Volume II

Final
Environmental Impact Statement for Activities Associated with Future Programs at U.S. Army Dugway Proving Ground

U.S. Army Dugway Proving Ground
Dugway, UT 84022-5000

April 30, 2003

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°C	degrees Celsius
°F	degrees Fahrenheit
>	greater than
≥	greater than or equal to
<	less than
≤	less than or equal to
%	percent
#	number
µg/g	micrograms per gram
µg/L	micrograms per liter
$\mu g/m^3$	micrograms per cubic meter
µmhos/cm	micromhos per centimeter
4DWX	Four Dimensional Weather System
911 BIO	911 BIO Consequence Management Advanced Concept Technology Demonstration
TM	trademark

A

AAB	Ammunition Accountability Branch
AAFES	Army and Air Force's Exchange System
ABP	agent breakdown product
ACHP	Advisory Council on Historic Preservation
ACTD	Advanced Concept Technology Demonstration
ACWA	Assembled Chemical Weapons Assessment
ADNL	A-weighted DNL
AF	Air Force
AFB	Air Force Base
AFMC	Air Force Materiel Command
AGL	above ground level
AHU	Air Handling Unit
AIRFA	American Indian Religious Freedom Act
AO	Approval Order
AOC	area of concern
AP	Administrative Procedures
AQCR	Air Quality Control Region
AQRV	Air Quality Related Value
AR	Army Regulation
Army	U. S. Army
ARPA	Archaeological Resources Protection Act
AST	above ground storage tank
ATEC	U.S. Army Test and Evaluation Command
Avery	Avery Technical Center

B

Baker	Baker Area
BERAP	Biological Emergency Response Assistance Plan
BG	*Bacillus subtilus* var. *niger*
bgs	below ground surface
BL	biosafety level

BLM	Bureau of Land Management
BMTF	Bushnell Materiel Test Facility
BOD	Biological Oxygen Demand
BP	Before Present
BRAC	Base Realignment and Closure
BT	*Bacillus thuringiensis*
BTU	British Thermal Unit
BW	biological warfare
BWC	Biological Weapons Convention
BYU	Brigham Young University
BZ	2-quinuclidinyl benzilate

C

CAA	Clean Air Act
CAC	containment aerosol chamber
CAIRA	Chemical Accident/Incident Response and Assistance
CALCM	Conventional Air Launched Cruise Missile
Carr	Carr Facility
CAWMP	Chemical Agent Waste Management Plan
CB	*Coxiella burnetii*
CBDP	Chemical and Biological Defense Program
CBR	Chemical Biological-Radiological
CCR	consumer confidence report
CCTF	Reginald Kendall Combined Chemical Test Facility
CDC	Center for Disease Control
CDNL	C-weighted DNL
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CG	phosgene
CGWMP	Comprehensive Groundwater Monitoring Plan
CHWSF	Central Hazardous Waste Storage Facility
Cine-S	Cinesextant
Cine-T	Cinetheodolite
CM	cruise missile
cm	centimeter(s)
CO	carbon monoxide
Co	county
COE	U.S. Army Corps of Engineers
CRMO	Cultural Resource Management Officer
CS	o-chlorobenzylidene malonitrile, also popularly known as “tear gas”
CSC	Closed System Chamber
CST	Civil Support Team
CSU	Colorado State University
CUCV	Commercial Use Cargo Vehicle
CW	chemical warfare
CWA	Clean Water Act
CWC	Chemical Weapons Convention
CWS	Chemical Warfare Service

D

DAS	data acquisition
dB	decibels
dBA	A-weighted decibels
dBC	C-weighted decibels
dBP	linear peak sound level
DCP	Disaster Control Plan
DeCA	Defense Commissary Agency
DEIS	Draft EIS
DEM	diethyl malonate
DEP	Directorate of Environmental Programs
DERP	Defense Environmental Restoration Program
DIS	Division of Installation Support
Ditto	Ditto Technical Center
DNL	day-night average sound level
DOD	Department of Defense
DPG	U.S. Army Dugway Proving Ground
DPGR	DPG Regulation
DRMO	Defense Reutilization and Marketing Office
DTC	Defensive Test Chamber
DU	depleted uranium
DWSP	Drinking Water Source Protection

E

EA	environmental assessment
ECRT	Environmental Characterization and Remediation Technology
EH	*Erwinia herbicola*
EIS	environmental impact statement
ENMP	Environmental Noise Management Plan
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act

F

FAASV	field artillery ammunition support vehicle
FAT	final acceptance test
FE	Fly's Eye
FEIS	Final EIS
FLPMA	Federal Land Policy and Management Act
FMZ	fire management zone
FONSI	finding of no significant impact
ft	foot or feet
ft^3	cubic foot or feet
FTS	Flight Termination System
FUDS	Formerly Used Defense Sites

Future Programs EIS	Environmental Impact Statement for Activities Associated with Future Programs at U.S. Army Dugway Proving Ground
FY	fiscal year

G

g	gram(s)
GA	ethyl N,N-dimethylphosphoroamidocyanidate (or Tabun)
GB	isopropyl methylphosphonofluoridate (or Sarin)
GC	gas chromotography
GD	pinacolyl methylphosphonofluoridate (or Soman)
Geneva Protocol	Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous, or other Gases, and of Bacteriological Methods of Warfare
GF	cyclohexyl methylphosphonofluoridate (or Cyclosarin)
gpd	gallon(s) per day
GPI	Granite Peak Installation
gpm	gallon(s) per minute

H

H	Levinstein Mustard
HAFB	Hill Air Force Base
HAMOTS	High Accuracy Multiple Object Tracking System
HAP	hazardous air pollutant
HC	hexachloroethane
HD	bis(2-chloroethyl) sulfide (or Distilled Mustard)
HEMTT	Heavy Expanded Mobility Tactical Truck
HEPA	high-efficiency particulate air
HERA	High Explosive Rocket Assisted
HiRes	High Resolution Fly's Eye
HIV	Human Immunodeficiency Virus
HMMWV	High Mobility Multipurpose Wheeled Vehicle
HMX	cyclo-1,3,5,7-tetramethylene 2,4,6,8-tetranitramine (or High Melting Explosive)
hp	horsepower
HP	High Probability Cultural Resource Area
HSMS	Hazardous Substances Management System
HT	bis(2-chloroethylthioethyl) ether mixture (or Distilled Levinstein Mustard)
HVAC	heating, ventilation, and air conditioning
HWMP	Hazardous Waste Management Plan
HWMU	hazardous waste management unit

I

I-80	Interstate 80
ICRMP	Integrated Cultural Resources Management Plan
ICUZ	Installation Compatible Use Zones
IDW	investigation derived waste
INRMP	Integrated Natural Resource Management Plan
IPP	Intermountain Power Project
IRP	Installation Restoration Program

ITAM	Integrated Training Area Management

J

JDAM	Joint Direct Attack Munitions
JSOW	Joint Standoff Weapon
JVAP	Joint Vaccine Acquisition Program

K

kg	kilogram(s)
km	kilometer(s)
kph	kilometers per hour
kW	kilowatt(s)

L

L	liter(s)
L/day	liter(s) per day
L/min	liter(s) per minute
LALSR	Low Altitude Large Scale Reconnaissance
LAT	lot acceptance test
lb	pound(s)
LC	lethal concentration
LC50	lowest concentration that results in death of 50 percent of animals
LCLo	lowest concentration
LCTA	Land Condition Trend Analysis
LD	lethal dose
LD50	lethal dose that results in death of 50 percent of animals
LDLo	lowest dose
LEQ	equivalent level
LRAM	Land Rehabilitation and Management
LSTF	Lothar Salomon Life Sciences Test Facility

M

m	meter(s)
m^2	square meter(s)
m^3	cubic meter(s)
MAAF	Michael Army Airfield
MAPS	Monitoring Avian Productivity and Survivorship
Max	maximum
MCL	maximum contaminant level
MeS	methyl salicylate
mg	milligram(s)
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mgd	million gallons per day
mi	mile(s)

Min	minimum
min	minute(s)
MIST	Man in Simulant Testing
mL	milliliter(s)
mm	millimeter(s)
MP	Medium Probability Cultural Resource Area
mph	miles per hour
MRTFB	Major Range and Test Facility Base
MS	mass spectrometry
MS2	Bacteriophage MS2
MSDS	Material Safety Data Sheet
MSL	mean sea level
MTAMP	Maneuver Training Area Management Plan

N

NA	not applicable
NAAQS	national ambient air quality standards
NaCl	sodium chloride
NAGPRA	Native American Graves Protection and Repatriation Act
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
ND	not detected
NEPA	National Environmental Policy Act
NG	National Guard
NHPA	National Historic Preservation Act
NIH	National Institute of Health
NIOSH	National Institute of Occupational Safety and Health
No.	number
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOI	Notice of Intent
NO_x	nitrogen oxides
NRC	Nuclear Regulatory Commission
NRHP	National Register for Historic Places
NTU	Nephelometric Turbidity Units

O

OB	open burning
OD	open detonation
OB/OD	Open Burn/Open Detonation
ODOBi	Open Detonation/Open Burn, Improved
OSHA	Occupational Safety and Health Administration
OVA	Ovalbumin
oz	ounce(s)

P

PAM	pamphlet
PAS	Pollution Abatement System
PCB	polychlorinated biphenyl
pCi/L	picocuries per liter
PCR	polymerase chain reaction
PCS	Potential Contamination Source
PGM	precision guided missile
PINS	Portable Isotopic Neutron Spectroscopy
PM_{10}	particulate matter less than 10 microns
PMCD	Program Manager for Chemical Demilitarization
POL	petroleum, oil, and lubricants
PPE	personal protective equipment
ppm	parts per million
PSD	prevention of significant deterioration
psi	pounds per square inch

Q

QAPP	Quality Assurance Program Plan
QASAS	Quality Assurance Specialist Ammunition Surveillance

R

R	Rule
RANS	Range Squadron
RCRA	Resource Conservation and Recovery Act
RDT&E	Research, Development, Test, and Evaluation
RDX	cyclo-1,3,5-trimethylene-2,4,6-trinitramine
REC	Record of Environmental Consideration
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
ROD	Record of Decision
RP	red phosphorus
RRM	range recovered munition
RTECS	Registry of Toxic Effects of Chemical Substances
RVFV	Rift Valley Fever Virus

S

SAM	Surface-to-Air Missile
SAMS	Surface Atmospheric Measurement System
SDP	Summary Development Plan
SDWA	Safe Drinking Water Act
SEB	Staphylococcal enterotoxin B
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Officer
SLTEST	Surface Layer Turbulence and Environmental Sciences Test
SO_2	sulfur dioxide
SOP	standing operating procedure

SO_x	sulfur oxides
SPCCP/ISCP	Spill Prevention, Control, and Countermeasures Plan/Installation Spill Contingency Plan
sq	square
SR	State Road
SVOC	semi-volatile organic compound
SWAT	Special Weapons and Tactics
SWMU	solid waste management unit

T

T	total
TAFAS	Toxic Agent Filter Abatement System
TBD	to be determined
TCEOP	Tooele County Emergency Operations Plan
TCLo	lowest toxic concentration
TDLo	lowest toxic dose
TDS	total dissolved solids
Temp	temperature
TEP	triethyl phosphate
TEU	Technical Escort Unit
TM	technical manual
TNT	trinitrotoluene
TOC	total organic carbon
TOSS	Television Ordnance Scoring System
TOX	total organic halogens
TPAD	Thermal Pollution Abatement Device
TPH	total petroleum hydrocarbons
TRMS	Test Resource Management System
TS	target site
TSCA	Toxic Substance Control Act
TSDF	treatment, storage, or disposal facility
TSS	total suspended solids

U

UAC	Utah Administrative Code
UDAQ	Utah Division of Air Quality
UDDW	Utah Division of Drinking Water
UDRC	Utah Division of Radiation Control
UDSHW	Utah Division of Solid and Hazardous Waste
UDWR	Utah Division of Wildlife Resources
UDWQ	Utah Division of Water Quality
UPDES	Utah Pollution Discharge Elimination System
U.S.	United States
USAEHA	U.S. Army Environmental Hygiene Agency
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank

UTTR	Utah Test and Training Range
UTTR-North	Designated North portion of the UTTR
UTTR-South	Designated South portion of the UTTR
UTTR-South AF	Air Force controlled UTTR-South
UTTR-South Army	Army controlled UTTR-South
UXO	unexploded ordnance

V

VEE	Venezuelan equine encephalomyelitis
VOC	volatile organic compound
VRMS	Visual Resources Management System
VV&A	verification, validation, and accreditation
VX	O-ethyl S-(2-diisopropylaminoethyl) methylphosphonothioate

W

WAFAFR	Wendover Air Force Auxiliary Field Range
WDTC	West Desert Test Center
WMD	Weapons of Mass Destruction
WP	white phosphorus

Y

yd^3	cubic yard(s)

1.0 Introduction

This Environmental Impact Statement for Activities Associated with Future Programs at U.S. Army Dugway Proving Ground (Future Programs EIS) has been prepared by the U.S. Army Dugway Proving Ground (DPG) for decision makers at DPG and to inform the public (i.e., stakeholders) of these planned activities.

The Future Programs EIS addresses the planned mission at DPG, the reasonable alternatives to the planned mission, and potential environmental impacts of DPG's future operations.

The future mission assessed in this EIS consists of those mission and support activities planned or anticipated to be conducted at DPG during the next 7 years.

DPG is a Department of Defense (DOD) Major Range and Test Facility Base (MRTFB) operated by the U.S. Army Developmental Test Command, which is a major subordinate command of the U.S. Army Test and Evaluation Command (ATEC). The facility encompasses 3,234 square (sq) kilometers (km) (798,855 acres) located in western Utah, approximately 129 km (80 miles (mi)) southwest of Salt Lake City, UT. DPG's location is identified on Figure 1.0-1, DPG Location Map.

DPG is the only U.S. Army (Army) installation large and remote enough to permit comprehensive and realistic testing of biological and chemical defense systems, munitions, and smokes, obscurants, and illuminants with a commitment to environmental protection and personal and public safety. No open-air testing of chemical or biological agents has been conducted at DPG since September 1969.

DPG is the Department of Defense's leader in smoke and obscurant testing.

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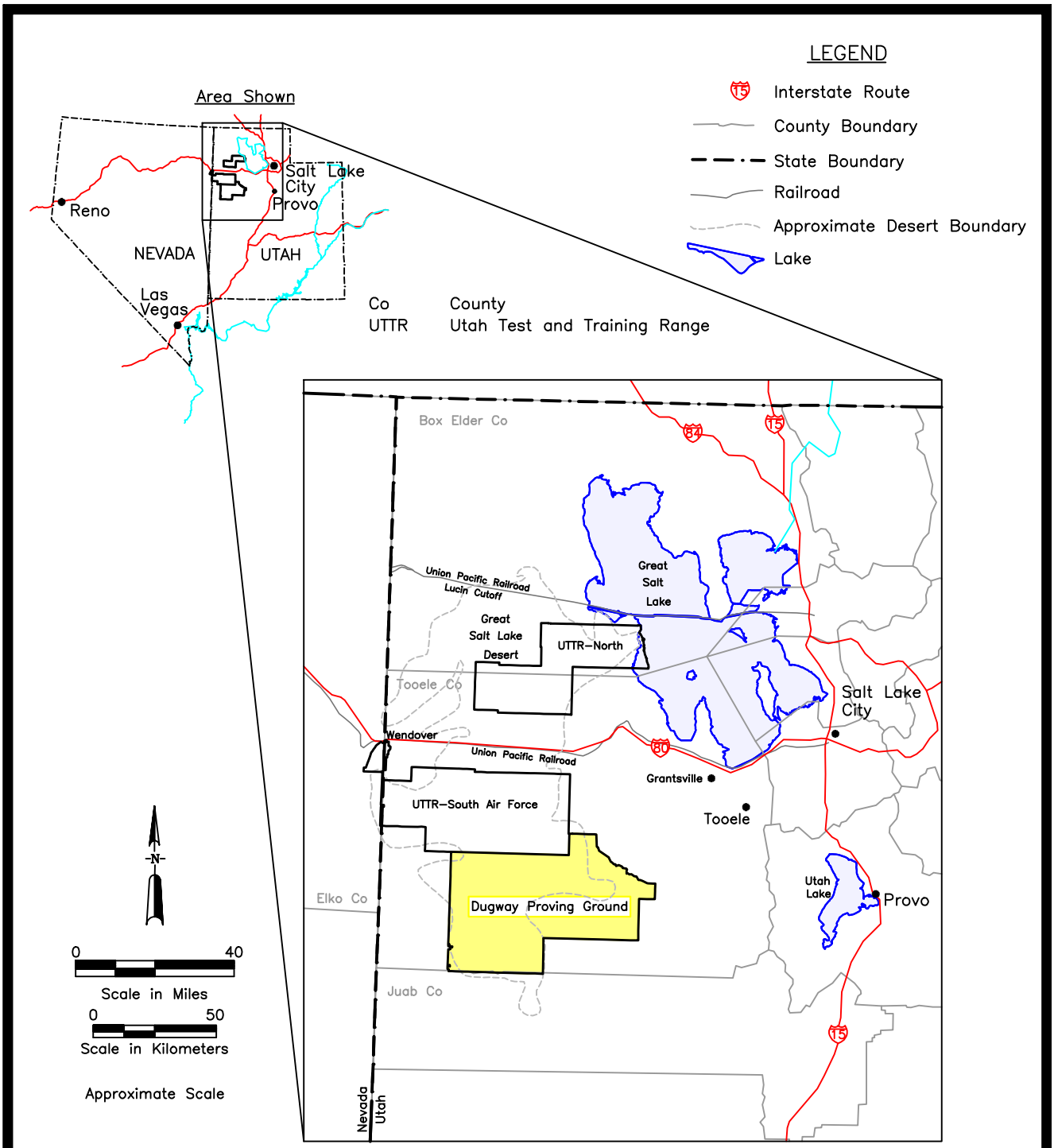

Figure 1.0–1

DPG Location Map

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DPG conducts all of its test activities in accordance with the International Convention on the Prohibition of the Development, Production, and Stockpiling of Bacteriological and Toxic Weapons and Their Destruction signed by the United States on April 10, 1972 at the International Biological Weapons Convention and the Chemical Weapons Convention (CWC) which became enforceable under international law on April 29, 1997. An understanding of the terms "chemical and biological agent" and "chemical and biological simulant" is essential in the understanding of DPG's mission and this EIS.

The term chemical agent is used in the Future Programs EIS to mean a chemical substance intended for use in military operations to kill, seriously injure, or incapacitate persons through its physiological effects. Chemical herbicides, riot control agents, smoke, obscurants, and flame retardants are excluded from this definition.

The term biological agent is used in the EIS to mean a pathogenic microorganism and any naturally occurring, genetically manipulated, or synthesized component of biological origin that is capable of causing:

- Death, disease, or other biological malfunction in humans, animals, or plants
- Deterioration of food, water, equipment, or supplies

The term chemical simulant is used in the EIS to mean a chemical substance that shares at least one characteristic of a chemical agent but with a reduced physiological effect.

The term biological simulant is used in the EIS to mean a biological substance, or microorganism that shares at least one physical or biological characteristic of a biological agent, has been shown to be non-pathogenic, and can be used for biological defense testing to replace the agent under study.

DPG also performs an important role in training DOD active and reserve components to ensure defense readiness. DPG's mission and organization are described in Section 2.1.1, Mission Description and Organization.

This chapter provides an overview of DPG and the framework for the Future Programs EIS by discussing the following:

- Proposed Action
- Purpose and Need for Action
- Scope of the EIS
- DPG History

- National Environmental Policy Act (NEPA) Review Process
- Results of Scoping
- Organization of the Future Programs EIS

1.1 Proposed Action

The Proposed Action described and evaluated in this Future Programs EIS is the implementation of DPG's planned mission for a 7-year time frame. This mission includes:

- Continuing baseline mission components of testing, technology development, and training with increases in most activity areas
- Implementing plans for diversification of operations
- Implementing a Summary Development Plan (SDP) identifying real property planning recommendations for DPG

Three alternatives to the Proposed Action are also described and evaluated, including a "no action alternative," required by regulations implementing NEPA. The Proposed Action and alternatives are described in detail in Chapter 2.0, Baseline Activities, Proposed Action, and Alternatives.

The Proposed Action is DPG's preferred alternative. The preferred alternative is the alternative identified by DPG as the lead agency that it believes would best fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors. The Proposed Action or any action alternative cannot be implemented until completion of the NEPA review process.

1.2 Purpose and Need for Action

The purpose of this EIS is to analyze and disclose the potential environmental impacts of the Proposed Action and alternatives. The Future Programs EIS is an installation-wide EIS that evaluates the interaction of the numerous activities and programs at DPG, rather than focusing on individual impacts of specific activities and programs. The Future Programs EIS also provides environmental analysis for implementation of the SDP.

DPG's large size, remoteness, and its extensive range infrastructure combine to offer an attractive test, technology development, and training site for many customers. DOD customers include all military branches within DOD. DPG is expanding services to existing customers, such as international military and Federal

agencies, and is increasingly serving the needs of non-DOD customers such as the U.S. Department of Energy, U.S. Department of Justice, National Aeronautics and Space Administration (NASA), private entities, and academia requiring test, technology development and training services.

Both DOD and non-DOD customers are posing challenges for DPG to support greater numbers of tests and training events related to new enemy threats, next generation materiel, advanced conventional weapon systems, environmental concern, and demilitarization technologies. The Proposed Action is needed to enable DPG to effectively respond to the challenges of a growing and diversified mission.

