conjunction with municipal solid waste or other nonhazardous solid waste, waste from a conditionally exempt small quantity generator of hazardous waste.

Class IV landfills are allowed to contain the following types of waste:

- construction/demolition waste, inert waste, yard waste, dead animals;
- upon meeting the requirements of Utah Code, Section 19-6-804 and Utah Administrative Code, Rule R315-320-3(1) or (2), waste tires and material derived from waste tires; or
- upon meeting the requirements of Utah Administrative Code, Rule R315-315-8(3), petroleum contaminated soils.

The landfill permits are managed by the Hill AFB solid waste program manager.

2.3.3 Biological Resources

Of the 369,014 acres comprising the land area of UTTR-North, approximately 8,165 acres (2.2 percent of the land) have been disturbed by the human activities described in Section 2.2.1.1. For the 587,899 acres controlled by USAF at UTTR-South, approximately 20,417 acres (3.5 percent of the land) have been disturbed. Figures 9 and 10 show the portions of UTTR that have been disturbed by human activities.

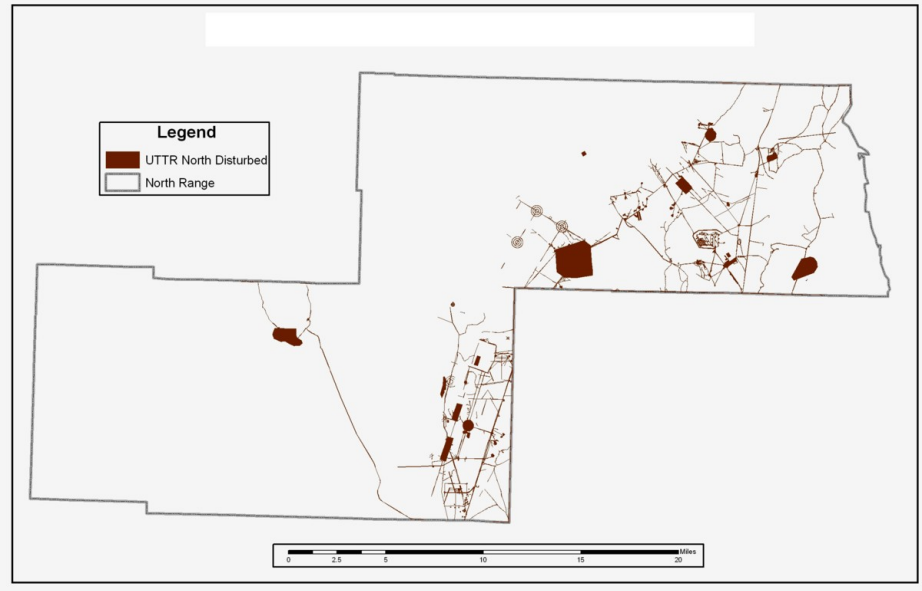

Figure 9: Areas of UTTR-North That Have Been Disturbed by Human Activities

Figure 10: Areas of UTTR-South That Have Been Disturbed by Human Activities

As stated in Section 1.7.2, no species of plants or animals listed as threatened, endangered, or sensitive are known to occur on Hill AFB, but there are eight Tier II species and twelve Tier III species as identified in the Utah Comprehensive Wildlife Conservation Strategy (2005), now known as the State Wildlife Action Plan. This plan defines Tier II species as *those listed on the Utah species of concern list under sole state authority*. These species could potentially be federally listed as threatened and endangered if population numbers become too low. The plan defines Tier III as *species that are of conservation concern because they are linked to an at-risk habitat, have suffered marked population declines, or there is little information available regarding the ecology or status of the species*. The lists of species identified in the State Wildlife Action Plan, as well as species on other important conservation lists found on UTTR, are as follows:

Mammals:

Tier II	*	Dark Kangaroo Mouse	Microdipodops megacephalus
Tier II	*	Kit Fox	Vulpes macrotis
Tier III		Bighorn Sheep	Ovis Canadensis
Tier III		Mule Deer	Odocoileus hemionus

Birds:

Tier II	*+	American White Pelican	Pelecanus erythrohynchos
Tier II	#*+^	Ferruginous Hawk	Buteo regalis
	#^	Golden Eagle	Aquila chrysaetos
	#^	Swainson's hawk	Buteo swainsoni
	#	Northern harrier	Circus cyaneus
Tier II	#*^	Burrowing Owl	Athene cunicularia
Tier II	#*	Short-eared Owl	Asio flammeus
Tier II	#*+^	Long-billed Curlew	Numenius americanus
Tier II	#*+	Grasshopper Sparrow	Ammodramus savannarum
Tier III	#+^	Brewer's Sparrow	Spizella breweri
Tier III		Sage Thrasher	Orescoptes montanus
Tier III	+^	Sage Sparrow	Amphispiza bellii
Tier III	+^	American Avocet	Recurvirostra americana
Tier III	+	Black-necked Stilt	Himantopus mexicanus
Tier III	#^	Peregrine Falcon	Falco perigrinus
	^	Prairie Falcon	Falco mexicanus
Tier III	#^	Snowy Plover	Charidrius alexandrinus
Tier III	+	Black Throated Grey Warbler	Dendroica nigrescens
	^	Loggerhead Shrike	Lanius ludovicianus

Reptiles:

Tier III		Long-nosed Leopard Lizard	Gambelia wislizenii
Tier III		Long-nosed Snake	Rhinocheilus lecontei

* = Bureau of Land Management (BLM) Sensitive Fauna within the Salt Lake Field Office
# = U.S. Fish and Wildlife Service Region 6 Birds of Conservation Concern List (2002)
+ = Utah Partners in Flight Avian Conservation Strategy (2002)
^ = Department of Defense Partners of Flight Birds of Conservation Concern

Wetlands, Mudflats, Playas

The vast majority of UTTR is considered arid, with annual precipitation between five and eight inches, most of which falls as snow during winter months. Areas that are classified as wetlands or jurisdictional waters of the US require protection from destruction or degradation. If one of these areas must be altered or damaged, a permit from the US Army Corps of Engineers is required. There are approximately 15,000 acres of wetlands near Blue Lake, which is located at the western edge of UTTR-South. The Utah Division of Wildlife Resources (DWR) has recognized this area as a unique desert oasis for migrating waterfowl, a warm water fishery, and a recreation area for scuba diving. In August 1974, the General Service Administration deeded 216 acres surrounding Blue Lake to the State of Utah for recreational use. Public access to this area is from the west and does not interfere with UTTR activities.

UTTR contains approximately 29,000 acres vegetated mudflats and playas. These areas exhibit some characteristics of jurisdictional wetlands (such as soil and hydrology). However, because of their association with the Great Salt Lake and high salt content, conditions for wetland plants are not very desirable. It has also been found that these vegetation spots move around from year to year depending on the amount of precipitation, which can lead to fresher water or to ponding, which leads to greater salt concentrations.

Invasive Species

The Air Force is required to prevent the introduction of and limit the impacts of invasive species of plants and animals (Executive Order 13112). On the UTTR, the predominant species of invasive plant species is Cheatgrass (*Bromus tectorum*). This grass species out-competes native grasses and contributes to an increase in rangeland fires. These fires pose safety threats to personnel and can limit military training exercises. Other invasive species of concern include the Salt Cedar or Tamarisk (*Tamarix ramosissima*), Halogeton (*Halogeton glomeratus*), and Dyer's Woad (*Isatis tinctoria*). Current projects include annual removal of invasive plant species such as Dyer's Woad and Tamarisk. Projects used to combat Cheatgrass, Halogeton, and Russian Thistle include controlled burning, spraying, and re-seeding with species capable of competing with these noxious weedy species. Green stripping and fire breaks are also being employed to combat the spread of fire. Monitoring surveys are conducted to track changes in invasive and native plant species. A complete list of invasive species found on UTTR is presented in the Hill AFB Integrated Natural Resources Management Plan (INRMP).

UTTR Habitat Descriptions

The Hill AFB INRMP identifies eight wildlife habitat classes that are distributed over the three basic landforms of valley flats, bajadas, and mountain massifs. Figure 11 displays a representative cross section of the landforms and their associated habitat classes. A description of the characteristics of each habitat class is provided following Figure 11.

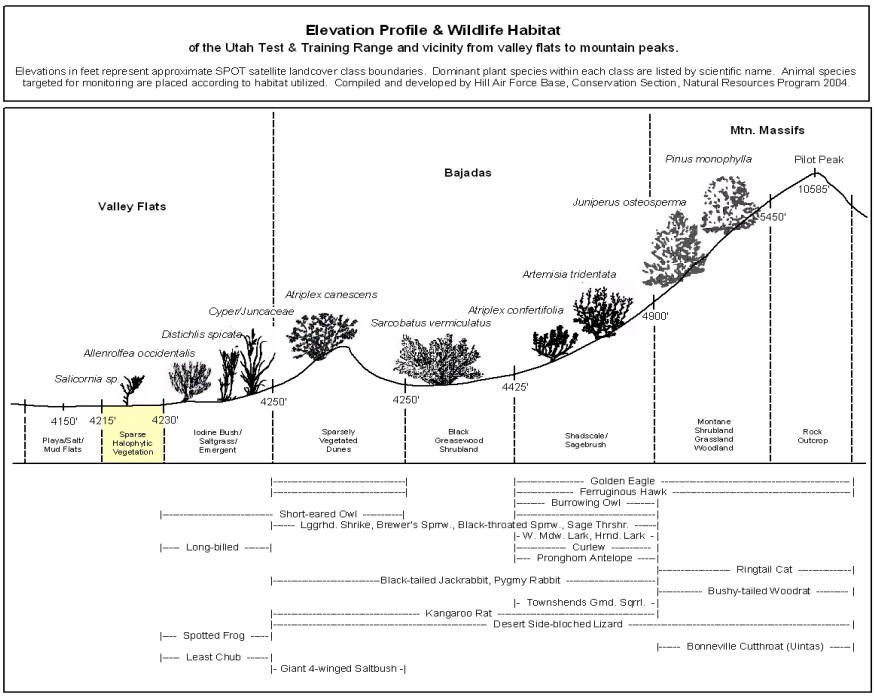

Figure 11: UTTR Landforms and Habitat Classes

Rock Outcrops - Vertical rock faces on exposed rocky outcrops characterize rock Outcrop habitats where bedrock is a dominant landform feature. The great irregularity of a rocky outcrop offers a wide variety of habitats, some directly exposed to harsh climatic conditions, others sheltered and secluded form natures onslaught. These rugged, sculptured rocky landforms with cliffs, and vertical rock faces, provide niches for plants and animals seeking some degree of tolerance from exposure to harsh environmental conditions. This structure can produce many life requirements including; temperature variations, feeding possibilities, reproductive opportunities, roosts, security against predators, and much more. Upon first sight these rock outcrops seem void of most life forms. Only close inspection will express the evidence of living organisms. Crevices extending down the face from the crest allow terrestrial plants to invade the rocky surface well beyond their normal growing range. These crevices created by geological forces of freezing and thawing as well as plant root expansion create an irregularity that provides for a diverse set of micro habitats that may be used by many life forms. Those on open rock faces must contend with heat drying and (in winter) scouring by ice. In places where their steep slopes face towards the sun the rocks absorb heat during the day and stay warm through the night, creating a special, warmer area for cold-blooded animals such as snakes, insects, and scorpions. Telltale white markings on the cliffs below nest sites can often be seen from quite a distance. Rock outcrops are often used as loafing areas by raptors to absorb the heat from the sun, or as lookout points to watch for prey. The environmental diversity of this habitat reveals clear differences in the assemblages of organisms within just a few yards of one another. Rock outcrops do not face major

anthropogenic disturbances on the UTTR or Little Mountain. The vegetation associated with the outcrops may burn on occasion. The range health index (RHI) scores for these habitats should average 0.59.

Montane Shrubland, Grassland, Woodland Complex - In the West Desert region of the Great Basin, these communities were once characterized by an open canopy of Utah Juniper (Juniperus osteosperma), usually as the only tree species. Where these stands of Juniper still occur there is a very sparse under story canopy layer because these trees root system spreads out on the surface and absorbs most of the water and nutrients available. Mountain Mahogany (Cercocarpus ledifolius), though rare can be found on south facing slopes near rock outcrops. Much of the Montane habitats of the West Desert have been burned and denuded of the tree component and as a result a shrub community of Black Sage (Artemisia nova), and grasses such as Salina Wildrye (Elymus salinus), have now become the more common dominant species. Forbs are present but usually comprise less than 3 percent of the canopy cover. Many of these communities have also been severely impacted by past range practices of chaining, tilling, and reseeding with exotic forage grasses. Although the juniper trees appear to regenerate after such disturbances, the effects on under story species are poorly known. These communities occur on slight to very steep hills, mountains, canyon slopes, rolling hills, terraces, and ridges causing the runoff potential to be high. Because of repeated fire events, there are few trees on the UTTR or Little Mountain. The areas that do contain trees should be given special attention during fire events to prevent any further loss. The same consideration should be given to other relatively undisturbed areas of this habitat. Because of the arid climate of the West Desert, successional changes can be extremely slow. Pristine areas lost to fire will take decades or longer to restore themselves. The RHI score for this habitat type should average 0.72.