DPG's goals in preparing this Future Programs EIS are to:

- **Maintain compliance with NEPA, which is discussed in Section 1.5, National Environmental Policy Act Review Process**
- **Evaluate the potential environmental impacts of the Proposed Action and alternatives**
- **Improve and coordinate DPG plans to fulfill its mission while protecting human health, sustaining its environment, and maintaining regulatory compliance**
- **Document known installation-wide existing environmental conditions**
- **Facilitate cost-effectiveness of future DPG NEPA documents by tiering which is the process of covering a topic in a broad-scope document with further narrow-scope document(s) covering the topic more precisely**
- **Assess the potential cumulative impacts to the environment from all DPG activities and other regional activities**

1.3 Scope of the EIS

The scope of the Future Programs EIS has been defined by the following factors:

- The Future Programs EIS broadly assesses the potential environmental impacts of DPG mission activities and tenant activities which DPG exercises some reasonable control over, such as the Utah Army National Guard and other reserve components. Installation decisions including any mitigation measures identified within the Future Programs EIS apply to both DPG and tenant activities. Tenant activities at DPG require NEPA documentation and approvals for the specific proposed actions.

- Since installation-wide EISs address the broad array of mission activities, not specific tests, a future planning time of 7 years has been used to focus the

analysis. The determination of time frame is based on the rationale that the nature of DPG mission activities, such as the type and level of intensity of testing and training activities, can be reasonably well defined for a 7-year outlook.

- The time frame for consideration of future programs in the Future Programs EIS ensures that the general type and intensity of most of DPG's future activities will be addressed. Because DPG's primary mission is testing technical military defense equipment and systems, a range of factors such as future technology developments, available budgets and changing defense threats often alter test plans. Specific program designations and equipment/materials to be tested may change between the time that this EIS is prepared, and the actual test date. Accordingly, this EIS identifies the general characteristics of reasonably foreseeable types of tests, rather than providing definitive and specific test information.

- It is likely that mission activities could occur at DPG over the next 7 years that cannot be identified in this EIS. The approach to address these unknown components is that future programs or activities at DPG not assessed herein will be "tiered" from this EIS to their own NEPA documentation. An accepted NEPA practice, "tiering" uses specific program documentation to build upon the environmental analysis presented in this EIS, to prepare a NEPA document that provides detailed environmental analysis for programs once they are better defined.

- Activities for which DPG is the proponent or has a high level of control are included in this EIS. For Air Force (AF) activities controlled by that branch of military service, DPG does not have control over the responsible official nor the authority to make a decision. The Utah Test and Training Range (UTTR) has priority use of the airspace west of Granite Peak, and routinely uses this airspace for test and/or training activities. The AF manages the UTTR as a test and training facility for high performance aircraft, which are principally based out of Hill Air Force Base (HAFB), Utah. On an occasional basis, the AF will conduct test and training activities east of Granite Peak, and at Michael Army Airfield (MAAF). Because the AF is the proponent for UTTR activities, and because the AF is responsible for the scope, timing, and frequency of such air activities, UTTR activities are not addressed under the baseline or Proposed Action of the Future Programs EIS. The Future Programs EIS considers the impacts of AF activities and their cumulative effects when combined with DPG activities in Chapter 5.0, Cumulative Impacts.

- Open-air testing of chemical and biological agents and radiological materials is not considered herein because this EIS addresses only existing and future activities at DPG. No open-air testing of biological or chemical agents or radiological materials has been conducted at DPG since September 1969.

- Environmental impacts of pre-1969, open-air testing of biological, chemical or radiological materials and/or agents, resulting in the creation of solid and hazardous waste management units, are addressed in DOD's Defense Environmental Restoration Program (DERP) and DPG's State of Utah Resource Conservation and Recovery Act (RCRA) permit. The DERP and State of Utah RCRA permit establish an Installation Restoration Program (IRP) at active sites, and the Formerly Used Defense Sites (FUDS) program at inactive sites. Since the RCRA permit process is the functional equivalent of NEPA, these DERP and RCRA programs are not open for comment under this NEPA review process. However, for informational purposes, the IRP and FUDS programs are summarized in Chapter 3.0, Affected Environment, and Chapter 5.0, Cumulative Impacts, respectively.

- This EIS does not address changes, increases, and decreases in activities that occurred before the enactment of NEPA. Baseline environmental conditions are stated in Chapter 3.0, Affected Environment. Such baseline conditions may include groundwater contamination, etc. Potential effects on existing conditions are discussed in the EIS to the extent that future changes, increases, or decreases in testing and training activities would affect the environment. However, activities in existence before the effective date of NEPA are not specifically evaluated in this EIS.

- Potential environmental impacts from activities occurring at DPG that are identified as occurring within and beyond the installation boundaries are addressed with respect to all relevant locations. Identified potential environmental impacts occurring beyond the installation boundaries have been evaluated with potential cumulative impacts from other regional activities in Chapter 5.0, Cumulative Impacts. Where impacts from regional activities outside DPG have the potential to affect DPG, these impacts are also summarized as part of the cumulative impacts analysis.

- As stated in Army Regulation (AR) 200-2, Environmental Effects of Army Operations, military classification of data pertinent to a proposed action does not relieve the Army of the necessity to assess and document the environmental effects of the proposed action. Where classified data are necessary to assess environmental effects under NEPA, NEPA documents are often separated into

classified and nonclassified volumes (typically prepared by different parties), consistent with applicable military regulations.

In those cases where only a small component of an overall proposed action is classified and that component is not needed to assess the environmental effects of a proposed action, the proposed action can be assessed in a single, nonclassified EIS. This is the case with the Future Programs EIS, which addresses both classified and nonclassified components of the DPG mission without distinction. No classified data are included in this EIS; however, the potential environmental impacts of classified mission activities are fully assessed, consistent with NEPA and applicable military regulations.

- The Proposed Action calls for implementation of an updated real property master plan. The Army considers "real property" to be permanent facilities such as structures, buildings, roads, and associated infrastructure. DPG has chosen to prepare an SDP to meet the real property master plan requirement for the EIS and to serve as a tool to analyze the installation's current and future planning needs. The SDP summarizes the essential elements of the real property master plan; it describes existing conditions and provides an overview of future development. Proposed actions from the SDP are included in the Future Programs EIS Proposed Action.

1.4 DPG History

A wide variety of military operations has been conducted for nearly 60 years at DPG. Although this Future Programs EIS is concerned with the foreseeable future mission, knowledge of DPG's operational and facility history is essential in understanding the testing and training mission and the environment at DPG.

The following three eras define the history at DPG:

- World War II Era
- Korean War to the Late 1960s Era
- Modern Era

1.4.1 World War II Era

DPG was established in 1942 with the entrance of the United States (U.S.) into World War II. The U.S. determined it was necessary to prepare for enemy chemical warfare capabilities because of the strength of the German and Italian chemical industries and the fact that these countries had used chemical weapons in World War I.

At that time, the Chemical Warfare Service (CWS) had determined that their testing facilities at Aberdeen Proving Ground, MD were inadequate and that expansion potential was limited. Using information from the Federal Grazing Service in combination with site surveys conducted in early 1942, Major John Burns of the CWS identified a testing site that offered suitable climate, remoteness, and space for expansion in the desert area of western Utah. On February 6, 1942, President Franklin D. Roosevelt ordered the transfer of an initial 513 sq km (126,720 acres) of public domain land to the CWS. Six days later, DPG was officially established. An additional 574 sq km (141,680 acres) of the public domain was withdrawn and transferred to the CWS in April 1942. Subsequent land withdrawals and transfers, and purchases of land from the Hatch Brothers and the State of Utah contributed to the installation area of approximately 3,234 sq km (798,855 acres) (Arrington and Alexander, 1964).

Construction of roads and facilities at the area known today as the Ditto Technical Center (Ditto) commenced immediately after DPG was established. The location of Ditto is shown on Figure 1.4-1, DPG Points of Interest. By mid-May 1942 barracks were nearly completed at DPG. By summer 1942, laboratories, magazines, and machine shops were operating. Construction of an airstrip began in 1943 with an original 2,096-meter (m) (6,875 foot (ft)) runway. A 16 m (54 ft) control tower was added in 1944. Today, the airstrip is 4,000 m (13,125 ft) and is known as MAAF shown on Figure 1.4-1, DPG Points of Interest. Initial water, electrical, and sewage systems were each completed in 1943 and 1944, but were all upgraded by 1945 to support increasing military testing activity. A 75-bed infirmary and an operations headquarters were completed in early 1943 and July 1944, respectively.

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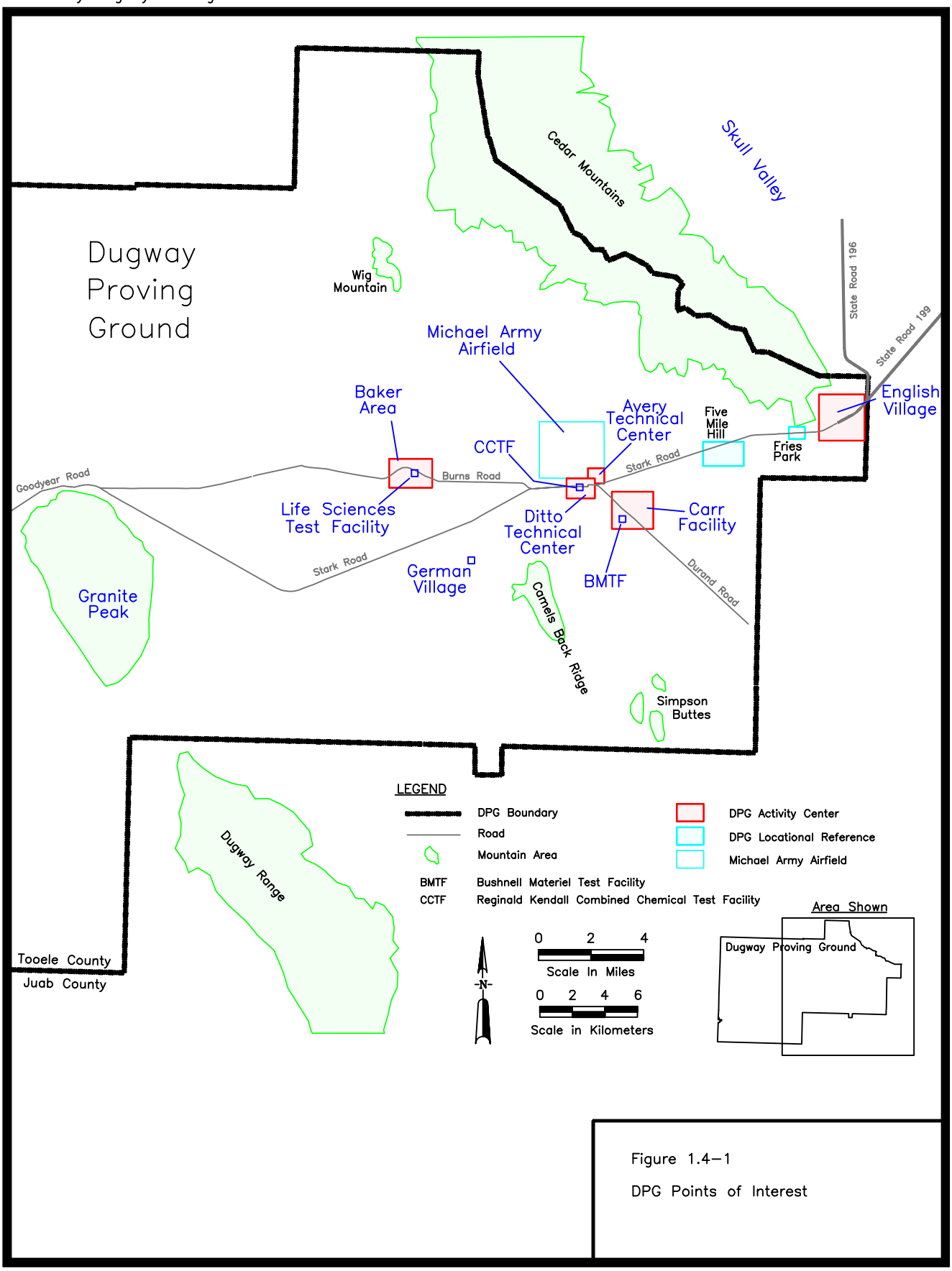

Figure 1.4–1

DPG Points of Interest

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Testing of military weapons commenced in the summer of 1942, and rapidly expanded in scope and intensity. Originally tasked as a testing ground for weapons, DPG was expanded to include laboratory facilities, housing, and administration buildings (Baum, 1947). Chemical weapons testing began in 1942, however, full-scale testing using biological agents did not commence until 1945 (PES, 1996). Several important military developments in modern warfare were tested at DPG during World War II, including the following.

- Incendiary bombs – During World War II, a strategic need arose for incendiary bombs targeting German and Japanese housing. To demonstrate the effectiveness of a newly-developed napalm bomb and other devices, German and Japanese houses were constructed at DPG in meticulous detail. The structures were bombed repeatedly in 1943, and led to the development of the M-69 230 kilogram (kg) (500-pound (lb)) cluster bomb used with great efficiency against major Japanese and German cities. Some of the test structures still stand and the area is locally known as "German Village."

German Village was constructed to replicate German buildings for incendiary testing during World War II.

- Flame throwers – Flame throwing devices were tested against simulated Japanese cave fortifications built primarily on the eastern slopes of Granite Peak in the central part of DPG shown on Figure 1.4-1, DPG Points of Interest. Chemical munitions and the highly effective M-2 and M-4 chemical mortars were also tested, as were various high explosives (Arrington and Alexander, 1964).

- Chemical weapons – The dissemination of chemical warfare (CW) materials within simulated Japanese cave, tunnel, and hilltop fortifications was also

conducted during the mid-1940s, as a reaction to Japanese defensive fortifications constructed in the South Pacific.

- Chemical agent spraying – One of the initial reasons for choosing the DPG area as a military test site was because the climate and wind patterns were ideal for high-altitude spray tests of chemical weapons targeting ground troops. These tests were conducted from 1942 to 1944 and demonstrated the ineffectiveness of such programs (AGEISS, 1996a).

- Biological weapons – The testing of biological weapons also took place at DPG toward the end of World War II.

The end of World War II brought major changes to the installation. On January 16, 1947, the Secretary of War established the Western Chemical Center consolidating the operations of the Deseret Chemical Center in Rush Valley south of Tooele, UT with DPG. Shortly thereafter, DPG was placed on inactive status.

1.4.2 Korean War to the Late 1960s Era

During the summer of 1950, DPG was reactivated in response to the Korean War. Work began on many activities originally commenced during World War II, with DPG now under the command of the Army Chemical Corps' Research and Development Command. New conventional weapon systems were tested. An intense period during the 1950s and 1960s ensued to conduct the following defensive testing.

- Chemical testing – Extensive testing involving CW materials was conducted over many of DPG's ranges and grids in the 1950s and 1960s. Generally, the tests used artillery, mortars, cluster bombs, massive bombs, drone rockets, land mines, aerial sprays to release chemical agents or chemical simulants, and sampling arrays arranged in grids to measure the dissemination and behavior of chemicals at various horizontal and vertical locations in relation to the point of release. Effects on materials were also identified. Dissemination of CW materials within cave, tunnel, and hilltop fortifications also occurred at several locations at DPG.

  A well-publicized event in DPG's history occurred in March 1968. Some 3,000 to 5,000 sheep in six separate flocks in nearby Skull Valley (See Figure 1.4-1) became ill and died over a 3 to 4-day period beginning on March 14, 1968. Three open-air tests involving persistent and nonpersistent chemical nerve agents had been conducted on March 13, 1968, at DPG from 24 to 56 km (15 to 35 mi) upwind of the nearest affected flock. Commercial spraying using the

pesticide heptachlor also occurred off-post in Skull Valley on March 15, 1968. The U.S. Congress Committee on Government Operations conducted hearings on the incident and issued a report in November 1969 which concluded that open-air testing of nerve gas caused death and injury to the sheep.

- Biological testing – Testing of a wide spectrum of biological warfare (BW) materials also occurred at DPG. Pathogens were open-air tested from 1951 through 1967. The first closed laboratory tests were conducted at Granite Peak Installations (GPIs) 2 and 3; upon closing of these laboratories, subsequent tests occurred at Baker Area (Baker). The location of Baker at DPG is shown on Figure 1.4-1, DPG Points of Interest. Objectives of the BW tests were to determine the military value of BW munitions and the amount and effectiveness of biological agent producible in the atmosphere by various delivery systems. Delivery systems included many of the CW methods such as bombs, aerial spray, and drone rockets but also included specialized methods including darts, impregnated leaflets, and small bore ammunition. Many of the grids used for BW testing coincided with those used for CW testing. Dissemination within grids was measured at sampling arrays. Effects on animal subjects were also identified. Generally, biological simulants were used for initial tests, followed by use of actual pathogens.

- Radiological testing – A series of radiological tests involving atmospheric release of radioactive materials from munitions, sponsored by the Atomic Energy Commission, was conducted adjacent to Granite Peak from 1949 to 1953. In addition, a nuclear engine meltdown using several long-lived radioisotopes was simulated on the salt flats west of Granite Peak in the summer/fall of 1959. No nuclear detonations occurred on any DPG ranges.

In 1952, the Biological Warfare Division moved from Ditto to Baker. Chemical testing operations remained headquartered at Ditto. At this time the Army constructed English Village (formerly known as the Easy Area) approximately 16 km (10 mi) east of Ditto. The location of English Village is shown on Figure 1.4-1, DPG Points of Interest. English Village is the DPG administrative headquarters, residential area, and community center.

1.4.3 Modern Era

In September 1969, open-air testing of chemical and biological agents at DPG was suspended in anticipation of an international treaty.

Open-air testing of chemical and biological agents never again occurred at DPG. On April 10, 1972 the U.S. signed the International Convention on the Prohibition

of the Development, Production, and Stockpiling of Bacteriological and Toxic Weapons and Their Destruction, known as the Biological Weapons Convention (BWC) treaty. The BWC treaty required signatories to execute "confidence building measures" aimed at increasing the confidence of signatories that the co-signatories were keeping control of their biological weapons systems in a way that avoided adverse human health effects and international security threats. Similarly, the CWC, which became enforceable under international law on April 29, 1997, prohibits the development, production, stockpiling, and use of chemical weapons and provides oversight for their destruction. Between 1972 and 1983, the intensity of testing of chemical and biological defenses decreased due to these treaties. However, at various times in DPG's recent history such as the 1991 Persian Gulf War, military testing of chemical and biological defenses has increased as a result of perceived chemical and biological threats.

Chemical and biological defense testing since 1969 has been conducted by the following two primary methods:

- In laboratory and large-scale chamber settings, using small amounts of chemical and biological agents to test the effectiveness of protection, detection, and decontamination equipment, and to test the effect of contamination and decontamination on the equipment under test

- In open-air situations, using chemical and biological simulants to test the performance of protection, detection, and decontamination equipment

Indoor facilities capable of performing chemical and biological defense testing at DPG have continued to be updated. DPG's indoor test capabilities were significantly upgraded in 1992 with the opening of the Reginald Kendall Combined Chemical Test Facility (CCTF) at Ditto, and in early 1998 with the opening of the Bushnell Materiel Test Facility (BMTF) at Carr Facility (Carr), and Lothar Salomon Life Sciences Test Facility (LSTF) at Baker. The locations of these facilities are shown on Figure 1.4-1, DPG Points of Interest.

Chemical and biological agents are not and have not been tested outdoors since September 1969. Open-air testing of decontamination methods, contamination avoidance, and evaluation of threat dissemination methods, including the use of biological and chemical simulants in place of biological and chemical agents, has been done at DPG since September 1969.

All outdoor tests use biological and chemical simulants instead of biological and chemical agents. This would continue under the Proposed Action.

The modern era is also noted by programs for testing battlefield smokes and obscurants in which open-air release of these materials is conducted under varying atmospheric and battlefield test conditions. Within the past 15 years, the breadth and diversity of DPG's modern mission have expanded through addition of mission/tenant activities. Baseline mission and tenant activities are described in Chapter 2.0, Baseline Activities, Proposed Action, and Alternatives.

1.5 National Environmental Policy Act Review Process

The NEPA review process is intended to assist public decision makers by ensuring that potential environmental impacts are identified and considered in planning and implementing Federal actions. The Federal action related to this EIS is the activity proposed to occur at DPG over the next 7 years as fully described in Section 2.2, Proposed Action. The NEPA review process generally ensures that the public is fully informed of Federal actions potentially affecting the environment, and that the public has the opportunity to participate in the process before decisions are made.