Shadscale, Cheatgrass, Desert Forbs Group - Extensive stands of the vegetation types in this alliance occur in the transition between the greasewood habitat and the uplands or montane habitats. Shadscale, (Atriplex confertifolia) shrub lands occur on dry desert type ecosystems that receive 5 to 8 inches of precipitation. Sites are nearly flat to moderately steep and occur at elevations between 4200 feet and 6200 feet. Shadscale is thought to have the greatest range in precipitation and temperature tolerance of any of the shrub species of the Great Basin. These shrub lands usually occur on lake plains, terraces, beaches and on alluvial fans. They also occur at higher elevations on benches and hilltops. The soil surface is often mostly barren with medium- to fine-textured soils, but may occur on coarser soils in which sediments are deposited by erosion. In most cases, the soils are alkaline and slightly to strongly saline. If disturbance occurs such as over grazing or fire, Cheatgrass usually becomes the dominant type of vegetation of this habitat. The Shadscale habitat is one of the most prevalent habitats on the UTTR. This habitat is regularly disturbed by fire events and construction of roads, targets, and buildings. This habitat supports a variety of wildlife species. It is the most common habitat to find the Pronghorn that live on or near the UTTR. When disturbances occur, efforts should be made to re-seed with native grass species to prevent Cheatgrass from establishing a foothold. The RHI score for this habitat should average 0.55.

Big Sagebrush Group - Climate type ranges from arid to semi-arid in the sagebrush (Artemisia sp.) habitat. They are found on flat to steeply sloped upland landforms. Plants on sloping landscapes are usually south facing and are commonly found on alluvial fans, foothills and hillsides. Soils are generally moderately deep to deep, well drained, and of loam, sandy loam, clay loam, or gravelly loam textural classes The site is characterized by having a large percent of rock fragments imbedded in the soil, ranging from 35 to 80 percent. The sites have moderate to dense cover coming mostly from the shrubs and grasses. Forbs are frequent but contribute little to the canopy cover. Mosses, lichens, and cryptogams commonly contribute to ground cover. There has been complex ecological interactions develop between fire regimes, grazing history, and climate patterns that have resulted in equally complex patterns of species structure and composition in the Big Sage (Artemisia tridentata) habitat. Shrub densities typically increase with overgrazing of the bunchgrass or with increasing summer drought, excessive grazing may decrease fire frequency due to consumption of herbaceous forage, resulting in increased shrub density. Conversely, invasion by non-native annual grasses such as Cheatgrass (Bromus tectorum) may increase fire frequency sufficiently to eliminate the shrubs from the stands. At fire return intervals lasting numerous years, short-lived re-sprouting shrubs, such as Chrysothamnus tend to be the dominant species. Lastly, if fire is completely absent, deep-rooted shrubs, such as Big Sage species become the dominants. In conclusion, the integrity of this habitat has been compromised by the influence of human settlement, agricultural patterns, current and past grazing and fire management practices. Undisturbed areas of Big Sage are relatively small on the UTTR and Little Mountain. These areas are susceptible to fire events and therefore, are in need of extra fire suppression efforts. If logistically feasible, any anthropogenic disturbances should be avoided or minimized. The RHI scores for Big Sage habitats should average 0.70.

Greasewood - This habitat is comprised of shrub lands found on dunes around pluvial lakes of the Great Basin. The soils are slightly too highly alkaline and saline and they are inhabited by halophytes and chenopod type plants. Sites can be nearly flat to slightly steep (1-15 percent slope). They are located on contouring benches on slopes near the lake level, and usually have southern aspects. Areas associated with lowland sites may receive overland flow during summer thunderstorms but usually have enough relief to drain and not be flooded for a period of time that would be detrimental to the vegetation. However, some sites do have high water tables but Black Greasewood (Sarcobatus vermiculatus) has been known to tolerate saturated soils for a few weeks. This habitat has dense stands of Black Greasewood that may reach heights of six feet. Greasewood is not ordinarily browsed and may be moderately poisonous to livestock in the fall but sheep will use it as winter forage. Fire will burn and kill the tops of Greasewood but it will promptly sprout out from the crown of the root. The UTTR has vast areas covered with the Greasewood habitat. This habitat is frequently disturbed in the construction and use of targets. In an ecosystem void of taller vegetation, greasewood is frequently used as nesting sites for several bird species. The RHI value for the UTTR and Little Mountain Greasewood habitats should average 0.60.

Vegetated and Sparsely Vegetated Sand Dunes - This habitat is characterized by the formation of wind formed dunes; they can reach heights of up to100 feet or more. Some of these dunes with less vegetation and exposed soil tend to become mobile and can move up to

nine feet per year. Vegetation on older established sand dunes can become heavily vegetated and lack some of the characteristics of normal sand dunes. These vegetated sand dunes are more permanent and are not mobile because the vegetation tends to cover the soil and make it stable. Close examination of the soil type needs to be conducted in order to verify the presence of these vegetated sand dunes. Vegetation usually consists of Fourwing Saltbush (Atriplex canescens) and Indian Ricegrass (Achnatherum hymenoides). Salt Cedar (Tamarix chinensis) is the only tree present and occurs in large clumps. The climate is characterized by cold, snowy winters and warm, dry summers with little rainfall. The sediments of the area are windblown from nearby playas and lake flats that are exposed during the dry months of the year from June to September. The soil profile is well drained leaving the soil subject to erosion. Soils are deep having as much as 60 inches of accumulated deposits and holding very little water. The most common concern with this habitat site is the presences of Salt Cedar, which is an invasive species. Efforts have been made to remove these trees, and should be continued until this species is completely removed. The RHI score for this habitat type should average 0.65.

Iodine Bush/Saltgrass/Emergent and Sparse Halophytic Vegetation (combined) - This habitat occurs within arid and semi-arid landscapes. It is associated with topographic depressions usually without drainage. In almost all cases it occurs at sites, which are seasonally moist or flooded, which encourages evaporation concentrates and transported salt and mineral crusts on the soil surface. These habits are maintained by annual cycles of flooding followed by extended periods of drought. The moisture supporting these intermittently flooded plains is usually derived off-site and as a result is dependent upon the adjoining watershed function for existence. The vegetation is linked with hummocks that are scattered throughout the bare ground flats. These hummocks are formed from the deposition by the wind of sandy soil. The hummocks, which can range in height from one to five meters, protect the plants from the effects of flooding. These mounds do not exist indefinitely, as the accumulates sediment and increases in size the distance over which the roots obtain water from the ground increases beyond the plants capacity to do so and the plants die. The mound is then subject to wind and surface flooding erosion and gradually disappears. The vegetation is tolerant of high salinities and pH. The soils are heavy, poorly drained. These habitats occur on the playa lake plains, low lake terraces and terraced lake plains of the Great Basin. Sparse Halophytic habitat type is present on the margins of the mudflats of the UTTR and Little Mountain. The RHI score for this habitat should average 0.40.

Playa/Salt/Mud Flat - This habitat occurs within the unvegetated mud and salt flats of the Great Basin. These areas are arid and semi-arid landscapes. It is associated with extremely flat terrain and is usually without drainage. These salt/mud flats are seasonally moist or flooded, which encourages the accumulation of evaporation concentrates, transported salt, and mineral crusts on the soil surface. The characteristics of this habit are maintained by annual cycles of flooding which promote the accumulation of salts and minerals and increase the pH of the water and soils. The hydrology of this habitat is dictated by the run-off from the surrounding watershed. The absence of vascular plants is due to the accumulation of salts, high pH, and extended periods of inundation of saline water. The soils are heavy and poorly drained because of the absence of drainage features of these inland sea salt/mud flats. These habitats are influenced by the ever

changing high and low watermarks of the Great Salt Lake, which constantly change in conjunction with the amount of run-off from the upland areas. This habitat has experienced some anthropogenic disturbances due to the ruts created by vehicles. These scars have the potential to be long lasting, as evidenced by the continued existence of 19th century emigrant wagon train ruts on the UTTR-North. Through examination of satellite imagery, there are an estimated three to five percent of the mud flats of the UTTR that have been marred by human traffic. The desired outcome for this habitat will be to limit the amount of disturbed mud flats to seven percent or less.

Wetlands - There are approximately 15,000 acres of wetlands near Blue Lake, which is located at the western edge of UTTR-South. These wetlands are primarily lacustrine and slope-fed wetlands. In order to manage and improve the wetlands on Air Force property, the natural resources department has developed a regional guidebook based on the hydrogeomorphic (HGM) method, for the evaluation and classification of wetlands of the Great Basin. This guidebook allows an observer to develop a number index value of the function for each wetland area. Using this index will allow the natural resources manager to determine the impact and mitigation of wetland alterations or improvements. If wetlands must be degraded as part of the military mission, the remediation process, as determined by the Army Corps of Engineers, can be guided more successfully. The desired outcomes for the wetlands of UTTR, is to avoid, minimize, and mitigate the effects of anthropogenic disturbances. By using the functional lift concept of HGM, a management objective of "no net loss" can be achieved. The natural resources program also has future plans for the development of a wetland bank at the Blue Lake Complex to mitigate disturbances in other wetlands.

Open Water - The waters of the west desert including the Great Salt Lake support a rich and dynamic biological system of regional, national, and global importance. Because it has no outlet, lake water varies in both level and salinity. Historic records indicate the surface elevation of the Great Salt Lake has varied from a maximum of 4,211 feet to a minimum of 4,191feet. The lack of outflow contributes to the lake's salinity. While the ocean is 3.5 percent salt, Great Salt Lake salinity varies from 15 percent to 27 percent. This variation in salinity and water level is a result of the combined effects of freshwater inflow from three rivers, precipitation, and evaporation rate. This variation influences the nutrient base and habitats for innumerable plants, invertebrates, reptiles, amphibians, mammals and birds. This variety of interdependent habitats includes wetlands ranging from freshwater to hyper saline, playas, shorelines and uplands. The abundance of bird life at Great Salt Lake has earned its designation as a "Western Hemisphere Shorebird Reserve." It is also the site of the breeding ground of one of the four largest colonies of American white pelicans in North America. Five million birds representing 257 species rely on the lake for resident feeding and sanctuary, breeding, or as a migratory stopover. The ecology of life at Great Salt Lake is an extraordinary example of the rich web of relationships between land, water, and food. Several industries rely on Great Salt Lake for their livelihood; among these are the shrimp cyst industry and the mineral extraction companies that mine sodium chloride, magnesium chloride, potassium chloride, and magnesium metal from the heavy brine.

2.3.4 Surface Soils

The UTTR has as many as 12 separate soil types, but the two most common soils are Playas and Playas-Saltair Complex soils. On UTTR-North, the Playas soil type covers 55 percent of the area, while on UTTR-South; this soil type covers 62 percent of the area. These soils are found primarily in the low-lying, flat portions of the ranges. The Playas are found on lake plains that are relatively barren, undrained basins subject to repeated inundation by water and salinization by evaporation of accumulated water. The soil material in the Playa is strongly calcareous, stratified silt, clay, and sand containing sufficient amounts of salt to limit or prohibit the growth of vegetation. The Playas-Saltair and Saltair-Playas soils are very deep and poorly drained soils also found on lake plains. This soil type is formed in alluvium and lacustrine sediments derived from mixed rock sources. The Playa water capacity is very low, while the Playas-Saltair water capacity is very low to low. Mudflat soils are poorly drained, strongly saline soils that consist of the Playas-Saltair Association. These soils are found on nearly level lake plains or basins that are subject to repeated salt water flooding and salinization by evaporation of accumulated salt water. Mudflat soils are usually smooth, crusted with salt, and patterned by cracks when dry. These soils are also strongly calcareous and have a silty clay, silty clay loam, or silt loam texture.

The next most common soil type in the UTTR-North is the Amtoft Dry-Rock Outcrop Complex that covers nearly seven percent of the ground. On the UTTR-South, the next most common soil type is the Saltair-Playas Complex, which covers 4.5 percent of the ground. Most of the remaining soils are found covering the slopes and upland areas. These consist mainly of silt loam, gravelly-sandy loam, thin cobbly loams, and rock outcrops. Most of these soils are alkaline and covered with sparse vegetation. Very few of the soils that cover the UTTR are suitable for rangeland, wildlife, cropland, roads, or structures.

The surface soils in the vicinity of the land-based facilities discussed in this document are generally flat to gently sloping. There is no evidence of erosion in the vicinity of the UTTR land-based facilities.

2.3.5 Water Quality

Surface Water

No perennial streams originate on UTTR, although there are perennial streams in the Deep Creek Mountains to the southwest, in the Pilot Mountains to the west, and in the Raft River, Grouse Creek, and Goose Creek Mountains to the north. Precipitation is usually short-lived and generates only small quantities of water in this arid environment (4.5 to 5.0 inches per year), although brief, intense thunderstorms can occur. Larger storms cause local ponding on mudflats and in small surface depressions, but the ponds normally last only a few days due to consistently high evaporation rates.

There are numerous perennial springs associated with the mountains, the most notable of which are Blue Lake and Mosquito Willy's on UTTR-South. Any spring water or surface water flow generally infiltrates within a short distance, although minimal amounts of saline surface water (that has not transpired or evaporated) may seasonally flow into an internal basin where it subsequently evaporates. Particularly in springtime, the mudflats can be inundated with water

from snow that has fallen locally as well as from snowmelt that runs off the surrounding mountains. During wet years, UTTR-North mudflats may be flooded by rising water levels in the Great Salt Lake.

The closest surface water body is the Great Salt Lake to the north of UTTR-North, which lies approximately four miles east of the TTU. Because the TTU is located on the west side of the Lakeside Mountains, surface water run-off from the TTU facility is directed to the west, away from the Great Salt Lake, into a local topographic depression.

Ongoing activities at UTTR comply with the *UTTR Stormwater Pollution Prevention Plan*. Best management practices (BMPs) were developed and are followed related to:

- good housekeeping;
- preventive maintenance;
- spill prevention and response;
- inspections;
- employee training;
- record keeping and internal reporting;
- non-stormwater discharge certification;
- sediment and erosion control;
- management of runoff; and
- section 313 water priority chemicals.