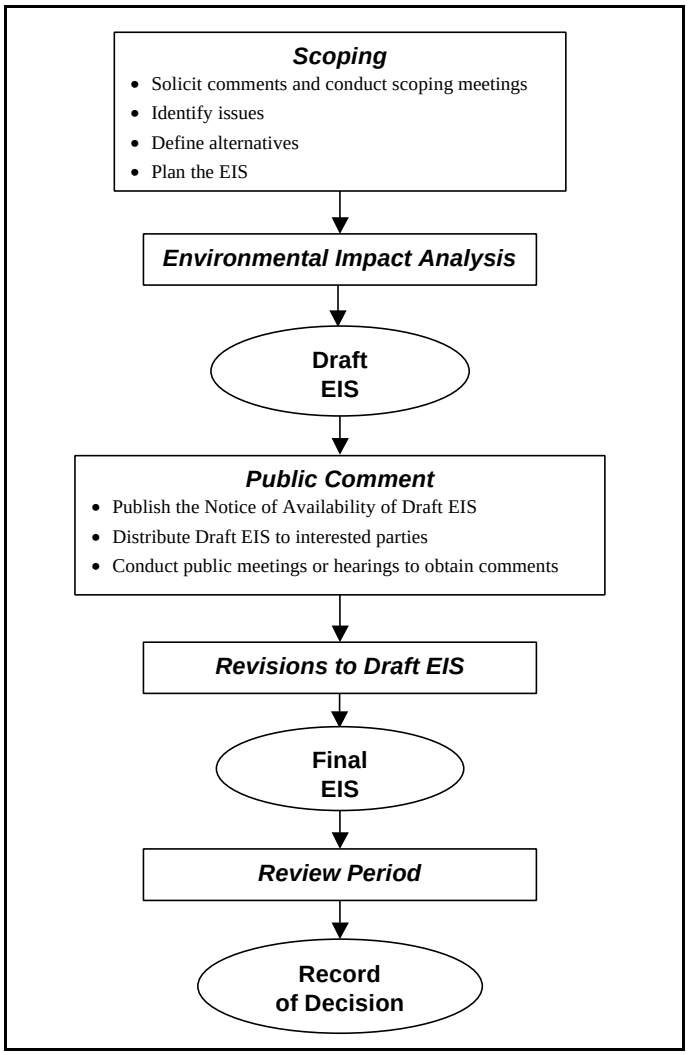
1.5.1 Developing the Environmental Impact Statement

NEPA requires evaluating all Federal actions that potentially affect the human and natural environment. The NEPA review process begins with the responsible Federal agency, known as the proponent, identifying a proposed action. Except for certain actions routinely excluded from further evaluation, the proposed action is then subjected to a structured analysis of potential environmental impacts in either an environmental assessment (EA) or an EIS.

An EA is used to identify potential environmental impacts of a proposed action and to determine whether the more rigorous EIS should be performed. If the EA determines that the potential environmental impacts of a proposed action are not significant, a finding of no significant impact (FONSI) is prepared and published in a newspaper of general circulation. However, if the EA determines otherwise, a Notice of Intent (NOI) to prepare an EIS is developed and published in the *Federal Register*. The *Federal Register* is the government's publication that officially publishes all Federal notices covering Federal agency action. The NOI formally initiates and notifies the public of the EIS. An NOI may be published and an EIS prepared without a prior EA when it is clear that significant potential environmental impacts are likely. This Future Programs EIS was initiated without first conducting an EA because the Army determined that some projected environmental impacts of the Proposed Action had the potential to be significant. The NOI for the Future Programs EIS was published in the *Federal Register* on July 29, 1998. The EIS includes a thorough analysis of the context, intensity, and duration of the potentially significant environmental impacts of a proposed action and alternatives. The EIS

does not exhaustively explore all potential environmental impacts with voluminous technical data and supporting analyses. Rather, the analyses focus on the most important potential impacts, and the EIS is intended to be concise and understandable by the public. The EIS process is depicted in Figure 1.5-1, Environmental Impact Statement Process.

Figure 1.5-1. Environmental Impact Statement Process.



The EIS process consists of the following phases after development of the proposed action and publication of the NOI.

- Scoping – This phase consists of open discussions with the public and concerned agencies about the EIS scope, proposed action, alternatives to the proposed action, procedural issues, further public involvement, and issues of concern.

- Environmental Impact Analysis – This step of the process consists of a scientific and systematic analysis of the potential environmental impacts resulting from implementation of the proposed action and alternatives. The results of the analysis are summarized in the Draft EIS.

- Draft EIS (DEIS) – Release of the DEIS is the first public exposure to the environmental analysis of proposed actions and alternatives. Availability of the DEIS is announced in the *Federal Register* through a Notice of Availability (NOA).

- Public Comment – A comment period follows the release of the DEIS to allow the public the opportunity to review and provide input into the Final EIS. Public hearings or meetings may be held during the comment period to facilitate public input.

- Revisions to Draft EIS – Once public comments have been assessed, the DEIS may need to be revised to reflect the public's substantive comments and concerns. Documentation of public comments and any associated revisions to the DEIS will be incorporated into the Final EIS.

- Final EIS (FEIS) – Publication of the FEIS is announced by an NOA in the *Federal Register*. Copies are typically distributed to interested parties.

- Review Period – Once the Final EIS has been produced and distributed, there is a final review period before the decision on the proposed action or alternatives is made.

- Record of Decision (ROD) – A concise ROD is prepared and published in the *Federal Register* documenting the final decision made regarding the proposed action.

1.5.2 Involving the Public

The NEPA review process requires the Federal agency proposing the action to provide the public with opportunities, where practicable, to participate by identifying issues, providing input into the alternatives, raising concerns/issues, and reviewing the DEIS.

Further, AR 200-2 requires public involvement and a plan to gain public input. Federal agencies are directed by Executive Order (EO) to consider environmental justice issues during environmental review. EOs are the official documents that the President uses to manage the operation of the Federal government.

The Future Programs EIS has been prepared according to these directives and the Public Affairs Plan that was developed to facilitate and guide public involvement for this EIS. Public involvement in the Future Programs EIS includes:

- Scoping meetings
- Dissemination of informational materials
- Maintenance of official EIS public reading rooms
- Additional meetings/announcements at major EIS milestones
- Public comment on the DEIS

To solicit formal public comment, the public is provided a 45-day period after publication of the NOA in the *Federal Register* to review and comment on the DEIS. Copies of the DEIS are available at the reading rooms listed in Chapter 6.0, Consultation and Coordination. A public hearing may be conducted during the comment period to formally record statements on the DEIS. The date, time, location, and agenda for the public hearing are included with the NOA in the *Federal Regi*ster. All written and oral public comment will be considered as the FEIS is subsequently prepared. A complete summary of public comment will be published along with responses to comments as an addendum to the FEIS.

1.5.3 Tiering and Relationship to Other Documents

NEPA encourages Federal agencies proposing the action to use existing environmental documentation rather than duplicating prior NEPA analyses. This process uses the following methods to eliminate repetitive discussions of the same environmental conditions and issues and allows EISs to focus on the specific issues applicable to the particular proposed actions.

- Tiering – Typically, when an overall, “programmatic” EIS or EA on a broad program/activity exists, subsequent EISs concerning aspects of the broad program will “tier” from the programmatic EIS. That is, the subsequent EIS will reference and adopt the broader EIS or EA as formal NEPA documentation.

- Incorporation by Reference – When NEPA documentation already exists and is relevant to a proposed action, such documents are often incorporated by reference to reduce the bulk and cost of EISs. Referenced NEPA documents must be reasonably available for inspection by interested parties during public comment periods.

The Future Programs EIS tiers from one prior programmatic EIS and incorporates by reference an additional two EISs and ten EAs listed in Table 1.5-1, NEPA Documents Related to this EIS.

The Future Programs EIS does not alter the approvals or documentation contained within existing NEPA documents for ongoing activities.

Approval of a ROD for the Future Programs EIS will not preclude the need for NEPA analyses for future proposed actions at DPG. Such future proposed actions should be consistent with the preferred alternative described in an approved ROD based on this EIS, and will be subject to the mitigation measures in the ROD.

Table 1.5-1. NEPA Documents Related to this EIS.

Document Title	Date Published	Status	Relationship to Future Programs EIS
Environmental Impact Statements			
Non-Stockpile Chemical Materiel Program Programmatic EIS	2/01	ROD TBD	Future Programs EIS tiers from this EIS
Final Programmatic EIS: Biological Defense Research Program	4/89	ROD Issued	Incorporated by reference
FEIS: Life Sciences Test Facility, DPG, UT	3/92	ROD Issued	Incorporated by reference
Environmental Assessments			
Final EA, Operation of New Materiel Test Facility, DPG, UT	5/93	FONSI Issued	Incorporated by reference
DEEPLOOK Artillery Firing Exercises and Training EA, UTTR, UT	6/96	FONSI Issued	Incorporated by reference
EA, 6545th Test Group (HAFB), Operations and Facilities on DPG, UT	4/90	FONSI Issued	Incorporated by reference
EA for the Construction and/or Modification of Wastewater Treatment Systems for Baker Area, Carr Facility, Ditto/Avery Area, and English Village Wastewater Treatment Lagoons, DPG, UT	4/90	FONSI Issued	Incorporated by reference
EA for Munitions Cryofracture Testing at DPG, UT	3/95	FONSI Issued	Incorporated by reference
EA for Construction and Operation of an Open Burn/Open Detonation Combustion Product Test Facility at DPG, UT	3/92	FONSI Issued	Incorporated by reference
EA for Construction and Operation of an Atmospheric Surface Layer Turbulence and Environmental Science Facility at DPG, UT	7/97	FONSI Issued	Incorporated by reference
EA, Baker Test Facility, DPG, UT	11/92	FONSI Issued	Incorporated by reference
EA for Munitions Management Device, Version 1 (MMD-1) Testing at DPG, UT	3/97	FONSI Issued	Incorporated by reference
EA for Use of Inactivated (Dead) Microorganisms as Biological Agent Simulants at DPG, UT	5/01	DRAFT	Incorporated by reference

DPG U.S. Army Dugway Proving Ground
EA Environmental Assessment
EIS Environmental Impact Statement
FEIS Final Environmental Impact Statement
FONSI finding of no significant impact
HAFB Hill Air Force Base
NEPA National Environmental Policy Act
ROD Record of Decision
TBD to be determined

1.6 Results of Scoping

This section summarizes the results of the scoping process conducted for the Future Programs EIS. The following two types of meetings were held as part of scoping.

- Stakeholder meetings – In late September and early October 1998, DPG met with over 35 individuals and organizations identified as key DPG stakeholders, including:

  - Elected officials
  - DPG employees
  - Neighboring landowners
  - Representatives of Federal, state, and local government agencies, environmental groups, citizen action groups, Native American tribes, and DPG tenants

  Section 6.2.2.1, Stakeholder Meetings, provides a list of the stakeholders and the objectives of the meetings.

- Public meetings – DPG held three public meetings to provide an overview of mission activities, the Proposed Action and alternatives, and opportunities for public comment. Section 6.2.2.2, Public Meetings, describes these meetings in more detail.

DPG held public meetings to obtain public input to the EIS.

Scoping for the Future Programs EIS surfaced a wide variety of issues, concerns, and ideas, which have been summarized in the Scope of Statement for the Environmental Impact Statement for Activities Associated with Future Programs (DPG, 2000j).

The Scope of Statement is available on DPG's website (https://www.dugway.army.mil/) and in public reading rooms.

A summary of the most frequently expressed public comments follows.

- Proposed Action and Alternatives – Develop a full range of alternatives, including decreased mission and base closure alternatives. Fully disclose all activities ongoing and planned for DPG. Clearly state whether testing will be conducted on nuclear materials and biosafety level (BL) 4 organisms which are classified by the Center for Disease Control (CDC) as biological organisms posing a high risk of life threatening disease.

- Evaluation Approach – Clearly state the past and future time periods for analysis, emphasizing the approach to assessing the pre-1969 open-air test era. Identify potential environmental impacts within and outside DPG boundaries and clearly explain the approach used to identify cumulative impacts. Disclose the status and results of actions to comply with Federal and state environmental statutes and regulations. Outline regulatory jurisdictions.

- NEPA Issues – Describe the relationship of past and future NEPA documents to the Future Programs EIS.

- Environmental Issues – Assess the impacts of DPG mission activities on air, groundwater, plant, wildlife, and cultural resources. Describe noise, traffic, and socioeconomic impacts on neighboring communities. Focus on the cause and effects of DPG activities and range fires.

- Health and Safety and Hazardous Waste – Address human health impacts of past testing including risks from occupational exposure. Address general public exposures to biological and/or chemical agents accidentally released during storage, testing, or transportation. Address clean-up and potential environmental impacts of past wastes. Describe current and projected future waste streams and disposal practices.

1.7 Organization of the Future Programs EIS

This EIS is written in “plain English” to the greatest extent possible to facilitate public understanding. Additionally, sections are cross-referenced to aid the reader to understand the topic and to reduce redundancy. Abbreviations, acronyms, and symbols used in this EIS are listed in the front of this EIS.

In addition, this EIS uses the following conventions:

- Common names for plants and animals are used. Scientific names for plants are in parentheses after the common name when they are first used.

- Where possible, common names for chemicals are followed by formal chemical names when they are first used.
- Abbreviations are used for the long, complex names for chemical agents. For example, the abbreviation GB is used when it first occurs in the EIS without the full chemical name, isopropyl methylphosphonofluoridate.
- Tables and figures appear as close as possible to where they are first referenced.

The Future Programs EIS has been prepared pursuant to Council on Environmental Quality (CEQ) regulations in 40 Code of Federal Regulations (CFR) 1500 and the Army's NEPA implementing regulations - AR 200-2, Environmental Effects of Army Actions. The Future Programs EIS is organized according to CEQ and Army guidelines for EIS content. It is divided into three volumes. Volume I contains the Executive Summary, Volume II contains the full EIS, and Volume III contains the supporting appendices. Volume II is comprised of the following elements.

- Chapter 1.0, Introduction – Provides background information for perspective and context and explains why this EIS is being prepared
- Chapter 2.0, Baseline Activities, Proposed Action, and Alternatives – Describes the existing and planned DPG mission and alternatives to the Proposed Action
- Chapter 3.0, Affected Environment – Describes the existing human and physical/biological environment at DPG
- Chapter 4.0, Impacts of the Proposed Action and Alternatives – Discusses the potential impacts of the Proposed Action and alternatives on the affected environment at DPG
- Chapter 5.0, Cumulative Impacts – Describes potential impacts resulting from the Proposed Action in combination with regional activities
- Chapter 6.0, Consultation and Coordination – Describes public and other governmental agency involvement in the EIS process
- Chapter 7.0, Public Comments and Responses – Identifies the comments received on the DEIS during the public comment period and responses to these comments
- Chapter 8.0, List of Preparers – Identifies the preparers of the EIS and their qualifications

- Chapter 9.0, References – Lists references cited as sources of information in the Future Programs EIS
- Glossary – Provides a source of definitions for terms used in the Future Programs EIS
- Index – Provides a reference source to find topics in the Future Programs EIS

Volume III contains the following appendices:

- Appendix A, List of Environmental Laws, Permits, and Management Plans
- Appendix B, DPG Facility Control Forms
- Appendix C, Mission Materials
- Appendix D, Toxicity Information About Mission Materials
- Appendix E, Solid and Hazardous Waste Management Units at DPG
- Appendix F, Areas of Concern at DPG
- Appendix G, Drinking Water Supply Wells at DPG
- Appendix H, Air Emissions Data for DPG
- Appendix I, Biological Resources at DPG
- Appendix J, Cultural Resources Project List at DPG
- Appendix K, DPG Hazardous Waste Types and Volumes Generated
- Appendix L, Distribution List

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2.0 Baseline Activities, Proposed Action, and Alternatives

This Future Programs EIS evaluates the potential environmental impacts resulting from activities associated with future DPG programs.

DPG has developed a Proposed Action that it believes best represents the type and level of future activities. The Proposed Action includes only those elements that are "reasonably foreseeable," and for which DPG is the proponent or has a high level of control. In addition to evaluating the Proposed Action, NEPA requires that reasonable alternatives also be identified and evaluated in the EIS process. The Proposed Action is DPG's preferred alternative. The Proposed Action or any action alternative cannot be implemented until the completion of the NEPA review process.

This chapter describes DPG's baseline activities that serve as the basis of measurement for future activities. This chapter also describes the Proposed Action and the alternatives to the Proposed Action. Alternatives that are fully evaluated must meet the purpose of and need for DPG's Proposed Action, as described in Section 1.2, Purpose and Need for Action. Alternatives considered, but which are not reasonable and/or do not meet the purpose of and need for DPG's future programs, have been eliminated from full NEPA analysis in this Future Programs EIS. Eliminated alternatives are discussed in Section 2.4, Alternatives Eliminated from Detailed Evaluation. This chapter also presents a summary table comparing environmental impacts of the Proposed Action and each alternative based on the analysis presented in Chapter 4.0, Impacts of the Proposed Action and Alternatives. Mitigation measures to reduce potential environmental impacts are also summarized in this table.

Information in this chapter, when combined with analyses provided in Chapter 3.0, Affected Environment, and Chapter 4.0, Impacts of the Proposed Action and Alternatives, meets the EIS goals of:

- Informing decision-makers and the public about DPG operations and potential impacts associated with DPG's future programs
- Providing documentation to allow for tiering of subsequent NEPA documents, as described in Section 1.5.3, Tiering and Relationship to Other Documents

Baseline activities of the combined missions of all DPG operations are described in this chapter. Data describing baseline activities are primarily from 1996 through 1998. If 1996 through 1998 data were unavailable, the closest available data are identified.

To describe baseline activities, the Future Programs EIS includes information obtained during interviews with the following:

- DPG's operating command
- West Desert Test Center (WDTC) testing employees
- Other key DPG employees
- DPG contractors
- DPG tenants

DPG operating records and reports were also considered when describing baseline and future DPG programs and activities.

Certain classified activities occur at DPG. Classified activities are those that must be kept confidential because of national security. However, classified activities normally use the same materials and facilities as unclassified activities, and therefore, have similar potential for environmental impact. Thus, the potential environmental impacts of classified activities are addressed in the assessment of unclassified activities.

The description of DPG's baseline activities is the basis for defining and evaluating the following Proposed Action and alternatives within this Future Programs EIS:

- Proposed Action (DPG's preferred alternative):
    - Maintain DPG's baseline operations and increase testing and training activities
    - Diversify operations
    - Implement an SDP prepared in conjunction with this EIS
- No Action Alternative – continue DPG's baseline operations and management intensity
- Decreased Mission Alternative – reduce the level and intensity of baseline DPG operations
- Maximum Expanded Mission Alternative – increase baseline DPG operations to the maximum extent that DOD and Army decision-makers can foresee

National Guard training would increase substantially under the Proposed Action.

While the Proposed Action represents DPG's proposed future based on existing knowledge and plans, there is uncertainty about future programs because of unknown factors such as:

- Levels of future DOD and Army funding for DPG
- Potential changes in testing, training, and other mission priorities in response to changing national security threats

Because of these uncertainties, it is important to consider the range of potential DPG activity level. Both the Decreased Mission and Maximum Expanded Mission alternatives are evaluated and the level of potential impacts from DPG's future programs is bounded within these "low activity" and "high activity" cases.

To describe and present all of the information about the baseline activities, Proposed Action and alternatives, this chapter is organized into the following major sections:

- Baseline Description of DPG
- Proposed Action
- Alternatives to the Proposed Action
- Alternatives Eliminated from Detailed Evaluation
- Comparison of Environmental Impacts and Mitigation Measures

2.1 Baseline Description of DPG

This section describes the baseline status and operation of DPG from 1996 through 1998. Information in this section is used as the basis for the continuation of baseline activities as part of the Proposed Action and alternatives.

DPG's remote location and large land holdings are necessary to maintain security and to mitigate potential adverse impacts.

DPG's location in western Utah is shown on Figure 1.0-1, DPG Location Map. The DPG workforce during the baseline period was generally in the range of 1,100 to 1,200 persons, with the following typical breakdown:

- 5 percent Army military personnel
- 40 percent civilians employed by the Army
- 40 percent contractors to the Army
- 10 percent nonmission related personnel such as personnel of the Postal Service, Tooele County Schools, credit union, etc.
- 5 percent AF military personnel, contractors, or civilians employed by the AF

Operation of DPG is in accordance with the specific missions and functions assigned to it by DOD and the U.S. Army Developmental Test Command, as described in Section 2.1.1.1, DPG's Mission Statement. DPG Command and mission activities are critical to the preparedness of the U.S. and allied forces and to the security of the nation.

DPG's baseline operations are described in the following sections:

- Mission Description and Organization
- Tenants and Customers
- Management Controls and Plans
- Activity Centers and Facilities
- Baseline Testing Activities

- Baseline Training Activities
- Baseline Research Support for Non-DOD Agencies
- Baseline Mission Support Activities
- Baseline Installation Support Activities

2.1.1 Mission Description and Organization

This section presents DPG's mission, internal organization, and organization within the DOD hierarchy.

2.1.1.1 DPG's Mission Statement

DPG's mission includes the following elements:

- **To serve America's soldiers, citizens, and allies by operating our nation's premier defense proving ground to provide quality testing, data, and information.**
- **To recognize, trust, empower, and develop a work force team dedicated to mission accomplishment.**
- **To anticipate and exceed customer expectations using recognized quality standards and processes to advance technology and support all aspects of chemical and biological defense, meteorology, smoke, obscurants, illumination, and munitions testing.**
- **To conduct all operations consistent with the highest standards of Army Values and environmental stewardship.**

DPG is a DOD MRTFB and serves as a primary chemical and biological defense testing center (AR 70-69). DPG does not conduct any nuclear testing and there are no plans to do so in the future. In addition to its chemical and biological defense testing, DPG also conducts and supports testing and technology development of:

- Conventional munitions
- Equipment reliability, durability, and performance in weather extremes
- Characterization of air emissions from open burn/open detonation of obsolete or unsafe munitions
- Methods to demilitarize weapons
- Smoke, obscurant, and illuminant systems
- Chemical and biological modeling and simulation
- Meteorological model development and validation

DPG's primary focus is to test and support chemical and biological defense and detection capabilities.

These various testing activities, the facilities they use, and the administrative and engineering controls that are implemented during these activities are discussed in Section 2.1.5, Baseline Testing Activities.

DPG also manages the installation's facilities and administrative, technical, and logistic services to support DPG's mission as well as its tenants' training, testing, and research activities.

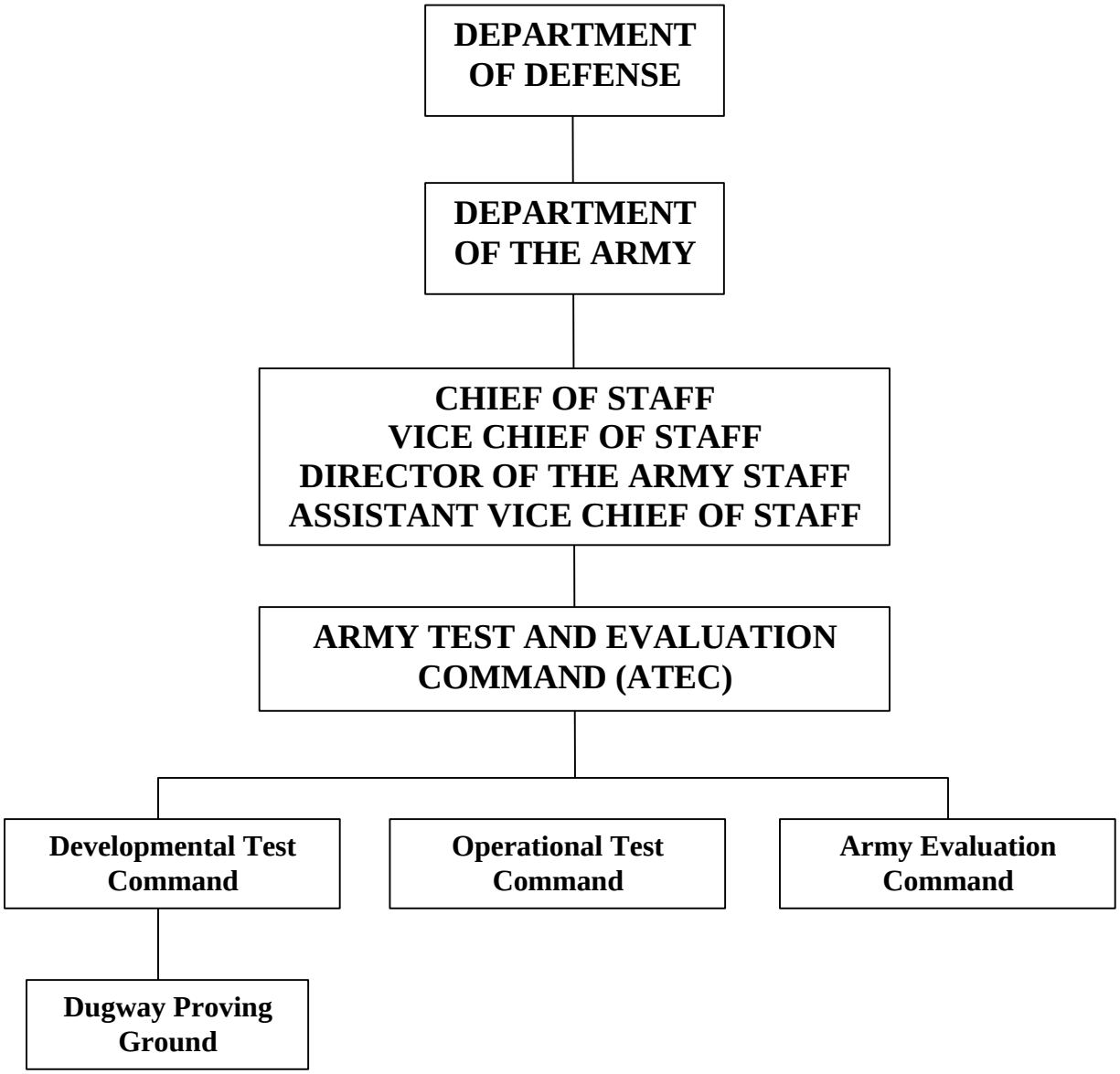
Treaties and U.S. law limit DPG's biological and chemical activities to defensive, protective, or other peaceful purposes. These treaties are discussed in Sections 2.1.5.1, Biological Defense Testing, and 2.1.5.2, Chemical Defense Testing.

DPG conducts a variety of chemical and biological defense testing operations in accordance with international treaties ratified by the U.S.

2.1.1.2 DPG Organization

DPG is a test center operated by the U.S. Army Developmental Test Command, which is a major subordinate command of ATEC as shown in Figure 2.1-1, DPG in Relation to the Department of Defense Hierarchy. U.S. Army Developmental Test Command is the U.S. Army's premier materiel testing organization for weapons and equipment. The diverse set of test capabilities operated and maintained by U.S. Army Developmental Test Command's test centers enable the U.S. Army Developmental Test Command to test military hardware of all types under precise and controlled conditions and across the full spectrum of man-made and natural environments.

Figure 2.1-1. DPG in Relation to the Department of Defense Hierarchy.



Source: Harn, 1999

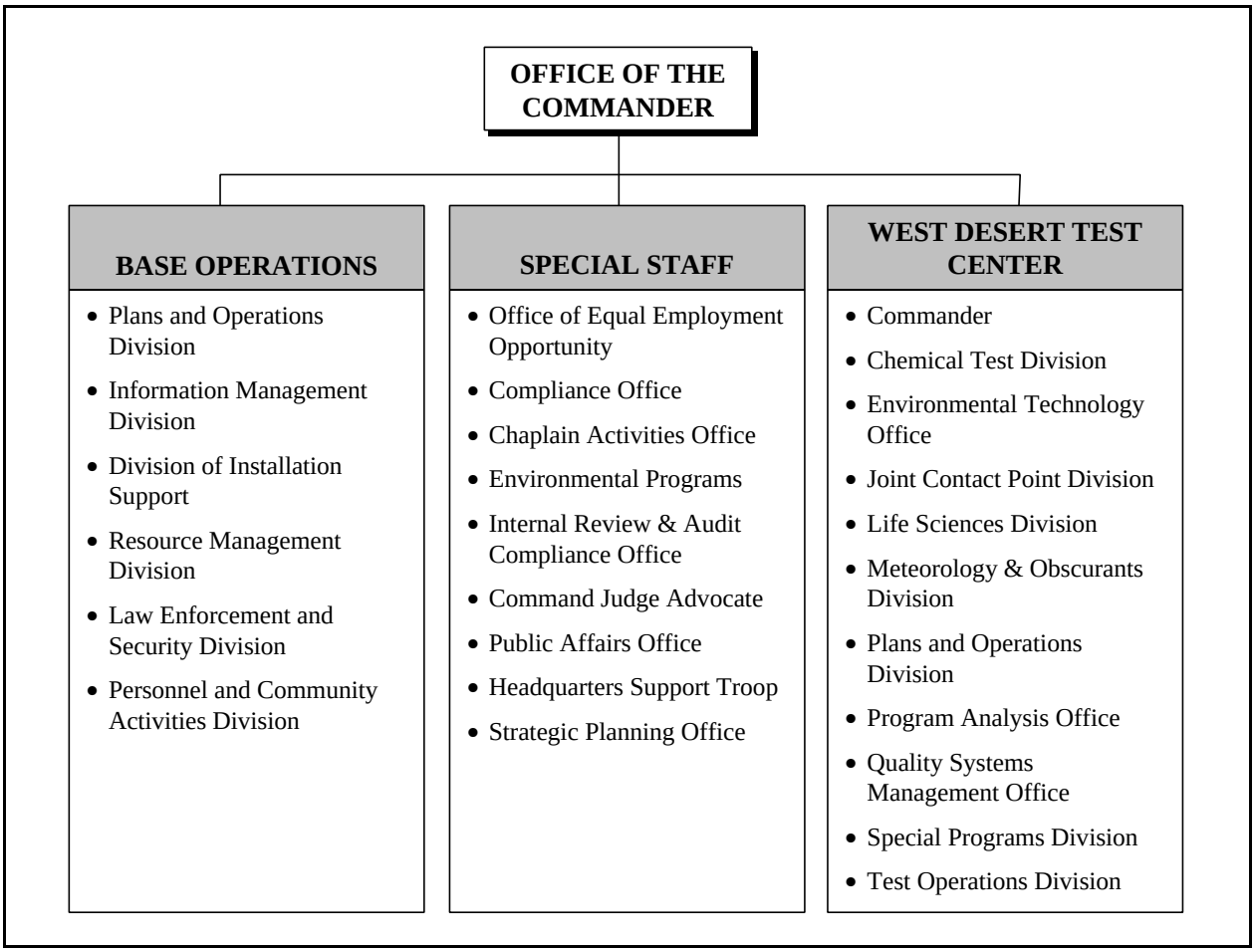
U.S. Army Developmental Test Command's mission is to support the materiel acquisition process for defense materiel by:

- Planning and conducting tests and simulations across the full spectrum of environments (arctic, tropic, desert, shock, vibration, electromagnetic, nuclear, underwater, live fire);
- Verifying safety of new materiel, and;
- Developing and procuring new test technology and instrumentation.

As a U.S. Army Developmental Test Command test center, DPG supports a variety of developmental testing (ATEC, 2001; Developmental Test Command, 2001).

DPG's organizational structure is presented in Figure 2.1-2, DPG Functional Organization.

Figure 2.1-2. DPG Functional Organization.



The DPG Office of the Commander assures that the mission and functions assigned to DPG are effectively and economically accomplished (DPG, 2000h). Personnel in this office assist the Commander in providing guidance and supervision for all DPG activities in implementing DPG's mission. All DPG functions except those provided by tenants or contractors are divided into the three groups listed in Table 2.1-1, DPG Organization and Functions.

Table 2.1-1. DPG Organization and Functions.

Organizational Unit	Functions
Base Operations	• Provides basic services that support installation operations such as housing, facility engineering, and security • Provides planning and operation support, and information and resource management
Special Staff	• Provides health and safety, environmental, public affairs, and legal support to the Office of the Commander • Provides religious and social activities, family support, and counseling through the Chaplain Activities Office
WDTC	• Carries out DPG's test mission • Provides management control of DPG's mission specific testing efforts
• Chemical Test Division	Conducts chemical defense testing, technology development, and training in support of DPG's mission
• Environmental Technology Office	• Handles NEPA planning for all WDTC programs and actions • Determines the impacts of proposed tests on the environment
• Joint Contact Point Division (049)	• Responsible for providing chemical and biological defense information to the Joint Services • Advises the Joint Services regarding development of policy and training procedures • Sponsors specific tests selected by the Joint Services
• Life Sciences Division	Conducts biological defense testing, technology development, and training in support of DPG's mission
• Meteorology and Obscurants Division	• Serves as the Program Manager for Army RDT&E Meteorology and Chief of the Atmospheric Sciences Team which provides meteorological support to RDT&E organizations outside U.S. Army Developmental Test Command • Conducts meteorological and mathematical modeling tests and studies for WDTC and its customers • Conducts conventional munitions, environmental characterization of emissions, weapon demilitarization, and smoke and obscurant testing • Conducts physical testing • Manages the DPG meteorological program • Provides general weather forecast and warning support for the installation and test-specific support for WDTC outdoor tests
• Plans and Operations Division	• Coordinates and supervises planning and operations, and military training • Provides support for chemical and biological treaties

Table 2.1-1. DPG Organization and Functions.

Organizational Unit	Functions
• Program Analysis Office	• Provides general support functions, including the coordination of financial matters, data validation and update, and management of contractual programs • Serves as the central control point within DPG/WDTC for receipt of all incoming test directives (documents detailing the preparation, coordination, and conduct of tests) for test/study programs, special projects and other mission-related assignments • Monitors conduct of the test programs and administers TRMS, a computerized system which tracks the progress of test programs • Serves as the installation point of contact for all TRMS actions
• Quality Systems Management Office	Manages International Organization for Standardization Accreditation Program for DPG and WDTC
• Special Programs Division[1]	Serves as the focal point for DOD and non-DOD chemical and biological defense training (counterterrorism training)
• Test Operations Division	• Oversees information management activities in support of all test missions • Provides various mission support activities summarized in Section 2.1.8, Baseline Mission Support Activities, such as Ammunition Accountability, Instrumentation, and Range Control

1 This division was not established during the baseline period.

DOD Department of Defense
DPG U.S. Army Dugway Proving Ground
NEPA National Environmental Policy Act
RDT&E Research, Development, Test, and Evaluation
TRMS Test Resource Management System
WDTC West Desert Test Center

SOURCES: DPG, 2000h; DPG, 1999a

2.1.2 Tenants and Customers

DPG tenants and customers are the sponsors of activities conducted at DPG. A DPG tenant is an organization that uses DPG on a regular basis to conduct testing or training activities, or to provide installation support activities. A DPG customer is a governmental or private entity that requires use of DPG's workforce, facilities, or vast land to conduct testing, technology development, or training activities. The scope of DPG customers ranges from an entity conducting a one-time activity to an entity conducting regular activities as part of an ongoing mission program at DPG. Unlike some tenants, DPG customers are not stationed at DPG.

2.1.2.1 DPG Tenants

DPG tenants can be classified as follows:

- Groups that use DPG's infrastructure and support services to conduct testing, training, or research at the installation
- Groups that provide support services for DPG's mission and the installation

DPG tenants include the following public and private entities:

- AF – 388th Range Squadron (RANS), described in the Avery Technical Center (Avery) discussion in Section 2.1.4, Activity Centers and Facilities
- Army Health Clinic – Health Services, summarized in Table 2.1-15, Summary of Installation Support Activities
- Cosmic Ray Research Consortium, described in Section 2.1.7, Baseline Research Support to Non-DOD Agencies
- Tooele County Public Schools
- U.S. Army Corps of Engineers (COE), summarized in Table 2.1-15, Summary of Installation Support Activities
- U.S. Army Robert Morris Acquisition Center – provides procurement and work clothes preparation, summarized in Table 2.1-14, Summary of Mission SupportActivities, and Table 2.1-15, Summary of Installation Support Activities
- U.S. Postal Service
- Retail Sales – Defense Commissary Agency (DeCA) and the Army and Air Force's Exchange System (AAFES), summarized in Table 2.1-15, Summary of Installation Support Activities
- Technical Escort Unit (TEU) – C Company, summarized in Table 2.1-14, Summary of Mission Support Activities,
- Test Measurement and Diagnostic Center
- Utah National Guard (NG), described in Section 2.1.6.1, Ground Training

DPG tenants typically have administrative operations at DPG. Additionally, tenants normally use their own equipment to carry out their testing, training, scientific

activity, or other activity at DPG. Tenants have an assigned DPG point of contact who assists the tenant with scheduling and administrative matters.

2.1.2.2 DPG Customers

DPG conducts tests for a variety of DOD, other Federal agency, and private customers. Customer testing at DPG is coordinated through U.S. Army Developmental Test Command. U.S. Army Developmental Test Command test centers are not authorized to conduct tests without prior coordination with U.S. Army Developmental Test Command headquarters. Some customer tests are classified.

In most cases, a test customer requests the use of a specific U.S. Army Developmental Test Command test facility such as DPG, based on the capabilities of the test center, prior relationships, customer convenience, test center marketing efforts, or because the requested test center will be the site for future mandated tests. In rare instances when a request for a test or services arrives at U.S. Army Developmental Test Command headquarters without a test center specified, U.S. Army Developmental Test Command coordinates with the customer to assign a test center. The assignment is made based on required capabilities, test center mission, or workload balance.

In addition to customer use of DPG for testing activities through the WDTC, other customers may use DPG for other activities such as:

- Radar tracking by NASA
- Reserve component training for units other than the Utah NG, which is a DPG tenant because of its regular use of DPG
- Active component training
- Training classes, for example, counterterrorism
- Fire-fighting training

DPG is an MRTFB and is funded under 10 United States Code (U.S.C.) 129(e). DPG is funded by direct appropriated funds and MRTFB customers. All customer tests or services require financing by the requester.

2.1.3 Management Controls and Plans

DPG has been organized to most efficiently and effectively implement and support its mission activities. In addition to DPG's organizational considerations, DPG has applied management controls and plans to carry out its mission, including:

- NEPA and Environmental Management
- Test Process Planning and Management
- Management Plans
- Cooperative Agreements

2.1.3.1 NEPA and Environmental Management

NEPA and its implementing regulations issued by the CEQ require environmental review and analysis of DPG's activities for their potential to impact the environment. As required by NEPA, the written environmental evaluation could be any of the following, depending on the potential level of impacts from a proposed action:

- Record of Environmental Consideration (REC)
- EA with a FONSI
- EIS with a ROD

In addition to NEPA, DPG complies with a variety of other Federal and State of Utah environmental laws and regulations.

To comply with these regulations, DPG holds a number of major environmental permits, such as a RCRA permit for hazardous waste storage and a Title V air emissions permit. In addition, DPG complies with the Federal Facility Compliance Act of 1992 by implementing a pollution prevention and waste minimization program, a Spill Prevention, Control, and Countermeasures Program, and other proactive programs. DPG has developed a number of management plans to ensure proper implementation of Federal and State of Utah environmental laws and regulations. Appendix A, List of Environmental Laws, Permits, and Management Plans, lists applicable laws, permits, and management plans that DPG complies with.

DPG manages hazardous waste in compliance with its Resource Conservation and Recovery Act permit and other environmental requirements.

NEPA and other environmental management activities at DPG provide substantial environmental control and management.

NEPA and environmental management activities are carried out in several ways at DPG including the following.

- Activities conducted by the Directorate of Environmental Programs (DEP) – DEP's status as an installation support group and its functions are summarized in Section 2.1.9, Baseline Installation Support Activities. DEP is the DPG organizational unit responsible for preparation of installation-wide NEPA documents, such as this Future Programs EIS.
- Activities conducted by the WDTC Environmental Technology Office – The roles and responsibilities of this office involve proper compliance and management of environmental issues for testing conducted by the groups within the WDTC. This office is responsible for NEPA documentation for all WDTC programs and actions. The environmental review process that the Environmental Technology Office implements is summarized in Section 2.1.3.2, Test Process Planning and Management.
- Activities conducted by various tenant organizations using airspace over DPG and/or DPG land and facilities – Tenants using DPG are discussed in Section 2.1.2.1, DPG Tenants. Generally, tenants conduct NEPA review of their own proposed activity involving DPG, and are responsible for managing environmental issues for their activity in cooperation with DPG. NEPA documentation for tenant activities is maintained by DEP. These tenant activities are included in this Future Programs EIS to ensure that the combined impacts of all DPG future programs are considered.

DPG is responsible for obtaining and maintaining all applicable environmental permits and approvals to allow testing and training missions to take place on the installation, and pays all fees for environmental permits that are required as a result of these training activities.

2.1.3.2 Test Process Planning and Management

To ensure each test is properly planned and that potential environmental impacts are considered, test process planning and management is conducted by the WDTC, according to the Test Coordination and Conduct Manual (DPG, 1999a). Test process and planning generally includes:

- Planning
- Preparation, including environmental review
- Testing
- Reporting
- Test Closure

Planning – Before any test can be started, DPG must receive a Test Execution Directive from U.S. Army Developmental Test Command. This document provides guidance for test planning and preparation. The planning phase of the test coordination and conduct process begins when WDTC staff identifies the potential of a test and evaluation need. It includes, but is not limited to, such items as:

- Preparing a preliminary cost estimate and receiving planning funds
- Initiating safety and environmental documentation
- Developing a clear understanding of test objectives
- Transforming test objectives into data quality objectives
- Designing and modeling the test
- Coordinating with WDTC test support resource managers
- Preparing the following:
    - Test outline
    - Program plan that includes cost, performance, and schedule
    - Test plan
    - Operations plan
    - Test report shell with proposed data presentation forms

For classified tests, the potential customer talks to DPG personnel prior to initiating the test to determine if DPG can support the test. Classified tests are typically classified because of the type of equipment being tested or some other aspect of the test and not because classified materials, such as chemical or biological agents or

simulants are used. Performing a classified test and activities related to it may require variations from DPG's standard test procedure. However, the standard test process requirements and regulations are followed (DPG, 1999a).

Preliminary planning ensures test objectives, test item battlefield threats, and the technology of the test item and test are understood. By determining and communicating the test objectives, U.S. Army Developmental Test Command, the DPG test director who manages the test project, and the customer can define the testing and determine if the test requirements can be met by available technology. Test item battlefield threats must be determined so that the item being tested can be designed to withstand battlefield conditions. The test background, including the physical principles and maintenance requirements that relate to the operations of the test item, must also be understood prior to test initiation (DPG, 1999a).

The planning phase of the test process is complete upon a briefing to the WDTC Commander, Technical Director, and test support resource managers and customer acceptance of the test program plan and test plan/operations plan.

Preparation, including Environmental Review – Where well defined preparation processes are in place that require long lead times for test preparation, certain preparatory actions may occur concurrently with the planning phase. The preparation phase of the test process begins when the draft test plan/operations plan is completed and under review. The preparation phase includes activities such as:

- Pre-operational data review
- Completion of safety and environmental documentation
- Pre-operational safety survey
- Installation of test fixtures and supporting equipment at test site(s)
- Operational readiness inspection
- Test readiness review
- Completion of detailed cost estimate and receipt of funds
- Coordination with applicable State of Utah agencies, if required

DPG's test planning process requires the development, review, and approval of a test plan for each proposed test that ensures the potential human health and environmental impacts of each test are identified. The final test plan includes, as appendices, guidelines and procedures that must be followed during the test to protect worker safety and safeguard the environment. These appendices are the Safety Annex and the appropriate level of NEPA documentation, usually an EA or REC.