The Oasis wastewater treatment facility consists of two wastewater treatment lagoons operating in series, draining to two wetland cells operating in parallel, which in turn drain to a habitat wetland pond. Wastewater flows into the first two lagoons for solids separation and digestion. Effluent from the lagoons flows to the wetland cells that are planted with cattails, bulrushes, and reeds for greater filtering and removal of organic compounds. Effluent from the two wetland cells discharges to a wildlife watering trough and then to the habitat wetland pond that is planted with bulrushes. The wetland cells and habitat pond are about three feet deep with sloped sides to prevent the trapping and drowning of animals that come to drink. The lagoons, cells, and pond are all lined with a polypropylene liner to prevent seepage to underlying soils and to groundwater.

At the TTU, accumulated surface water is monitored on a monthly basis in accordance with permit conditions. Accumulated water that that is likely to facilitate contaminant transport or serve as a water source for wildlife within the TTU boundary is sampled within 24 hours. The samples are analyzed for hazardous constituents.

Groundwater

Groundwater in the valley areas of UTTR occurs under both water table (unconfined) and artesian (confined) conditions. Groundwater quality generally ranges from 2,000 to 5,000 parts per million of total dissolved solids, which makes the water unsuitable for human consumption without treatment. The major constituents in the groundwater are calcium, potassium, magnesium, and sodium bicarbonate.

The principal source of recharge to the groundwater is from precipitation on the adjoining mountains. Recharge occurs primarily above an elevation of 4,600 feet because most of the area below 4,600 feet is underlain by fine-grained lakebed deposits of low permeability and of sufficient thickness to prevent much recharge to the older valley fill. Some underflow from adjoining valley fill and Paleozoic bedrock may also provide recharge.

Groundwater drawn from wells at Oasis is treated by RO before it is suitable for human consumption. The pressure and yield of the Oasis wells is more than adequate to support growth and construction for additional missions.

At the TTU, groundwater is periodically monitored by extracting samples annually from groundwater monitoring wells TTU-1 and TTU-2. The groundwater monitoring program includes:

- procedures for collecting groundwater samples;
- a list of contaminants of concern (COC);
- a list of concentration limits for groundwater constituents;
- procedures for statistical evaluation of the data;
- procedures to determine groundwater elevations;
- procedures to sample and analyze unfiltered groundwater samples; and
- a quality assurance project plan.

If there is a statistically significant increase of the concentration of a COC or the background concentration for any constituent, an additional compliance monitoring program will be created.

Under the terms of the RCRA Part B Permit, groundwater monitoring will be conducted at the TTU during the closure and post-closure care periods to determine whether any remaining contamination could originate from the TTU and impact groundwater quality.

2.3.6 Cultural Resources

Types of Cultural Resources

The term cultural resources is very inclusive and refers to any place, site, building, structure, or object, or collection of these, that was built or used by people. Resources can be either prehistoric or historic. Some cultural resources, such as traditional cultural properties (TCPs) and sacred sites, may be a place without any visible evidence of human use or modification. Not all cultural resources belong to the more restricted class of historic properties. An historic property is:

- any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior;
- the artifacts, records, and remains that are related to and located within such properties; and;
- properties of traditional religious and cultural importance that meet the NRHP criteria.

One kind of cultural significance a property may possess is traditional cultural significance. Traditional in this context refers to those beliefs, customs, and practices that have been passed down through the generations, usually orally or through practice. The traditional cultural significance of a historic property is therefore derived from the role the property plays in a community's historically rooted beliefs, customs, and practices. A TCP is therefore defined as one that is eligible for inclusion in the NRHP because of its association with cultural practices or beliefs of a living community that:

- are rooted in that community's history, and
- are important in maintaining the continuing cultural identity of the community.

Examples of TCPs would include:

- sacred locations associated with American Indian religious beliefs;
- rural communities whose buildings or landscapes reflect cultural traditions valued by the long-term residents; or
- traditional resources areas (e.g., for gathering medicinal plants, eagle feathers, etc.) that a particular group has used for generations.

Although the terms TCP and sacred site are sometimes used interchangeably they are not synonymous. As used by the National Park Service and defined in the National Register Bulletin, *Guidelines for Evaluating and Documenting Traditional Cultural Properties*, the term TCP is an inclusive term that includes the full range of properties that have cultural value, not only those that are sacred. Sacred site, as defined in Executive Order No. 13007, includes:

> ….any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian Tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the Tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site.

It should be noted that some American Indian groups find the term TCP to be offensive because it does not adequately convey the religious significance of a place and imposes a dichotomous relationship between the sacred and secular worlds that is not appropriate for many, if not most, American Indian groups. Thus, the term sacred site is often preferred as it expresses better the deep, spiritual connection between beliefs, places, and activities.

TCPs or sacred sites are not easily identified for they may not exhibit any distinctive characteristics or have any special meaning except for the group that ascribes significance to that particular site, building, or place. Since a TCP/sacred site is intimately tied to the identity of a group, the group will not likely share such information publicly and normal cultural resources surveys will not recognize TCPs. Knowledge of TCPs/sacred sites is often gained only through intensive interaction with groups, particularly through interviews with knowledgeable persons. Since TCPs and sacred sites are often considered to be sensitive by those who use them, information that is obtained regarding their location, significance, and associated rituals or behavior shall be guarded and kept from public view.

Human History for UTTR

UTTR is located in the eastern Great Basin. Humans have inhabited the UTTR and surrounding areas for approximately 12,000 years. Prehistoric peoples across the entire Great Basin lived primarily as mobile hunter-gatherers, adapting through time to changing climatic conditions and population densities. The eastern Great Basin is unique for its Fremont expression, at which time people led largely sedentary lives before resuming a more mobile lifestyle. On UTTR-North and UTTR-South, the archaeology of the earliest Great Basin inhabitants dominates.

The first European presence in present-day Utah began in 1776 with the arrival of the Dominguez-Escalante expedition. In 1846, the Donner-Reed immigrant party crossed the Great Salt Lake Desert on their way to California.

Utah history shares many of the same themes as other western states, but in addition, holds a unique Mormon heritage. In 1847, Mormons began to settle the Great Salt Lake Valley and adjacent areas. Salt Lake City was established and became an important resupply point for California bound immigrants. Mining and ranching activities throughout Utah and Nevada began to expand.

Identified Cultural Resources on UTTR

Approximately 240,000 acres of UTTR-North, UTTR-South, and Wendover Auxiliary Area have been inventoried for cultural resources to date. During those inventories, 444 prehistoric sites, 37 historic sites, and two multi-component sites were identified. There are 231 historic properties (eligible or unevaluated archaeological sites) on UTTR. There are 252 ineligible sites on UTTR. Details on these properties are provided in the Hill AFB Integrated Cultural

Resources Management Plan (ICRMP). Although no studies have been conducted to specifically identify TCPs or sacred sites on Hill AFB-managed properties, one sacred site has been identified by American Indian Tribes (Hill AFB consults with 19 American Indian Tribes identified through an ethnographic study as having ancestral territory on lands managed by Hill AFB, including UTTR). Furthermore, ethno-historical sources, archaeological and ethnographic studies, the inadvertent discovery of American Indian human remains, and the interest expressed by contemporary American Indian Tribes suggest the potential for additional TCPs or sacred sites to exist.