To adhere to environmental regulations, the test director must first confer with the WDTC environmental scientist for a preliminary assessment of the environmental impacts of the proposed test and the required NEPA documentation (DPG, 1999a). The WDTC Environmental Technology Office then prepares and obtains approval of NEPA documentation. All indoor and outdoor testing requires NEPA documentation. Next, the test director must:

- Assess the hazardous materials and/or wastes that will be used in or result from the test through DEP.
- Address other Federal environmental regulations such as the Clean Air Act (CAA), Clean Water Act (CWA), and Endangered Species Act (ESA).
- Comply with State of Utah regulations prior to testing.

After environmental review, if it is determined that adverse impacts on the environment would occur, the test procedure or materials used must be altered, in conjunction with the U.S. Army Developmental Test Command and the customer (DPG, 1999a). All classified tests at DPG undergo a similar environmental review process. For these tests, an unclassified NEPA document is prepared. The unclassified NEPA document indicates the test materials and amounts used. It evaluates the potential environmental impacts of the proposed test, but does not discuss classified information. Tests are usually classified because of capabilities or vulnerabilities of the equipment being tested, not because of the releases to the environment. If the test materials are classified, it is in conjunction with the test name or test item name. Almost always, the test materials are those commonly tested at DPG and are addressed in unclassified NEPA documents that the NEPA document for the classified test can be tiered from.

Approval of the test plan and successful completion of the operational readiness inspection and the test readiness review indicate successful completion of the preparation phase of the test process.

Testing – The testing phase includes such ongoing activities as:

- Daily test operation
- Continuing system tests
- Test data status checks
- Continuous data review
- Maintenance of test logbook

- Daily test status review meetings
- Regular customer updating and reporting

The testing phase of the process is complete when the data management team indicates that all data quality objectives and the test objectives from which they have been derived have been achieved.

Reporting – The reporting phase of the test process begins when the data management team releases the test data and all quality control checks have been completed. This phase of the process includes such items as:

- Identification of findings, conclusions, and recommendations
- Drafting of test report document
- Concurrent editorial and technical review
- Staffing of the final document
- Presentation of the test data to the customer in the desired format

The reporting phase of the process ends when the WDTC Technical Information Center receives the published report and the report and data are archived.

Test Closure – The test closure phase of the test process may begin as soon as the testing phase ends, i.e., when no test fixtures, equipment or test items are required for further testing. It includes such activities as:

- Fixture de-commissioning (if one time use)
- Equipment and instrument decontamination
- Disposition of test items
- Disposal of hazardous and non-hazardous wastes
- Site and surface restoration
- Archival of raw data and records

The test closure phase of the process is complete when all activities relating to the test are completed and the “lessons learned” report is complete.

After test data are collected and analyzed, hazardous waste generated by the test is removed.

2.1.3.3 Management Plans

A variety of management plans have been developed, or are under development, at DPG to ensure:

- Federal and state regulations are complied with
- The installation's cultural and environmental features are preserved and managed
- Adequate facilities are provided for DPG personnel and the DPG community

These management plans also enable DPG to effectively support the installation's mission and are intended to mitigate any potential environmental impacts from DPG activities. Table 2.1-2, DPG Management Plans, summarizes major DPG management plans as of 2000. Plans are updated as necessary.

Table 2.1-2. DPG Management Plans.

Plan	Description	Source(s)
Asbestos Management Plan	• Delineates management procedures for asbestos in DPG structures • Encompasses asbestos management through renovation and abatement projects, encapsulation and informing and training operations and maintenance personnel and building occupants • Establishes an asbestos database for DPG structures and ongoing renovation projects • Establishes assessments for each occurrence of asbestos to determine the potential for environmental release and associated risk to human health and environment • Establishes development of abatement plan for each assessed area where potential for asbestos exposure exists	Lewis, 1996
Biological Emergency Response Assistance Plan (BERAP)	• Provides system for notifying local, state, and Federal officials of an accident, should one occur, at a DPG laboratory • Establishes Biological Emergency Response Team to contain and decontaminate an accident should one occur • Addresses local DPG response to secondary casualties or other emergency situations that may occur as a result of a biological mishap	DPG, 1996d
Chemical Accident/Incident Response and	• Provides information to prepare for, respond to, and recover from an accident/incident involving a chemical agent release	DPG, 2000d

Table 2.1-2. DPG Management Plans.

Plan	Description	Source(s)
Assistance (CAIRA) Plan	• Explains emergency response concepts and procedures for CAIRA operations • Provides technical information to facilitate decision making in an emergency	
Chemical Agent Waste Management Plan (CAWMP)	• Provides guidance for managing chemical agent-related waste and facilitates compliance with DPG's RCRA Permit and State of Utah, and Federal RCRA requirements • Identifies typical chemical agent-related wastes generated at DPG	AGEISS, 1999a
Comprehensive Groundwater Monitoring Plan (CGWMP)	• Ensures compliance with various Consent Orders and groundwater discharge permits issued by the State of Utah, with respect to groundwater monitoring • Provides detailed information regarding the location, regulatory criteria, and regulatory requirements for monitoring, sampling, and analysis of DPG groundwater monitoring wells • Includes forms, checklists, and other documentation required to document groundwater monitoring	AGEISS, 1996f
Disaster Control Plan (DCP)	• Serves as the master plan for emergency response at DPG • Specifies implementation, notification, and evacuation procedures for a natural or man-made disaster	DPG, 1986b
DPG Fire Management Plan	Provides guidance and creates policies and procedures for the prevention, control and extinguishment of wildfires at DPG	Horman, et. al., 2000
Drinking Water Source Protection (DWSP) Plans	• Delineate the DWSP area and special zones within it • List, prioritize, and assess potential contamination sources within the DWSP area to determine if additional controls may be needed to protect the aquifer • Include a program management provision to review any new potential contamination sources within a DWSP area to ensure steps are taken to protect groundwater	AGEISS, 1998g; AGEISS, 1998h; AGEISS, 1998i
Excavation Permit System	• Requires approval and a permit for excavation • Protects safety, health, and welfare of all employees, contractors, and tenants at DPG from exposure to potentially contaminated soil	DPG, 2000c
Hazardous Waste Management Plan (HWMP)	• Identifies facilities that generate hazardous waste • Summarizes hazardous waste generation processes • Provides guidance for the management of these facilities and processes in compliance with RCRA regulations, and other Federal, state, and Army environmental protection laws	AGEISS, 2000b
Integrated Cultural Resources Management Plan (ICRMP)	• Provides guidelines to: ▪ Integrate cultural resource management with the DPG mission ▪ Present a research design and procedure to determine the significance of known cultural resources and their eligibility for the National Register for Historic Places ▪ Identify information needed to complete the evaluation, if cultural resources cannot be adequately evaluated with existing information ▪ Identify areas that have not been inventoried where DPG actions are in progress, or planned for the immediate future, and prioritize the archaeological inventory of these localities ▪ Tentatively identify areas throughout DPG that have low, moderate, or high probabilities for historic properties to coordinate cultural resource management responsibilities with mission objectives • Provides recommendations to maintain compliance with cultural resources management laws and regulations	DPG, 2001

Table 2.1-2. DPG Management Plans.

Plan	Description	Source(s)
Investigation Derived Waste (IDW) Management Plan	• Establishes a systematic procedure at DPG to characterize and dispose of IDW in a timely and consistent manner which complies with applicable regulations • Provides contractors and government employees with consistent procedures for management of IDW	AGEISS, 1995a
Maneuver Training Area Management Plan (MTAMP)	• Provides information about training activities, environmental characteristics of DPG training areas, and environmental impacts of military training activities at DPG • Identifies eight management goals to manage land use for the training areas while minimizing long-term environmental degradation • Provides the military with sufficient, quality training areas while maintaining natural resources and preventing environmental disturbances • Addresses implementation, funding, priorities, and program coordination	AGEISS, 1996h
Natural Resource Management Plan	• Contains the inventories and conditions of a variety of DPG's renewable natural resources of critical or special environmental concern at DPG • Addresses management objectives and methods for protecting and improving these resources • Lists priorities and manpower requirements • Describes the responsibilities of planners and decision makers • Discusses necessary monitoring, protection, and enforcement systems	BIO/WEST, 1991
Noxious and Nuisance Weed Management Plan	• Identifies the scope and importance of noxious and nuisance weeds and related problems • Identifies the assets and approaches to limit these weeds and related problems • Identifies resources and strategies to meet program shortfalls for limitation of weeds and related problems	Johnson, et al., 2000
Pest Management Plan	• Provides guidance for operating and maintaining an effective pest management program, including the use of both chemical and non-chemical control techniques for minimal environmental contamination • Ensures effective, economical, and environmentally acceptable pest management and compliance with pertinent laws and regulations	Griffin-Albers, 1997
Pollution Prevention Plan	• Provides guidance to eliminate or minimize creating pollution by reducing the amount of hazardous substances, pollutants, or contaminants before they enter a waste stream • Provides information about DPG's pollution prevention program	AGEISS, 2000c
Quality Assurance Program Plans (QAPPs)	• Provide guidance for collecting and assessing data, and for generating data of acceptable quality and completeness in the following two QAPPs: • The Laboratory Quality Assurance Plan for Regulatory Compliance Analyses that describes the policies, requirements, responsibilities, and procedures established to support regulatory compliance of analyses conducted at DPG • The QAPP for RCRA waste at DPG documents the type and quality of data necessary for making hazardous waste management decisions and provides guidance for collecting and assessing data from the hazardous waste management program	AGEISS and AQS, 1998b; UDSHW, 1998c

Table 2.1-2. DPG Management Plans.

Plan	Description	Source(s)
Spill Prevention, Control, and Countermeasures Plan/Installation Spill Contingency Plan (SPCCP/ISCP)	• Identifies potential spill locations at DPG and provides installation-wide procedures and requirements related to spill prevention and spill response • Ensures an integrated approach to spill prevention and spill response at a particular facility when used with facility-specific spill contingency operating procedures • Identifies potential spill locations; oil, hazardous substances, and hazardous waste stored at these locations; spill prevention, control, and countermeasure practices; and general inspection and training requirements for spill prevention • Identifies immediate spill response actions, general spill response procedures, training requirements for spill response, and spill reporting requirements	AGEISS, 2000a
Summary Development Plan (SDP)	• Summarizes proposals and requirements for real property with a direction for the future development of DPG • Serves as a tool to analyze DPG's current and future planning needs • Summarizes the essential elements of the real property master plan and provides an accessible source of information to support capital investment decisions	AGEISS and HBA, 2000

Army	U.S. Army
BERAP	Biological Emergency Response Assistance Plan
CAIRA	Chemical Accident/Incident Response and Assistance
CAWMP	Chemical Agent Waste Management Plan
CGWMP	Comprehensive Groundwater Monitoring Plan
DCP	Disaster Control Plan
DPG	U.S. Army Dugway Proving Ground
DWSP	Drinking Water Source Protection
HWMP	Hazardous Waste Management Plan
ICRMP	Integrated Cultural Resources Management Plan
IDW	investigation derived waste
MTAMP	Maneuver Training Area Management Plan
QAPP	Quality Assurance Program Plan
RCRA	Resource Conservation and Recovery Act
SDP	Summary Development Plan
SPCCP/ISCP	Spill Prevention, Control, and Countermeasures Plan/Installation Spill Contingency Plan

2.1.3.4 Cooperative Agreements

Cooperative agreements allow for mutual support between two or more organizations. For example, DPG has an agreement with the AF/UTTR regarding mutual support for spill response. DPG also has agreements or is included in agreements with the following organizations:

- 388th Fighter Wing Commander – regarding test and training programs
- 388th Range Control Squadron, HAFB – regarding ground party access and scheduling and ground party control
- 62nd Ordnance Company – regarding explosive ordnance disposal services
- 96th Regional Support Command – regarding the Army Education Center
- Air Force Operational Test and Evaluation Command – regarding operational testing
- Bureau of Land Management (BLM) – regarding research plot maintenance, fire, and horse management

- C Company, Technical Escort Unit – regarding technical escort unit support
- DeCA – regarding the Commissary
- Deseret Chemical Depot and their Respective Public Affairs Office – regarding coordination for public affairs assistance between DPG and Deseret Chemical Depot in an emergency situation
- Deseret Chemical Depot – regarding responsibilities in the event of a chemical accident/incident
- Evans U.S. Army Community Hospital and Latter Day Saints Hospital – regarding treatment of chemical and biological operations patients from Tooele Army Depot and DPG
- Evans U.S. Army Community Hospital and Salt Lake Regional Medical Center – regarding treatment of chemical and biological operations patients from Tooele Army Depot and DPG
- Evans U.S. Army Community Hospital and Tooele Valley Regional Medical Center – regarding treatment of chemical and biological operations patients from Tooele Army Depot and DPG
- Evans U.S. Army Community Hospital and University of Utah Hospital – regarding treatment of chemical and biological operations patients from Tooele Army Depot and DPG
- Evans U.S. Army Community Hospital and Utah Valley Regional Medical Center – regarding treatment of chemical and biological operations patients from Tooele Army Depot and DPG
- Federal Bureau of Investigation – regarding laboratory/analytical support and information sharing
- Fish Springs National Wildlife Refuge – regarding police, communication, community, equipment, and transportation services
- Fort Carson – regarding medical support
- Highway Patrol – regarding accident/incident support
- Secret Service – regarding analytical support and expertise

- Tooele Army Depot Health Clinic – regarding medical support
- Tooele County Sheriff's Department – regarding accident/incident support
- Tooele Fire Department – regarding fire support
- University of Utah – regarding support to personnel and facilities for cosmic ray research
- University of Utah and Utah State University – regarding use of the Surface Layer Turbulence and Environmental Sciences Test (SLTEST) site at DPG for large-scale fluid dynamics and atmospheric sciences experiments
- U.S. Army Deseret Chemical Depot – regarding assay of lewisite sample bubblers
- U.S. Army Medical Command – regarding improvement of occupational health support
- U.S. Army Soldier, Biological and Chemical Command – regarding quality assurance program supporting chemical agent monitoring
- U.S. Army Test Measurement and Diagnostic Equipment – regarding instrumentation support
- U.S. Department of Agriculture (USDA), Forest Service, Intermountain Research Station – regarding community classification, vegetation mapping, and land rehabilitation and restoration
- U.S. Geological Survey – regarding groundwater investigations
- Utah Air National Guard-299th Range Control Squadron – regarding airspace control
- Utah Division of Wildlife Resources (UDWR) – regarding neotropical migratory birds
- Utah Geological Survey – regarding archeological and geological investigations

2.1.4 Activity Centers and Facilities

This section presents a summary of DPG's activity centers and the primary facilities used for testing, training, and material/waste management at DPG.

Activity centers are areas where major administrative, testing, training, mission support, and/or installation support activities occur. Facilities used in testing, training, and material/waste management at DPG include structures and designated indoor/outdoor areas where testing or training occurs, or where materials and/or wastes are stored or handled.

2.1.4.1 Activity Centers

The following five activity centers are described in this section and shown in Figure 2.1-3, DPG Activity Centers and Facilities:

- Avery
- Baker
- Carr
- Ditto
- English Village

Brief descriptions of Five Mile Hill and Fries Park are also provided. These two areas are often used as a locational reference when describing facilities or activities in this Future Programs EIS. However, Five Mile Hill and Fries Park are not considered DPG activity centers because the activities that occur near or at these locations are not as numerous or diverse as those occurring at the five major activity centers.

Each of the DPG activity centers has a specific purpose, and supports a different facet of the overall DPG mission. As part of the planning process for military installations, facilities and infrastructure within the activity areas are assessed on a regular basis as to their function and capability to support the mission. The planning process documents existing conditions, capacity, and alternative uses of the facilities and infrastructure. Systematic evaluation of the present and future factors affecting installation development form the basis for determining development objectives and planning proposals to solve existing problems and meet future needs.

To plan for facility and infrastructural needs associated with DPG's future activities, the SDP identifies existing real property deficiencies. These deficiencies form the basis for proposed plans to improve, upgrade, repair, maintain, or replace the facilities and infrastructure at DPG. Real property deficiencies associated with the activity centers, as identified in the SDP (AGEISS and HBA, 2000), are summarized at the end of the discussion for each activity center. Real property deficiencies for primary indoor or outdoor facilities located within the activity centers are summarized with the description of the facility in Section 2.1.4.2, Primary Indoor Facilities, or Section 2.1.4.3, Primary Outdoor Facilities.

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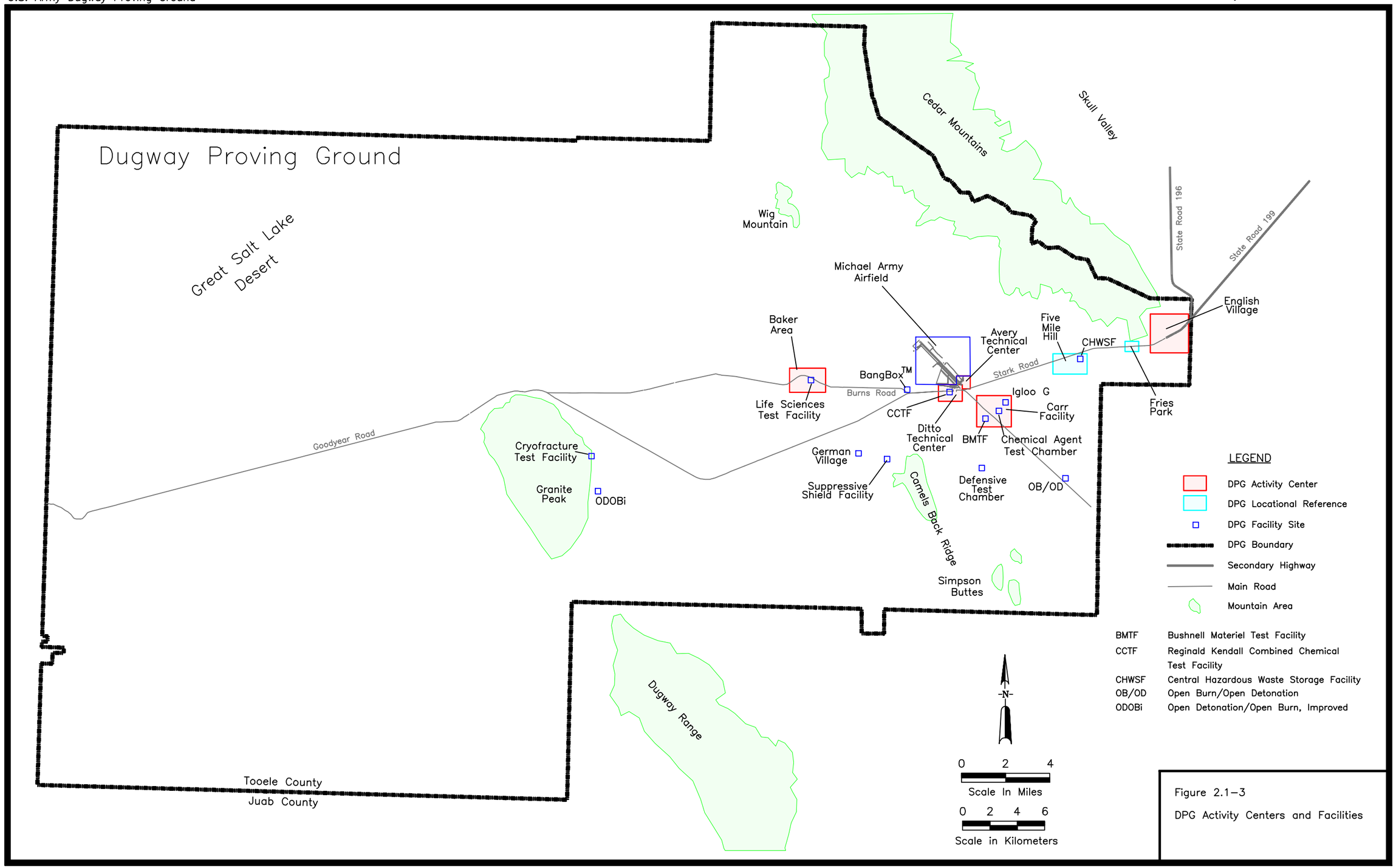

Figure 2.1–3

DPG Activity Centers and Facilities

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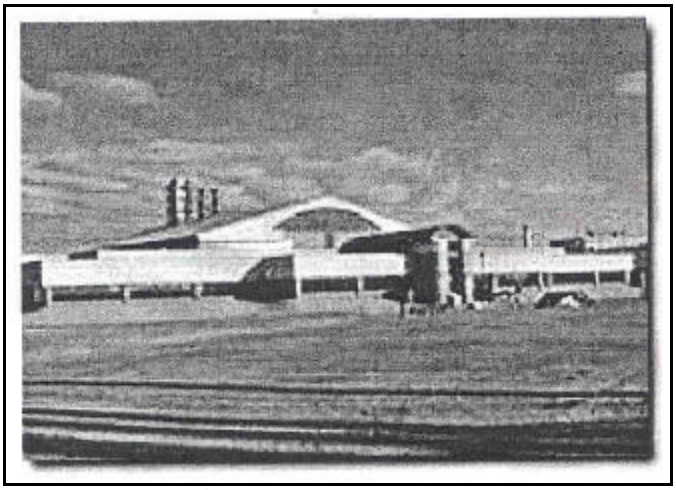
Avery Technical Center – Avery consists of 0.16 sq km (40 acres) of land adjacent to Ditto and immediately south of MAAF. Known as the Able Area until the Vietnam era, Avery is the historic site of radiological testing laboratories at DPG. Studies such as dosimetry (radiation dose measurement) and food preservation by irradiation were conducted here (Lewis and Nachmanoff, 1998). DPG leases Avery, including a hangar, to the AF. AF personnel stationed at Avery are part of the AF's 388th RANS. As a DPG tenant, the 388th RANS is responsible for providing ground support activities to 388th Fighter Wing testing and training activities conducted on the UTTR. These ground support activities include tracking and evaluation of aircraft training and test missions; response to in-flight emergencies and support of grounded flight crews; and support of crews in testing and recovering aircraft, missile, and space vehicle elements. In addition to their primary AF support responsibilities, the 388th RANS provides support to non-AF activities that require electronic flight surveillance capabilities.

Baker Area – Baker consists of 0.10 sq km (24 acres) of land located approximately 8 km (5 mi) west of Avery and Ditto. DPG's biological defense testing laboratory functions are based at Baker. The main biological defense testing facility at Baker is the LSTF, described in Section 2.1.4.2, Primary Indoor Facilities. The LSTF was constructed to replace the old Baker Laboratory built in 1952. The old Baker Laboratory, now known as the Baker Test Facility, is used for training and some simulant testing activities.



The Lothar Salomon Life Sciences Test Facility is DPG's main biological defense testing facility.

A variety of additional support facilities are located at Baker, including buildings historically used as a change house, a decontamination site for vehicles that had been used in outdoor testing activities, and Baker Lagoon.

Real property deficiencies at Baker include the lack of a facility for technology demonstration as a mock biological weapons factory to support testing activities and upgrades are necessary to restore and maintain the Fungus Building (AGEISS and HBA 2000).

Carr Facility – Carr consists of 0.57 sq km (140 acres) of land located approximately 3.2 km (2 mi) southeast of Ditto and Avery. Carr, which was known as the Toxic Gas Yard and then Charlie Area until the 1960s, is a primary storage location for materials and equipment required to support the various testing, training, and support activities conducted at DPG. Carr also contains several test facilities including the BMTF and the Chemical Agent Test Chamber described in Section 2.1.4.2, Primary Indoor Facilities. Munitions, explosives, and chemical agents are some of the materials stored at Carr. These materials are stored in secured areas and management of these materials is described in Section 3.13, Materials and Wastes.

Equipment such as special chambers used to test military equipment reliability, durability, and climatic ability is located at Carr. Offices for personnel that are responsible for managing the various materials stored at Carr, such as Ammunition Accountability and Quality Assurance Specialist Ammunition Surveillance (QASAS) personnel, are also located at this activity center.

Several real property deficiencies have been identified at Carr. For example, existing chemical and biological test chambers at DPG are not able to provide sufficient simulated wind flow conditions around vehicles to determine the effectiveness of decontamination procedures. The instrumentation facility at Carr operates below capacity due to failing infrastructure and antiquated design. Explosive testing at Carr is conducted within a minimum safe distance of the location of the Vibration Facility, X-ray Facility, and Black Powder Operation. Therefore, explosive testing is deferred to non-duty hours for occupant safety and DPG is unable to conduct explosive testing during on-duty hours. The water supply at Carr is inadequate. Sewer mains in this area may leak, collapse, or be clogged (AGEISS and HBA 2000).

The Bushnell Materiel Test Facility is one of the test facilities located near Carr.

Ditto Technical Center – Ditto is where the first buildings were constructed at DPG in 1942 and is located adjacent to the southeast quadrant of MAAF on approximately 0.65 sq km (160 acres) of land. Originally designated Dog Area, the Ditto Technical Center was named for General Rollo C. Ditto. Ditto is the primary mission support center for DPG activities (Lewis and Nachmanoff, 1998). The main administrative and test support functions for all WDTC testing activities including planning, environmental review, scheduling, data analysis, reporting, and resource management are conducted at Ditto. Offices for the WDTC Commander and all WDTC division chiefs except for the Life Sciences Division chief are located at Ditto. The Compliance Office, Plans and Operations, and the office of the Technical Director are also located at Ditto.

Chemical defense testing activities are conducted in the CCTF at Ditto. The CCTF is described in Section 2.1.4.2, Primary Indoor Facilities. Support activities based at Ditto include airfield operations, meteorology and modeling, instrumentation, range control, security, and work clothing preparation. A mission control center is located in Ditto's Kuddes Operation Center where test personnel and customers can view testing activities as they occur from a visitor viewing room. The Joint Contact Point Division maintains a large library at Ditto, with the primary purpose of providing chemical and biological technical information to the Joint Services and other government agencies. This library also is a repository for the various DPG test reports that are produced by WDTC. The library contains over 85,000 classified and unclassified documents, many of which are available in digital format. The Treaty Office is in Ditto as are various nontechnical services, such as a cafeteria and a car wash.

Real property deficiencies at Ditto identified within the SDP include insufficient space for shop functions and for maintenance and repair of mobile generators used to

support testing activities. Also, sewer mains in this area may leak, collapse, or be clogged (AGEISS and HBA 2000).

English Village – English Village is located on approximately 2.63 sq km (650 acres) at the eastern edge of DPG and provides access to the remainder of DPG. English Village was originally constructed in the 1950s and was known as the Easy Area. The Easy Area of the 1950s included installation headquarters, barracks, dorms, schools, and 300 housing units (Lewis and Nachmanoff, 1998). Most of the 1950s era buildings have been remodeled one or more times, and since 1987, construction includes a number of new houses, a Child Development Center, and a fitness center.

A health clinic located at English Village provides medical services to DPG personnel.

A variety of administrative, personnel, community, and installation activities are conducted at English Village to support DPG's private and public sector requirements. These activities include providing housing, medical clinic, retail sale stores, schools, public works, and community and recreational areas for installation personnel. The administrative offices for a variety of support activities are located at English Village, including environmental support, fire fighting, and utilities. The DPG Office of the Commander is also located at English Village.

A number of real property deficiencies exist at English Village (AGEISS and HBA 2000). The bachelor housing and transient housing buildings infrastructure are at the end of their operational lifetime. This housing does not meet modern hotel operation standards. The existing Youth Center is not large enough to properly accommodate youth center operations. There is insufficient space to house troops at English Village. The Mountain View and Wherry housing units, roadways, parking lots, and

driveways require repair and maintenance. Warehouse space at English Village is not adequate for installation requirements. Communications Operations are conducted in two separate buildings and are inefficient.

The SDP also identified several real property deficiencies related to utilities (AGEISS and HBA, 2000). For example, water pressure is low in the water distribution system. A separate irrigation system has not been installed. Total dissolved solids concentrations are high in the water distribution system. Arsenic concentrations in the water distribution system may exceed new CWA environmental standards. The English Village Bulk Fuel Storage Facility requires upgrade and repair.

Five Mile Hill and Fries Park – Five Mile Hill consists of 1.48 sq km (365 acres) of land adjacent to the Cedar Mountains. The Central Hazardous Waste Storage Facility (CHWSF) and several cosmic ray research activities and facilities are located in the area around Five Mile Hill.

The Central Hazardous Waste Storage Facility is located near Five Mile Hill at DPG.

Fries Park consists of about 0.57 sq km (140 acres) of land. It was constructed in the 1950s to provide temporary housing for construction workers building English Village. Many of the original buildings at Fries Park were demolished in 1998.

2.1.4.2 Primary Indoor Facilities

The major indoor facilities used for testing, training, and/or material and waste management activities at DPG are summarized in this section. Descriptions of the

facilities used for research support for non-DOD agencies are presented in Section 2.1.7, Baseline Research Support to Non-DOD Agencies. Descriptions of the following facilities are provided in this section:

- BangBox™
- Bushnell Materiel Test Facility
- Central Hazardous Waste Storage Facility
- Chemical Agent Test Chamber
- Cryofracture Test Facility
- Defensive Test Chamber
- German Village
- Igloo G
- Lothar Salomon Life Sciences Test Facility
- Open Detonation/Open Burn, Improved
- Reginald Kendall Combined Chemical Test Facility
- Suppressive Shield Facility

Details about the structure and controls of these facilities are provided in Appendix B, DPG Facility Control Forms. Facility deficiencies identified in the SDP (AGEISS and HBA, 2000) are summarized at the end of each facility description.

BangBoxÔ – The BangBox™ is located west of Ditto as shown in Figure 2.1-3, DPG Activity Centers and Facilities. Officially named the Propellant, Explosive, and Pyrotechnic Thermal Treatment Evaluation Test Facilities, the BangBox™ consists of two igloo-shaped test chambers, a command post, two storage containers, and an instrumentation building. These chambers are capable of testing explosive charges up to 0.2 kg (0.5 lb) and propellant charges up to 3 kg (7-lb) (DPG, 1996e).

One of the BangBox'sÔ chambers is designed for open burning and one is designed for open detonation of test materials.

The instrumentation building, located between the two BangBox™ chambers, is equipped with a Continuous Emission Monitoring System that monitors air emissions. The command post is 550 m (1,804 ft) from the chambers and contains a data acquisition (DAS) file server, remote DAS monitors, the detonation/ignition system firing station, and a small computer work station for conducting test support (Feilner, 1998). Munitions and energetics used for BangBox™ tests are stored in a portable, skid-mounted munitions storage magazine 500 m (1,640 ft) north of the BangBox™ (DPG, 1996e).

The BangBox™ was designed to identify and quantify the emissions released when test materials such as conventional munitions and energetics are burned or detonated within the controlled environment of the BangBox™ test chambers. BangBox™ tests are conducted as part of the Environmental Characterization and Remediation Technology (ECRT) test activities. DPG has identified the need for a facility capable of testing explosive charges up to 18 kg (40 lb) (AGEISS and HBA, 2000).

Bushnell Materiel Test Facility – The BMTF is primarily used for chemical defense tests. Either chemical agents or simulants can be used in these tests at the BMTF. Some biological defense tests conducted by the Life Sciences Division at the BMTF involve biological simulants.

Chemical or biological defense tests on military equipment are conducted at the Bushnell Materiel Test Facility.

The BMTF is located in Carr, as shown on Figure 2.1-3, DPG Activity Centers and Facilities, and contains the following three test chambers, two of which are capable of reproducing most battlefield conditions.

- Multipurpose Test Chamber used for defensive testing of medium to large test items in controlled environments containing chemical agents or simulants, or biological simulants (Shipley et al., 1998). This test chamber can accommodate military equipment that meets North Atlantic Treaty Organization (NATO) shipping requirements, including most fighter aircraft, helicopters, and ground vehicles. This test chamber has unique capabilities to include flow and temperature controls that permit testing under tight temperature limits between -46 and +54 degrees Celsius (°C) (-50 and +130 degrees Fahrenheit (°F)).

- Closed System Chamber (CSC) used to test small items in controlled environments containing chemical agents or simulants, or biological simulants (Shipley et al., 1998). The CSC provides secondary containment for glove box and small chamber tests.

- Agent Transfer Chamber which contains two fume hoods used for chemical agent sampling and transfer operations. Small test fixtures for tests can be set up in the Agent Transfer Chamber (Shipley et al., 1998).

An Approval Order (AO) from the Utah Division of Air Quality (UDAQ) is in place for the BMTF which identifies chemical agent concentration limits for release into the environment. Chemical agent is stored at the BMTF for use in chemical defense testing. Up to 500 kg (1,102 lb) of chemical agent can be stored in the Agent Repository at the BMTF (UDAQ, 1998a).

Due to the lack of staging space within the BMTF, test fixtures can only be assembled in an inactive test chamber or following the completion of chamber testing. Actual available test time is accordingly decreased by 50 percent (AGEISS and HBA, 2000). Additional staging space is needed to allow for assembly of test fixtures outside the BMTF to increase chamber availability for testing.

Central Hazardous Waste Storage Facility – The CHWSF is a 16-bay, five-chemical storage cabinet facility with a 94,178-liter (L) (24,880-gallon) capacity. The CHWSF is a RCRA waste storage facility permitted by the State to store almost any hazardous waste for up to a period of 1 year (UDSHW, 1998a). The CHWSF is located at Five Mile Hill, about 6.4 km (4 mi) west of DPG's main entrance, as shown on Figure 2.1-3, DPG Activity Centers and Facilities. It is prohibited from

storing compressed gas cylinders, mixed radioactive wastes, explosives, and pure, dilute, and off-specification chemical agent that have not been decontaminated.

The major purpose of the CHWSF is to provide a facility at DPG where:

- Hazardous waste can be classified, segregated, and safely stored in accordance with Federal and State of Utah hazardous waste storage regulations prior to disposal at a permitted off-installation facility
- Waste characterizations, manifests, and land disposal restriction notifications can be prepared for waste being shipped off-installation for eventual treatment or disposal

Appropriate security measures are permanently in place at this facility to prevent unauthorized access. Renovation of this facility is needed to restore it to full operational capacity (AGEISS and HBA, 2000).

Chemical Agent Test Chamber – The Chemical Agent Test Chamber is located in Carr, as shown on Figure 2.1-3, DPG Activity Centers and Facilities. It is a complex of environmental test chambers, support structures, and equipment for testing chemical agents and industrial chemicals, which are chemical substances normally used in industrial applications whose toxicological properties allow them to be used as if they were chemical agents. The Chemical Agent Test Chamber consists of two test chambers located side-by-side and is used for chemical defense test activities. Test chamber personnel can view operations within both subchambers through a window in an elevated observation room that is sealed off from the test rooms (AGEISS, 1999a). Some upgrades, repairs, and replacements are needed to improve the Chemical Agent Test Chamber as a test facility for uses other than chemical agent transfer since that activity now occurs only at the BMTF (AGEISS and HBA, 2000).

Cryofracture Test Facility – This facility is located along the eastern flank of Granite Peak, as shown on Figure 2.1-3, DPG Activity Centers and Facilities. This facility consists of a 15 by 15 m (50 by 50 ft) metal building which contains a liquid nitrogen bath, hydraulic press, and open-grate furnace and is used for demilitarization testing. A control center trailer is located approximately 183 m (600 ft) from the test facility behind an earthen berm (GA, 1996a). From the control center, test personnel use a computer to control cryofracture operations, collect test data, and monitor various alarms. Test personnel can also monitor activities from the control center through cameras installed within the facility. The facility is operated under a RCRA Research Development and Demonstration permit issued September 1997. Tests conducted at this facility are part of ECRT testing activities.

Methods to demilitarize small explosives, chemical simulants, and conventional munitions are tested at the Cryofracture Test Facility.

An AO for the Cryofracture Test Facility limits the burning of explosives to 907 kg (2,000 lb) per 12-month period and 23 kg (50 lb) per 24-hour period (UDAQ, 1997b).

Defensive Test Chamber – The Defensive Test Chamber (DTC) is located southwest of Carr, as shown on Figure 2.1-3, DPG Activity Centers and Facilities, and is primarily used for chemical and biological defense testing activities. Chemical simulants are primarily used at the DTC, although chemical agents and biological simulants may be used. A wind tunnel, housed in one side of the chamber, can increase wind speed and ensure good mixing of the vapor clouds. The DTC is equipped with engineered systems that can simulate various temperature conditions. Most battlefield conditions can be reproduced within the DTC, although capability to generate wind speed greater than 13 kilometers per hour (kph) (8 miles per hour (mph)) is limited. The chamber is designed for Man in Simulant Testing (MIST) of chemical and biological personal protective clothing and equipment. The existing wind tunnel is too small to accommodate military vehicles (AGEISS and HBA, 2000). Associated structures/equipment at the DTC include a control room, an equipment room, the test chamber, personnel change facilities, and filter systems (AGEISS, 1999a).

The DTC has limited room for testing the effectiveness of personnel protective equipment (PPE) on individuals conducting decontamination work in a chemical simulant environment. Several activities take place in temporary structures that are located at the DTC. A single permanent building would consolidate these activities and increase testing efficiency and improve coordination. A waterline would provide a source of potable water at the DTC (AGEISS and HBA, 2000).

German Village – German Village is located northwest of Camels Back Ridge, as shown in Figure 2.1-3, DPG Activity Centers and Facilities. During World War II, German Village was built to test the effectiveness of incendiary bombs on typical German structures. German Village is used in support of other DPG activities, such as chemical and biological defense training (counterterrorism training), and as an artillery firing point.

Igloo G – Igloo G, located in Carr, as shown on Figure 2.1-3, DPG Activity Centers and Facilities, is a 7.6 by 24 m (25 by 80 ft), 30-year old earth covered ammunition storage magazine. DPG is authorized by the State of Utah to use Igloo G to store chemical agents and range-recovered munitions containing chemical agents (UDSHW, 2000). Management of materials stored in Igloo G is described in Section 3.13.3.3, Chemical Agents. Appropriate security measures are permanently in place at this facility to prevent unauthorized access.

Lothar Salomon Life Sciences Test Facility – The LSTF is a 2,973-sq m (32,000-sq ft) facility located at Baker. Tests conducted at the LSTF are part of biological defense testing activities. Both biological simulants and biological agents are used at this facility. This facility was built to replace the 1952 Baker Laboratory. The LSTF consists of laboratories and chambers that are capable of working at BL 1 through BL 3. Section 2.1.5.1, Biological Defense Testing, describes the BL categories. This facility is divided into the following four major functional areas (Dynamac, 1992).

- Administrative section consists of offices, rest room facilities, lunchroom, etc.
- General Analytical Support Unit houses microscopes and conventional analytical instrumentation. This unit does not require biological containment equipment.
- BL 2 Microbiological Area consists of laboratory rooms used for routine microbiological procedures such as culture preparation, analytical tests, and handling of biological simulants. Low activity radionuclides may also be used as tracer materials for some analytical tests.
- BL 3 Suite consists of multipurpose test rooms, BL 3 cultivation and assay room, aerosol chamber support room, and a special containment aerosol chamber (CAC) for conducting BL 3 testing with pathogenic microorganisms and toxins. The chamber can simulate a wide range of environmental conditions dealing with temperature, humidity, and aerosol concentration (DPG, 1998b).

In 1997, the LSTF received an AO from UDAQ which specified the type of emergency generator, boilers, and ventilation system required to operate the LSTF; test procedures such as air monitoring of emissions; procedures that must be followed

in the event of failed boiler status; requirements for the testing areas; and the types of records that must be maintained at the facility (UDAQ, 1997a).

Appropriate security measures are permanently in place at the LSTF to prevent unauthorized access to the LSTF Laboratory. Additional security measures such as a fence and video monitoring equipment may be required to safeguard the temporary modular structures surrounding this facility.

The LSTF is not large enough to support the growing staff and equipment needs of the biological defense testing program. Temporary modular structures are being used until a permanent solution is found (AGEISS and HBA, 2000).

Open Detonation/Open Burn, Improved – Open Detonation/Open Burn, Improved (ODOBi) is a test facility located by Granite Peak on Downwind South between Romeo and Tango roads and is shown on Figure 2.1-3, DPG Activity Centers and Facilities. The ODOBi is designed for the validation of modeling data and can withstand detonations of up to 11 kg (25 lb) of net explosive weight. Tests conducted at this facility are associated with ECRT tests. Similar ECRT test activities take place at the Suppressive Shield Facility. The ODOBi's remote location makes access difficult and inefficient for ECRT personnel.

The Open Detonation/Open Burn, Improved tests emissions from energetics that cannot be tested at the BangBox^{Ó} or Suppressive Shield.

Reginald Kendall Combined Chemical Test Facility – The CCTF is a modern 3,252-sq m (35,000-sq ft) facility located in Ditto, as shown on Figure 2.1-3, DPG Activity Centers and Facilities. It consists of two laboratory buildings and one administrative building. The facility supports the testing of protective clothing and masks, detectors, and decontamination systems using chemical agents and simulants. The CCTF also supports the analysis of samples collected in laboratory and chamber

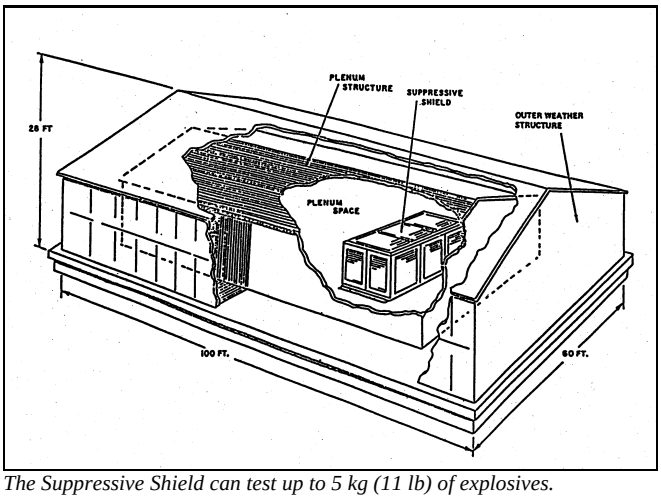
trials and environmental samples from DPG operations to ensure compliance with Federal, state, and local regulations.

The CCTF has a ventilation system design that maintains negative air pressure in the laboratory rooms and surrounding corridors with respect to other areas of the building. This ensures that the building's air flows through the filtration system. Tests using chemical agents and simulants are conducted in controlled conditions in laboratory fume hoods and small glove box test chambers. When conducting test operations, all CCTF personnel and visitors must have emergency evacuation PPE readily available in case of an emergency. Many of the engineering controls are required by the AO for the CCTF (UDAQ, 1992).

Very small quantities of chemical agent may be stored at the CCTF in support of testing activities. The CCTF is certified to store up to 10 L (2.6 gallons) of chemical agent (DPG, 2000m). Appropriate security measures are permanently in place at this facility to prevent unauthorized access.

Some upgrades, repairs, and replacement activities are needed to maintain buildings within the CCTF and meet building codes and health and safety standards (AGEISS and HBA, 2000).