Many of the inventories have been conducted to provide data that is essential for management needs, and to create a 25 percent sample survey of UTTR. This goal was achieved and Hill AFB views the sample survey as completing its basic inventory needs. Nevertheless, the use of such a wide transect interval and the proposal of eight archaeological districts (never recognized by Hill AFB) on the basis of survey data alone have produced a database that is unacceptable for regulatory compliance.

The UTTR geoarchaeological study, *The Archaeology of Shifting Environments in the Great Salt Lake Desert*, combines existing data on the character and location of known archaeological sites on the UTTR with regional site information and geomorphological analysis to address compliance requirements and management concerns regarding cultural resources. Previous sensitivity modeling at UTTR focused entirely on the surface archaeological record; however, it is clear that subsurface cultural resources exist on the training ranges (Carter 2004, Carter 2005, Young 2006, Young 2008a) and that these often significant resources cannot be managed without an understanding of the regional landscape, of the natural forces shaping that landscape, and of the temporal position of the resources. Identifying these factors will allow Hill AFB cultural resources managers to facilitate the Air Force mission in a more responsible and cost-effective manner.

The strategic mission of Hill AFB and the UTTR provides the foundation for data collection and model development. Management needs include clear and timely project planning, expected conflicts with cultural resources, expectations regarding buried archaeological sites, and guidelines for the potential for sites to be eligible for inclusion on the National Register of Historic Places.

The geoarchaeological model augments the existing ICRMP through predictive modeling of surface and subsurface archaeology; in combination this provides management frameworks for determining and enacting priorities regarding cultural resources on the UTTR. The model itself does not fulfill regulatory requirements, but provides a valuable planning tool for managing mission-related activities. The goal is to provide management the tools to clarify the sensitivity of mission-related activities on cultural resources of the UTTR. It does not replace otherwise mandated cultural resources assessments and evaluations. It does, however, provide an efficient means of assessing the overall resource sensitivity for specific areas. The associated maps (Figures 12-13) provide graphical presentation of statistical and spatial information derived from broad geographic information system (GIS)-based datasets and regional archaeological and environmental resources.