Suppressive Shield Facility – The Suppressive Shield Facility is located north of Camels Back Ridge, as shown on Figure 2.1-3, DPG Activity Centers and Facilities. Tests conducted at this facility are associated with the ECRT test program. It is used for large shrapnel producing detonations and weapons emissions characterization. Energetics, chemical simulants, decontaminants, and biological simulants can be used in this facility. The vapor containment inner core, houses a shrapnel containment detonation chamber, called the blast chamber.



The Suppressive Shield can test up to 5 kg (11 lb) of explosives.

2.1.4.3 Primary Outdoor Facilities

Primary outdoor testing, training, and material/waste management facilities at DPG include the following:

- Airspace
- MAAF
- Open Burn/Open Detonation (OB/OD)
- Ranges and impact areas
- Test grids
- Training areas

Characteristics of test grids, ranges, and impact areas vary greatly with the test requirements and therefore over the years many different ones have been constructed and are not in active use. Figure 2.1-4, Historic Outdoor Test Areas, shows locations where testing has occurred at DPG including historic grids, ranges, and impact areas. Facility deficiencies identified in the SDP (AGEISS and HBA, 2000) are summarized at the end of each description.

Airspace – By various agreements between the AF and Army, there are two airspaces above DPG – the airspace west of Granite Peak, and the airspace east of Granite Peak and west of Five Mile Hill. These two airspaces are shown on Figure 2.1-5, Impact Areas for Air Testing and Training, as R-6407 and R-6402A, respectively. The UTTR has priority of use of the airspace west of Granite Peak, and routinely uses this airspace for test and/or training activities. The AF manages the UTTR as a test and training facility for high performance aircraft, which are principally based out of HAFB, Utah. DPG has priority of use of the airspace east of Granite Peak, and routinely uses this airspace in support of the various testing and training activities described in this EIS.

For safety and scheduling purposes, 299th Range Control Squadron at HAFB provides airspace control on a regular basis for both airspaces above DPG. All activities at MAAF are scheduled and approved by DPG's Plan and Operations Division's Aviation Branch, and airspace east of Granite Peak is controlled on a daily basis by DPG Range Control. On a frequent basis, the UTTR will conduct testing and/or training activities at MAAF and east of Granite Peak through coordination with DPG's Aviation Branch and Range Control. AF over-flights of critical facilities and residential areas, including Ditto, Carr, Baker, and English Village, must be avoided.

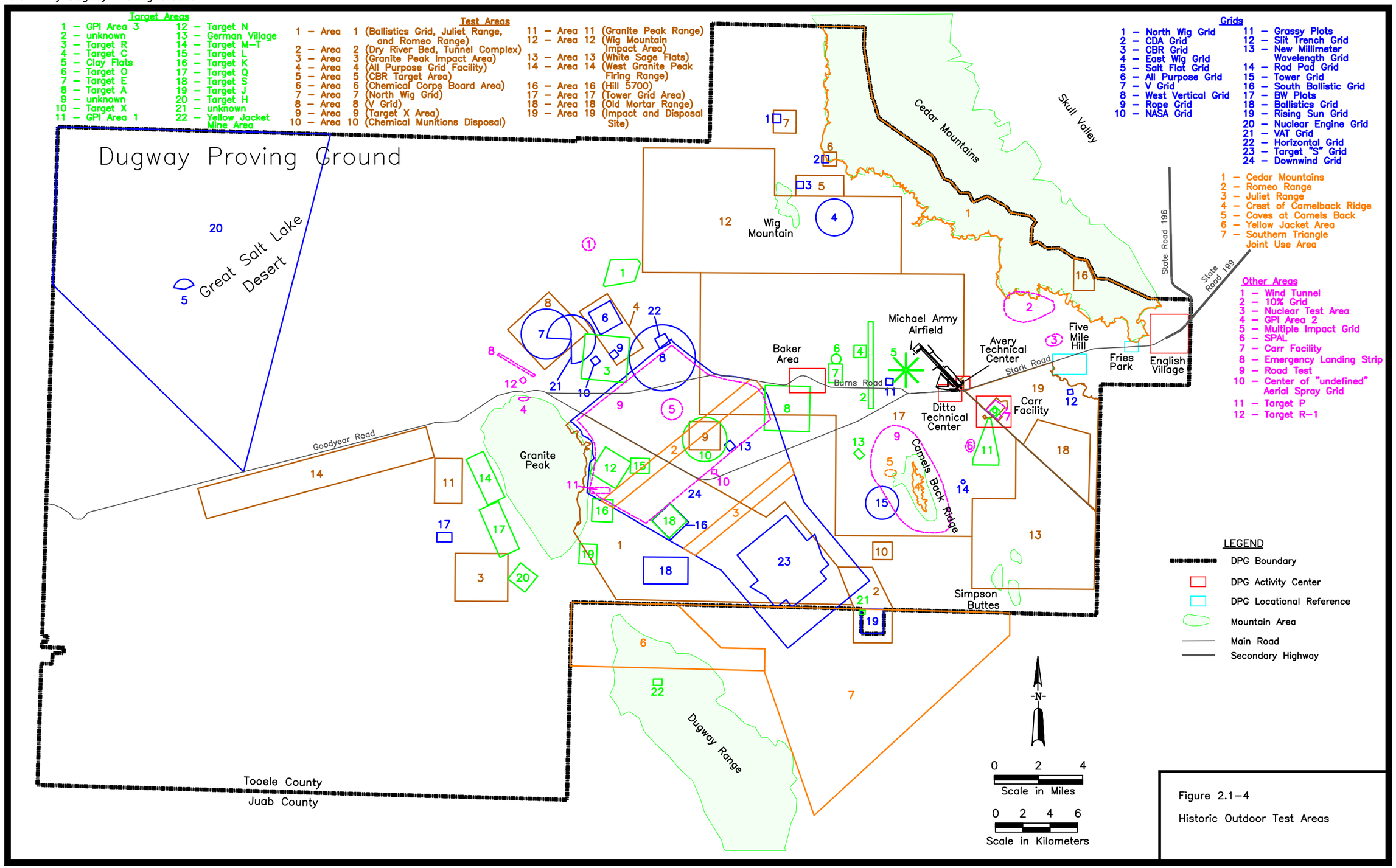


Figure 2.1–4

Historic Outdoor Test Areas

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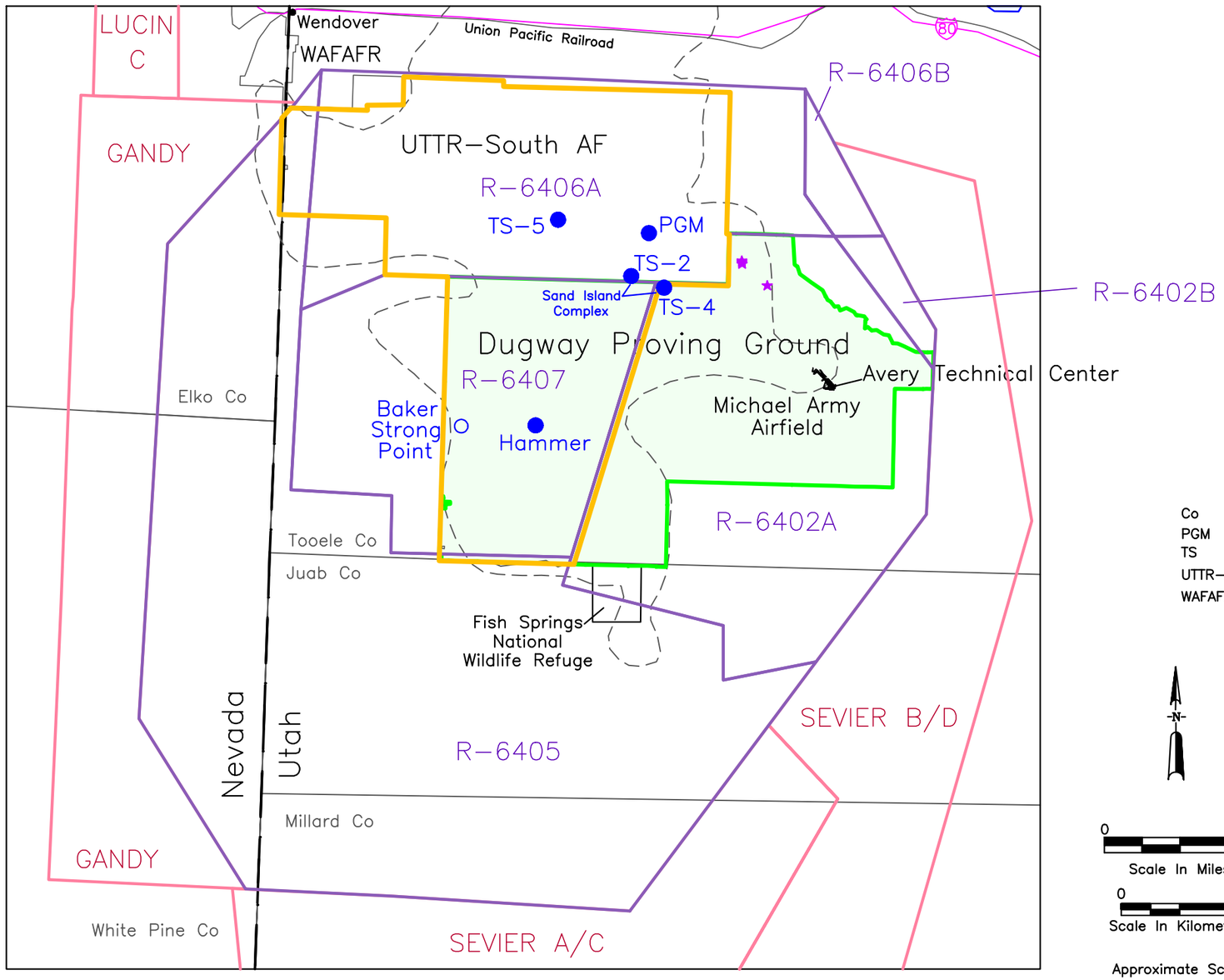
Baseline Activities, Proposed Action, and Alternatives



LEGEND

- Interstate Route
- County Boundary
- State Boundary
- Railroad
- Approximate Desert Boundary
- Lake
- Baker — Training Target
- TS-4 — Test Target
- Cruise Missile Impact Site
- UTTR Chaff and Flares Authorized Area
- UTTR Restricted Airspace
- UTTR Military Operating Area
- DPG Boundary

Co	County
PGM	Precision Guided Missile
TS	Target Site
UTTR-South AF	Utah Test and Training Range – South Air Force
WAFAFR	Wendover Air Force Auxiliary Field Range

Air testing and training activities are conducted by the Air Force on DPG land and airspace above DPG.

N

0 16
Scale In Miles

0 20
Scale In Kilometers

Approximate Scale

Figure 2.1-5
Impact Areas for Air Testing and Training

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Because the AF is the proponent activity for UTTR activities, and because the AF is responsible for the scope, timing, and frequency of such air activities, UTTR activities are not addressed under the baseline or Proposed Action of the Future Programs EIS. However, this EIS does consider the impacts of AF activities and their cumulative effects when combined with DPG activities in Chapter 5.0, Cumulative Impacts.

Michael Army Airfield – MAAF is located north of Ditto and Avery on 2.8 sq km (680 acres) and is shown on Figure 2.1-3, DPG Activity Centers and Facilities. DPG Plans and Operations Division's Aviation Branch operates the airfield. The original airfield was constructed in 1943 with a 2,096 by 46 m (6,875 by 150 ft) runway, a decontamination pad, parking apron, taxiway, and turnaround area. In 1951, a new runway, 2,438 by 61 m (8,000 by 200 ft), was built parallel to the original runway. A 1,562-m (5,125-ft) extension at the north end and 198 m (650 ft) overruns at each end were added to the new runway in 1969. At the same time, a new decontamination taxiway and a 28-sq m (300-sq ft) decontamination pad were built at the northwest end. In 1985, the airfield was improved to support C-141 aircraft by resurfacing the runway, taxiways, parking apron, and decontamination pad. The original runway and decontamination pad, built in 1943, are no longer used (Rosser, 1994).

Michael Army Airfield is used by the Army and Air Force for aviation training, test and evaluation missions, and ground support for the Utah Test and Training Range.

The airfield's 4,000 by 61 m (13,125 by 200 ft), hard surfaced runway is long enough to land a variety of aircraft. Facilities at the airfield include:

- 680-sq-m (7,317-sq-ft) office building
- 1,860-sq-m (20,014-sq-ft) Army hangar
- Control tower

Portable control towers are deployed to MAAF to support major active and reserve component training and testing exercises. Additional resources include a helicopter pad, emergency medical technicians and equipment within 1.6 km (1 mi), fire/crash rescue on the airfield, and security and public affairs personnel on the installation. Fuel storage and aircraft maintenance facilities are available at MAAF. Types of fuel stored at MAAF are described in Section 3.13.3.8, Petroleum Fuels. Fuel supplies arrive by truck and are stored in two 90,847-L (24,000-gallon) metal above ground storage tanks (ASTs) (AGEISS, 2000d). Fuel supplies are also stored in two trucks configured to store, transport, and pump JP8 (jet fuel) and a 500-gallon stationary tank for aviation gasoline.

MAAF supports transportation of test equipment, hazardous cargo, repair parts, and dignitaries between DPG and military or commercial airports. MAAF is also used in DPG test programs as required. MAAF is an arrival and departure point for some troops conducting training exercises at DPG and active and reserve component military units performing yearly training from MAAF utilizing nearly all fixed wing and rotary aircraft in the DOD inventory. MAAF also serves as an aircraft emergency-landing site. Additionally, during joint exercises, described in Section 2.1.6.1, Ground Training, military aircraft take-off and land at MAAF.

MAAF is a member airfield of the DOD Joint Airbase Utilization Plan and the DOD Hurricane Evacuation Plan. It serves as an evacuation base for tactical fighter wing aircraft located at Nellis Air Force Base (AFB), NV. It also serves as a recovery airfield for in-flight emergencies such as losing power, hitting birds, and losing air pressure (Ainsworth, 1996) and for hung ordnance for aircraft using bombing ranges within the UTTR. Hung ordnance occurs when the ordnance does not properly dislodge from the aircraft. The aircraft are taxied to the northwest decontamination pad and unloaded by Explosive Ordnance Disposal (EOD) personnel.

The majority of aircraft that use MAAF are DOD aircraft such as C-141s, C-5As, C-130s, and C-17s (all military transportation aircraft), and F-15s, F-16s, and F-18s (all military fighter/bomber aircraft). Also, some commercial aircraft, such as 727s and 707s, which support specific testing and training activities, use MAAF. Usage in 1996 was higher than in 1995, but lower than in previous years. The total traffic

count in 1998 was 895 aircraft, of which F-16 fighters accounted for 65 percent (Ainsworth, 1997b). The airfield averages approximately 15 to 20 aircraft emergencies each year, with the majority of the incidences in 1998 involving F-16s (DPG, 2000d).

Due to deteriorating runway conditions, aircraft landing restrictions are severe during the winter months from November through March. Only F-16s and aircraft 5,670 kg (12,500 lb) gross weight and below can land on the runway during these months. During the remaining months of the year, many aircraft are restricted to gross weight significantly below their maximum capability.

Open Burn/Open Detonation – The OB/OD area is an oval shaped area approximately 549 by 396 m (1,800 by 1,300 ft). The OB/OD area has been operational for 30 years and is located in the southeast portion of DPG, as shown in Figure 2.1-3, DPG Activity Centers and Facilities. Carr is the closest area to the OB/OD where DPG personnel work on a regular basis and the closest residents are in English Village, approximately 12 km (7.5 mi) northeast of the OB/OD area (AGEISS, 1996b).

DPG is authorized by the State of Utah to use the Open Burn/Open Detonation area to demilitarize DPG's energetic wastes.

Weight limits are set by Army protocol for safety of personnel conducting the treatment and on the maximum quantity of energetic waste that DPG expects to treat per event. The weight limits are 454 kg (1,000 lb) of energetic material per event, not to exceed 1,360 kg (3,000 lb) of energetic material per day for OB and 680 kg

(1,500 lb) of energetic material per event, not to exceed 680 kg (1,500 lb) of energetic material per day for OD (UDAQ, 2001).

OB/OD treatment is performed only as needed, typically once or twice per month. Items treated range from cartridges weighing less than 0.45 kg (1 lb) to bombs weighing up to 363 kg (800 lb).

Ranges and Impact Areas – Ranges are areas designated for testing or training. An impact area is an area designated for testing or training where artillery, mortar, or missiles are targeted to impact. All impact areas are marked with warning signs, barriers, and/or guards. Passing any of these hazard warnings without Range Control permission is forbidden (DPG, 1997a). Range Control operations and responsibilities are summarized in Section 2.1.8, Baseline Mission Support Activities. Instrumentation provides in-flight measurements of test munitions. Some ranges or impact areas may coincide with training areas where munitions are fired. Nine ranges and four impact areas are used for ground activities at DPG. Figure 2.1-6, Baseline Locations of Grids, Ranges, and Impact Areas, shows their locations. Figure 2.1-5, Impact Areas for Air Testing and Training, shows the locations of targets/impact areas for air activities. Table 2.1-3, Summary of Baseline Ranges and Impact Areas at DPG, summarizes information about each range and impact area.

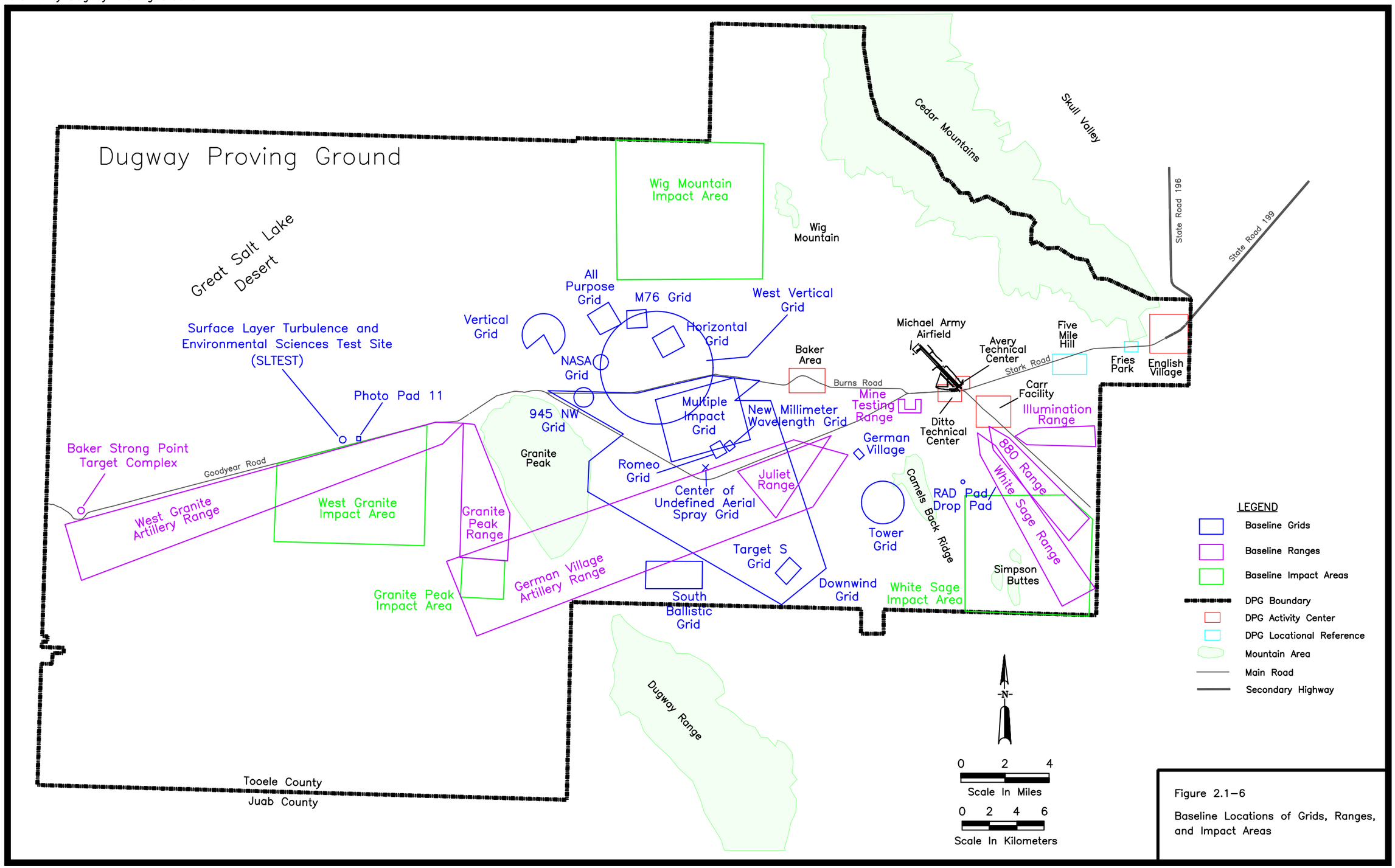

Figure 2.1–6

Baseline Locations of Grids, Ranges, and Impact Areas

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Table 2.1-3. Summary of Baseline Ranges and Impact Areas at DPG.