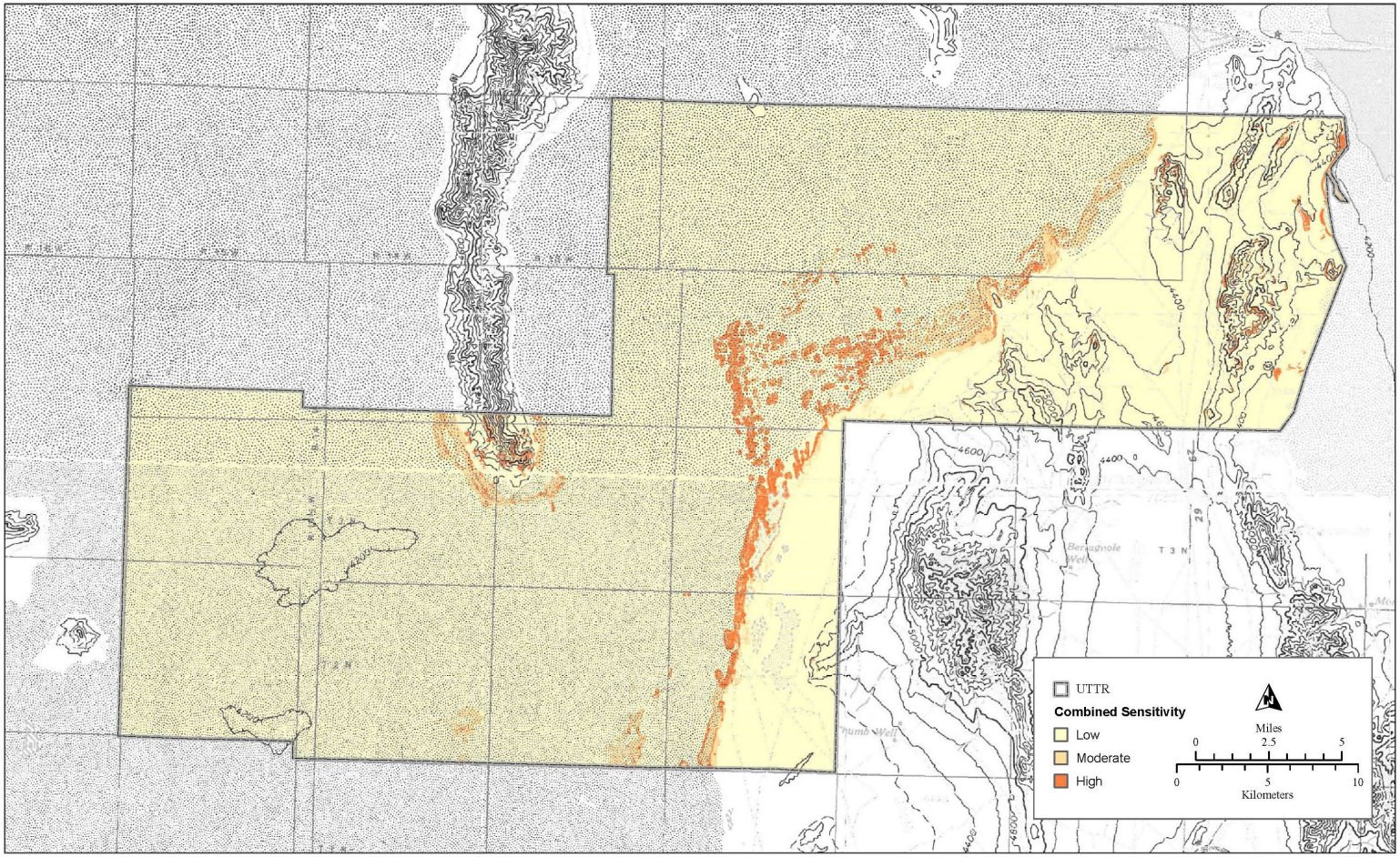

Figure 12: UTTR Geoarchaeological Model - Management Map UTTR-North

Source: Young 2008b

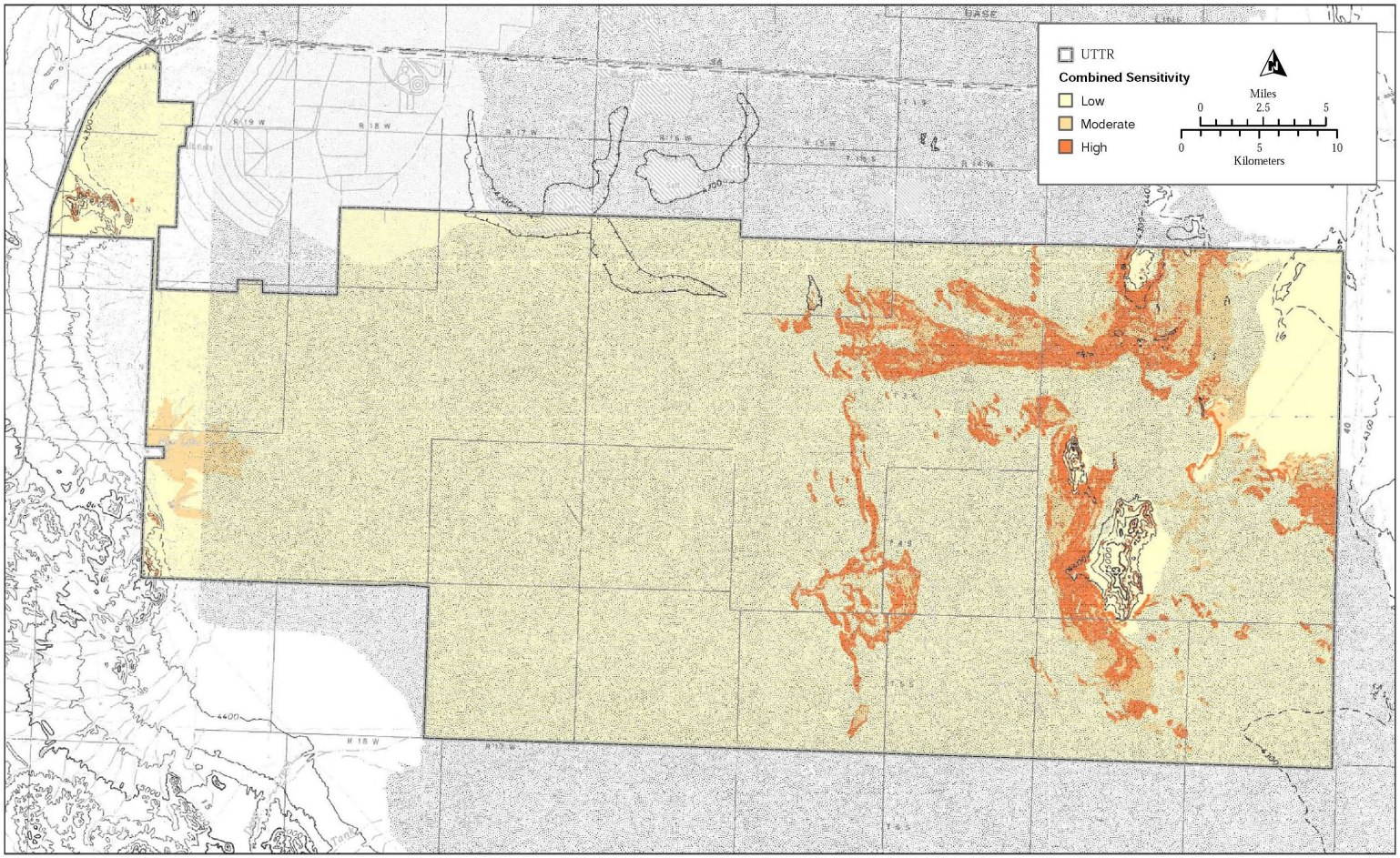

Figure 13: UTTR Geoarchaeological Model - Management Map UTTR-South

Source: Young 2008b

The evidential themes used for the analysis include slope, aspect, distance to water, proximity to prehistoric lake shores, soil age, and land cover. These sensitivity maps specifically address the potential for buried archaeological sites on the lands of the UTTR, with clear presentation of known cultural resources, landform groups, and sensitivity zones emphasizing both surface and buried archaeological contexts.

At UTTR-North, 35 buildings and structures have been recommended as individually eligible for listing in the NRHP. No buildings or structures at UTTR-South are currently recommended as eligible. Figure 14 shows the NRHP eligible buildings at UTTR-North.

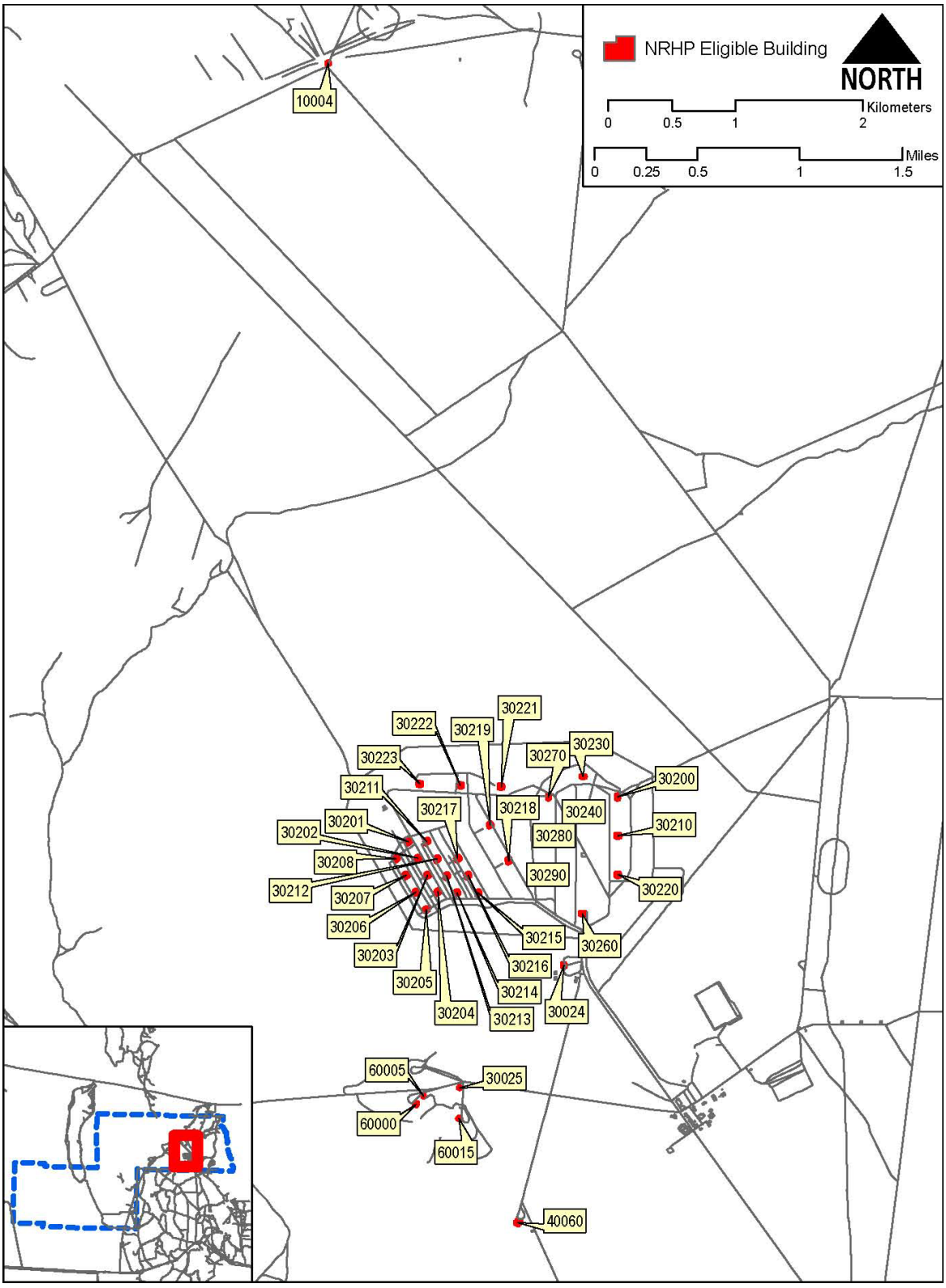

Figure 14: NRHP Eligible Buildings at UTTR-N

2.3.7 AICUZ

Noise at UTTR results from several primary sources and activities including aircraft noise and sonic booms from air testing and training activities; detonations from conventional munitions; artillery firing from conventional munitions; and demolition and construction activities.

A decibel (dB) is the physical unit commonly used to describe instantaneous sound levels. Sound measurement is further refined by using an "A-weighted" decibel (dBA) scale which emphasizes the audio frequency response curve audible to the human ear. Example noise levels include a quiet urban nighttime (40 dBA), an air conditioner operating 100 feet away (55 dBA), and a heavy truck moving 50 feet away (85 dBA).

Aircraft-Based Activities

Because noise can be continuous, steady or fluctuating, intermittent or impulsive, and because human response to noise is extremely diverse, EPA examined noise evaluation methods that could be employed for the protection of public health and welfare with a reasonable margin of safety. EPA recommended use of the day-night average sound level (L_{dn}) as a descriptor of the 24-hour daily noise environment. The L_{dn} is the energy-equivalent average A-weighted sound level (in dB) over a 24-hour period, with a 10 dB penalty added to noise that occurs during the hours of 10:00 p.m. to 7:00 a.m., because nighttime events are considered more annoying than noise occurring during daytime. Ambient L_{dn} levels in remote uninhabited areas would typically range from 33 dB to 40 dB. The L_{dn} measurement is used extensively to assess the noise environment caused by aircraft operations around civilian and military airfields and has been adopted by USAF as the measure for noise regulations. The other developments of L_{dn} are applicable to aircraft noise in other circumstances, such as measuring noise caused by low-level sorties and measuring noise from sonic booms caused by supersonic flights. Noise caused by low-level flying is measured by the onset rate adjusted monthly day-night average sound levels (L_{dnmr}), which is identical to L_{dn} except that a penalty of up to 5 dB is applied to aircraft noise events that have a more sudden rate of onset (which could induce a surprise effect on humans), and the average daily noise is evaluated for the calendar month with the highest number of low-level overflights.

Almost all of the land under the flight operation area is rural countryside with low background noise levels, but with existing conditions of sporadic overflight by low-level military aircraft. Estimated L_{dnmr} noise exposures from low-level operations at UTTR range from 50 dB to 64 dB in the overflown valleys and less in the adjacent mountain areas. Since aircraft do not fly along fixed routes, the existing aircraft activity within the UTTR is not well defined. With the exceptions of avoiding identified noise sensitive areas and altitude minimums and maximums, the aircraft are free to maneuver throughout the area. The Air Force has evaluated noise exposure on the UTTR-South range based on the number of flights, aircraft types, flight altitudes, speeds, and engine power settings. The findings for the UTTR-South Range indicated noise contours of L_{dnmr} 65 dB predominantly along the eastern boundary due to a concentration of flight activity en route to target areas. Of the towns and ranches located under the UTTR-South Range airspace but outside of DoD controlled lands, only three ranches were estimated to have noise exposures of 65 L_{dnmr} or greater due to aircraft operations.

Estimates of aircraft noise indicate that the towns of Callao, Trout Creek, Gandy, and Eskdale lie within a range of 36 to 62 dB L_{dnmr}, and the town of Partoun has a L_{dnmr} of 57 dB due to aircraft noise. The number of persons expected to be highly annoyed under the baseline aircraft noise conditions was estimated to be 16 residents from a total of 385 residents located within the UTTR-south airspace.

The effects of aircraft noise are mitigated in several ways:

- Avoiding restricted areas established as a 1.5 mile radius around the highest point in specified areas of habitation and above the entire Fish Springs Wildlife Refuge.

- Restricting intentional low altitude supersonic flight to the UTTR supersonic operating areas.

- Requiring range users to view a video and/or slide show of UTTR airspace that makes the users aware of areas to be avoided by aircraft.

- Scheduling activities most likely to include low-altitude flights and sonic booms at seasons and times of day when they are least likely to result in startle effects or annoyance; this means minimizing activities during spring and early summer birthing periods for wildlife and livestock, specific dates of local cattle drives, and nighttime or early morning for local residents, to the extent such scheduling does not impede the effectiveness of the overall UTTR mission.

- Informing area residents when composite force training and large force exercise activities are planned, because these are the most complex activities, involve extensive opposed force actions, and are therefore most likely to result in noise in general and in unintentional sonic booms.

- To the extent practical, informing area residents of scheduled opposed missions, which can result in unintentional sonic booms.

- Increasing communication with area residents using web pages and e-mail to provide information to individuals with computers and to the computer facilities at local schools.

- Conducting an educational outreach program through the local schools to explain how noise (including sonic booms) is generated, which types of aircraft operate at UTTR, and how they interact; the goal is to increase interest in and understanding of Air Force operations at UTTR.

- Following a formal procedure to investigate noise complaints from area residents, seeking disciplinary action if air crews acted inappropriately, responding to the person submitting the noise complaint stating whether or not the noise was a violation of USAF policies, and if it was, actions taken to rectify the situation.

Land-Based Activities

OB/OD at the TTU is not allowed to generate ground vibration or noise at levels that have an adverse effect on nearby receptors. The RCRA Part B Permit for UTTR states that due to the isolated location of the TTU, effects from ground vibration are considered to be insignificant.

The RCRA Part B Permit for UTTR stipulates that that noise levels must be below 140 dB for impulsive noise (OD) and below 85 dB for continuous noise (OB). The permit requires implementation of a noise prediction, mitigation and management program, which combines computer modeling with public relations to reduce the impact of noise generated by TTU operations on potential receptors. The effects of OD noise on nearby receptors are evaluated prior to each OD event. Meteorological data are monitored and used to perform sound propagation modeling. A "go" or "no-go" determination is made based on the results of the sound propagation modeling prior to each OD event. A predicted noise level of 120 peak decibels (dBP) or greater at any off-UTTR receptor location results in a "no-go" determination.

A comprehensive noise monitoring study for OD at UTTR was conducted from July through August of 1996 (Dames 1997). The study compared actual sound levels to results of the sound propagation models in use at UTTR. The results verified accurate prediction of sound levels at off-UTTR receptor locations.

2.4 Description of Relevant Pre-Existing Environmental Factors

During scoping discussions and subsequent analysis, no pre-existing environmental factors (e.g., hurricanes, tornados, floods, droughts, earthquakes) were identified for the proposed action.

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