Range or Impact Area Name	General Location	Type of Activity Conducted	Area (acres)
880 Range	South of Carr and east of White Sage Range	Conventional munitions testing	4,113
Baker Strong Point Target Complex Range	West of Granite Peak, approximately 1 mile from DPG's west boundary	• Strafe and inert ordnance • Laser training • SAM site	7,680
German Village Artillery Range	South of Baker	• Smoke and obscurant testing • Conventional munitions testing	33,331
Granite Peak Impact Area	Southwest of Granite Peak	Impact area for firing from West Granite Peak training area	2,226
Granite Peak Range	West side of Granite Peak	Conventional munitions testing	6,452
Illumination Range	Southeast of Carr	• Conventional munitions testing • Smoke, obscurant, and illuminant testing	1,788
Juliet Range	South of Baker	Conventional munitions testing	3,777
Mine Testing Range	West of Ditto	Anti-personnel and anti-tank mines testing	258
West Granite Artillery Range (Causeway Artillery Range)	West of Granite Peak and South of Goodyear Road	Conventional munitions testing and training	21,077
West Granite Impact Area	West of Granite Peak	• Conventional munitions testing and training • Impact area for firing from the Granite Peak firing points	19,637
White Sage Impact Area	Southeast corner of DPG	• Conventional munitions testing • Smoke, obscurant, and illuminant testing • Impact area for firing from White Sage training area	19,335
White Sage Range (Howitzer Range)	South of Carr	• Conventional munitions testing and training • Smoke, obscurant, and illuminant testing	6,554
Wig Mountain Impact Area	West of Wig Mountain	• Conventional munitions testing • Impact area for firing from Wig Mountain and Cedar Mountain training areas	26,736

Baker Baker Area
Carr Carr Facility
DPG U.S. Army Dugway Proving Ground
SAM Surface-to-Air Missile

NOTE: All ranges, impact areas, and grids may be used for conventional munitions testing. The type of testing activity specified represents the most common or frequently performed activity.

Test Grids – Test grids are designated areas where outdoor field tests are performed, most often involving chemical or biological simulants. Grids are constructed as

necessary to accommodate the test and the data that are needed. Sampling positions are established to permit fast and efficient collection of air samples. Eighteen test grids are used at DPG and their locations are identified in Figure 2.1-6, Baseline Locations of Grids, Ranges, and Impact Areas. Table 2.1-4, Summary of Baseline Test Grids at DPG, summarizes information about each test grid.

Table 2.1-4. Summary of Baseline Test Grids at DPG.

Grid Name	General Location	Type of Testing	Area (acres)	Dimensions (width and length or diameter in feet)
945 Northwest Grid	North and east of Granite Peak	Smoke and obscurant	400	Diameter 4,747
Aerial Spray Grid	Defined center point north of Stark Road in Downwind Grid	Atmospheric dispersion and ground level deposition for aircraft and ground spray trials	Not available	Undefined
All Purpose Grid	Northeast of Granite Peak	• Biological defense • Chemical defense • Smoke and obscurant • Conventional munitions	773	5,590 by 6,059
Downwind Grid	East of Granite Peak	• Biological defense • Chemical defense • Smoke and obscurant	45,327	78,587 by 49,418
RAD Pad/Drop Pad	North of Simpson Buttes	Physical	16	Diameter 938
German Village	West of Camels Back Ridge	• Biological defense • Chemical defense • Smoke, obscurant, and illuminant • Conventional munitions	77	2,155 by 1,573
Horizontal Grid	Northeast of Granite Peak	• Biological defense • Chemical defense • Modeling and assessment • Smoke and obscurant	734	5,963 by 5,353
M76 Grid	Northeast of Granite Peak	• Conventional munitions • Smoke and obscurant	467	4,878 by 4,240
Multiple Impact Grid	East of Granite Peak between Burns Road and Stark Road	• Biological defense • Chemical defense • Conventional munitions • Obscurant	6,947	19,692 by 15,448
NASA Grid	Northeast of Granite Peak	• Chemical defense • Conventional munitions • Smoke and obscurant	237	Diameter 3,607
Romeo Grid	East of Granite Peak and south of Multiple Impact Grid	• Conventional munitions • Smoke and obscurant	216	3,009 by 3,290
New Millimeter Wavelength Grid	East of Granite Peak and south of Multiple Impact Grid (next to Romeo Grid)	• Conventional munitions • Obscurant	83	1,772 by 1,995
Photo Pad 11	East of SLTEST site on the north side of Goodyear Road	• Biological defense • Modeling and assessment	Not available	Not available
SLTEST Site	West of Granite Peak; SAMS Number 18	• Biological defense • Modeling and assessment	Not available	Varies according to test

Table 2.1-4. Summary of Baseline Test Grids at DPG.

Grid Name	General Location	Type of Testing	Area (acres)	Dimensions (width and length or diameter in feet)
South Ballistic Grid	North of Dugway Range	• Conventional munitions • Obscurant	2,055	13,610 by 6,641
Target S Grid	Southeast portion of Downwind Grid	• Conventional munitions • Modeling and assessment	453	5,226 by 3,883
Tower Grid	West of Camels Back Ridge	• Biological defense • Chemical defense • Conventional munitions • Modeling and assessment	1,891	10,266
West Vertical Grid	Northeast of Granite Peak	• Biological defense • Chemical defense • Smoke and obscurant	13,243	Diameter 27,105

NASA National Aeronautics and Space Administration
SAMS Surface Atmospheric Measurement System
SLTEST Surface Layer Turbulence and Environmental Sciences Test

NOTE: All ranges, impact areas, and grids may be used for conventional munitions testing. The type of testing activity specified represents the most common or frequently performed activity.

Real property deficiencies associated with test grids include deteriorated infrastructure at Downwind Grid, including electrical power, communication lines, and asphalt roads. The electrical power and communications systems do not meet present technology needs (AGEISS and HBA 2000).

Grids are constructed as necessary to accommodate the test and the data that are needed.

Training Areas – Large portions of DPG are designated for training purposes. DPG was first opened to Army Reserve Component training in 1969. Military training requires varying terrain to ensure the most realistic training experience. The training areas at DPG include vast areas of the valley floor, foothills, salt and alkali desert,

and rugged mountain ranges. These conditions and the four-season climate of west central Utah provide ideal conditions for training light, airborne, artillery, special operations, and joint command forces. Baseline ground and air training activities at DPG are described in Section 2.1.6, Baseline Training Activities. As of 2000, about 23 percent of DPG land holdings are designated for training activities. Figure 2.1-7, Baseline Locations of Ground Training Activities, shows the locations of the four training areas and their associated impact areas. The following four ground training areas and associated impact areas are located at DPG:

- The Cedar Mountain Training Area is located within the Cedar Mountains. Several interconnecting roads within the training area are useful for truck convoy/ambush scenarios.

- The Wig Mountain Training Area is located south-southwest of the northern portion of the Cedar Mountain Training Area and east/northeast of the Wig Mountain Impact Area. The training area includes a series of raid sites and associated firing fans, which have been designated and constructed for troop training.

- The White Sage Training Area includes two noncontiguous areas to the north and northwest of the White Sage Impact Area. The White Sage Training Area is used primarily for artillery and Combat Service Support field operations

- The West Granite Peak Training Area, also known as Causeway, is located approximately 40 km (25 mi) west of Ditto, south of Goodyear Road, and just west of Granite Peak. This training area is used primarily for artillery and Combat Services Support operations.

The SDP identified several real property deficiencies associated with training areas. For example, the existing small arms and machine gun range at DPG is located too close to the DPG property boundary. Existing and proposed firing points are not durable enough to minimize environmental damage from tracked vehicles. Also, a Chemical and Biological Mock City capability is not available for counterterrorism training at DPG (AGEISS and HBA 2000).

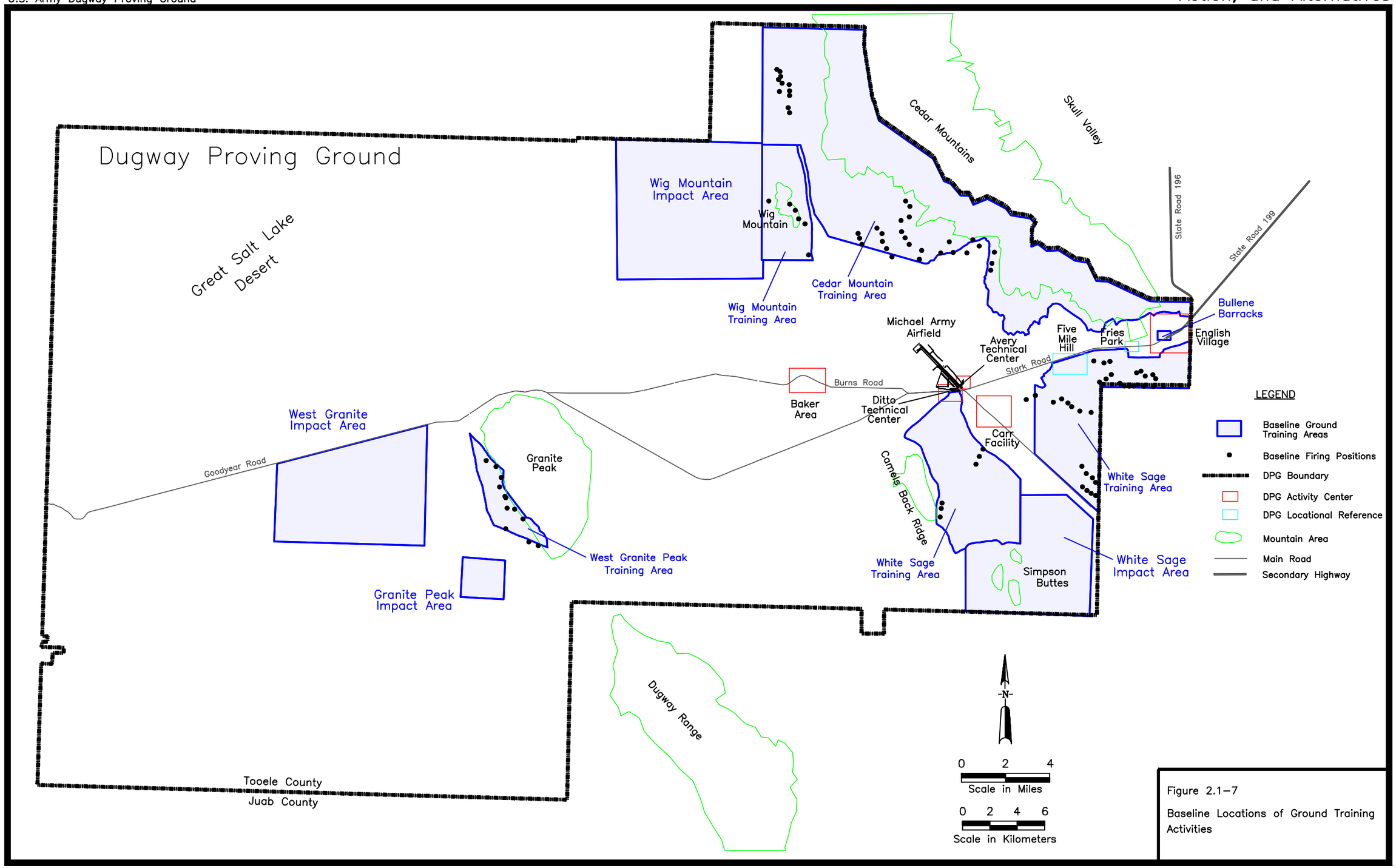

Figure 2.1–7

Baseline Locations of Ground Training Activities

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2.1.5 Baseline Testing Activities

Testing has traditionally been and continues to be the major component of DPG's mission and programs.

Testing is conducted at DPG for the following purposes.

- **Developmental and operational testing is conducted to collect data on whether military materiel meets required design specifications and operational requirements to support acquisition decisions throughout a product's entire life-cycle.**
- **Testing is conducted to determine whether military equipment can survive contamination and subsequent decontamination of chemical and biological agents without adversely impacting its performance.**
- **Quality testing on military equipment and systems that have passed the design stage is conducted to ensure product quality, functionality, and operational characteristics.**

These tests strengthen the readiness of U.S. and allied forces and deter enemy aggression. Testing activities at DPG are conducted by WDTC staff and DPG contractors at indoor laboratories and test chambers and outdoor test sites, grids, and ranges. DPG activity centers and indoor and outdoor testing facilities are described in Section 2.1.4, Activity Centers and Facilities.

The materials used in testing activities at DPG are discussed in this section. Additional information about mission materials and wastes generated by DPG testing activities is found in Section 3.13, Materials and Wastes, and in Appendix C, Mission Materials. To ensure compliance and safety, the plans for and results of testing activities are documented within DPG by each testing division through test plans and post-test reports discussed in Section 2.1.3.2, Test Process Planning and Management. The potential environmental impacts associated with DPG tests are analyzed through the NEPA review process prior to initiating testing activities, as described in Section 2.1.3.1, NEPA and Environmental Management, and Section 2.1.3.2, Test Process Planning and Management.

The following testing activities are conducted at DPG:

- Biological Defense Testing
- Chemical Defense Testing
- Conventional Munitions Testing
- Environmental Characterization and Remediation Technology Testing
- Modeling and Assessment Testing

- Smoke, Obscurant, and Illuminant Testing
- Physical Testing
- Support to Air Testing

International treaties and conventions prohibit offensive chemical and biological agent outdoor testing. Only simulants are used for outdoor chemical and biological tests.

These treaties are discussed in Sections 2.1.5.1, Biological Defense Testing, and 2.1.5.2, Chemical Defense Testing.

2.1.5.1 Biological Defense Testing

Biological warfare did not receive intense research and development efforts in the U.S. until the late 1930s and early 1940s, when concerns about the potential use of biological weapons by Germany, Italy, and Japan heightened the need for retaliatory and defensive capabilities (Pearson, 1998). U.S. biological weapons research and development continued through the 1950s and 1960s as a counter effort to the Soviet Union's biological weapons program. In 1968, the U.S. discontinued its offensive biological weapons program and confined biological research to strictly defensive measures (CEIP, 1971; GAO, 1992).

In an effort to control the international use of biological weapons, the U.S. signed and ratified the following international treaties:

- The Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous, or Other Gases, and of Bacteriological Methods of Warfare (Geneva Protocol)

- Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological and Toxin Weapons and on Their Destruction, commonly referred to as the BWC

The Geneva Protocol prohibits the use of both biological and chemical weapons in warfare. The BWC bans the development, production, stockpiling, or acquisition of biological agent weapons. The BWC does not encompass biological agents or their derivatives such as toxins that are permitted for medical, defensive, or other peaceful purposes (GAO, 1992).

International concern regarding protection and defensive capabilities from biological weapons has increased substantially since the Geneva Protocol and BWC were ratified by the U.S. in 1975. This increased concern is due to the significant increase in the number of countries that have biological weapon capabilities which pose a

serious threat to the international community (DOD, 1997; DOD, 2000). This threat is heightened by the likelihood that terrorists may use biological weapons (GAO, 1998b; AMC, 2001a). In 1996, President Clinton listed the need to do more to "protect…people from those who would use disease as a weapon of war" among the U.S. priorities for global action (Pearson, 1998).

To counter the proliferation of biological weapons and protect against terrorist threats, the U.S. is focusing on strengthening its biological defense program. DOD requested, and the U.S. Congress approved, increased funding for biological defense. Numerous efforts are underway that would provide the U.S. armed forces with new biological defense equipment and capabilities (GAO, 1998a; DOD, 2000). These efforts include improved protective masks, body garments, and systems to better detect biological agents (GAO, 1998a; DOD, 2000). The Army has been given the lead among the armed services for testing and evaluation related to defending against biological agents (DOD, 1997).

Understanding Biological Defense Testing – Biological defense testing activities conducted at DPG are part of the DOD's Chemical and Biological Defense Program (CBDP). Biological testing activities at DPG provide major contributions to the CBDP objective of establishing a solid national defense against biological attack. An EIS has analyzed CBDP activities, including DPG's biological defense testing (DOD, 1989a; Dynamac, 1992). The final EIS was published in April 1989. The ROD was published in December 1989 approving the continuation of CBDP activities.

DPG has the capability to support biological defense tests that require BLs 1, 2, and 3. BLs are developed by the CDC and the National Institute of Health (NIH) (Dynamac, 1992; CDC, 1993) and each is defined by a specific set of practices, safety equipment, and facility design. Every microorganism is assigned to a particular BL based on the risk inherent in the manipulations and quantities routinely used in a clinical laboratory. Activities that use larger quantities, or which have a higher risk of aerosol generation, generally require a higher BL.

- BL 1 facilities, practices, and equipment are appropriate for undergraduate and secondary educational teaching laboratories where work is done with defined and characterized strains of viable microorganisms not known to consistently cause disease in healthy adult humans. *Bacillus subtilus* var. *niger* and *Erwinia herbicola* are representative of microorganisms assigned to this level.

- BL 2 facilities, practices, and equipment are applicable to clinical or diagnostic laboratories where work is done with the broad spectrum of indigenous moderate-risk agents that are present in the community and associated with

human disease of varying severity. With good microbiological techniques, these agents can be used safely in activities conducted on the open bench, provided the potential for splashes or aerosols is low. Hepatitis B, *Staphylococcus aureus*, Human Immunodeficiency Virus (HIV), and *Salmonella* are representative of microorganisms assigned to this level.

- BL 3 facilities, practices, and equipment are applicable to clinical, research, or production facilities in which work is done with agents with a potential for respiratory transmission, and which may cause serious and potentially lethal infection. Primary hazards to personnel working with these agents relate to autoinoculation, ingestion, and exposure to infectious aerosols. *Bacillus anthracis*, yellow fever virus, Venezuelan equine encephalomyelitis (VEE) virus, *Mycobacterium tuberculosis*, and *Coxiella burnetii* are representative of microorganisms assigned to this level.

- BL 4 facilities, practices, and equipment are applicable for work with dangerous agents that pose a high individual risk of life-threatening disease, which may be transmitted via the aerosol route and for which there is no available vaccine or therapy. Lassa fever virus, ebola virus, and the Crimean-Congo hemorrhagic fever virus are representative of microorganisms assigned to this level.

DPG does not conduct biological testing activities with BL 4 level organisms, the highest BL category.

DPG uses biological agents and simulants for the following biological defense test purposes:

- Contamination avoidance – testing biological agent detection, identification, and early warning equipment and battlefield management systems

- Protection – testing equipment that would sustain life and allow for continued operational capability in biological agent contaminated areas and studying vaccines that can be used to protect individuals who may be exposed to biological agents

- Decontamination – testing decontaminants, decontamination equipment, and tactics, techniques, and procedures for their effectiveness with equipment and personnel decontamination

Contamination avoidance, protection, and decontamination testing involve the following activities (Dynamac, 1992):

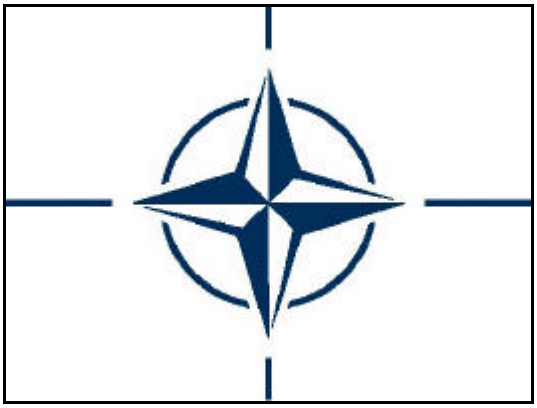
- Support to customers who are developing new detectors, protective devices, or decontamination systems
- Test methodology activities to:
  - Evaluate new types of simulants that can be used for testing purposes
  - Incorporate new scientific and engineering advances into testing activities
  - Develop test methods for new biological defense concerns
- Assessments that facilitate the development of test procedures to mimic battlefield or terrorist activities by identifying biological agent threats up to BL 3
- Testing in support of techniques, tactics, and procedures as well as other operational issues
- Operational tests to ensure the performance and reliability of biological defense equipment by testing it under simulated battlefield conditions.
- Contamination/decontamination testing on military equipment to determine its ability to withstand repeated biological contamination and decontamination

Outdoor biological defense testing conducted at DPG primarily involves contamination avoidance (detector) and decontamination systems (Mohr, 1999). All outdoor tests are conducted with biological simulants. Biological simulants are described in Section 3.13.3.4, Biological and Chemical Simulants. Aircraft or ground-vehicles disseminate simulants as aerosols for outdoor tests (Andrulis, 1992). These outdoor tests allow observations of equipment operations under battlefield conditions. The effects of weather conditions on droplet size, dispersion patterns, equipment operation, decontamination procedures, equipment penetration, and reaerosolization are also examined (Andrulis, 1992). Due to optimal weather conditions, outdoor tests are primarily conducted from March to October (Mohr, 1999).

Indoor biological activities related to testing involve (Mohr, 1999; Andrulis, 1992):

- Producing biological agents for indoor tests and biological simulants for indoor and outdoor tests
- Assaying test samples
- Conducting various detector, PPE, and decontamination tests

DPG attempts to use biological simulants over biological agents to the greatest extent possible, although biological agents often must be used to ensure that the defense systems perform as expected with the actual biological agents. Management of these materials is described in Section 3.13.3.2, Biological Agents, and Section 3.13.3.4, Biological and Chemical Simulants.



DPG helps the North Atlantic Treaty Organization standardize its antigens at DPG's biological test facilities.

A large portion of indoor biological defense work at DPG is antigen production in support of U.S. military and North Atlantic Treaty Organization (NATO) biological defense efforts. Antigens are the biological agents or simulants that cause the body to produce antibodies. DPG also produces antibodies. Antibodies detect and combat infecting antigens in humans and animals. Antibodies are created at DPG by injecting rabbits or mice with a small amount of the antigen, and then collecting the antibodies their bodies produce. Standardized antigens and antibodies must be developed so that the defensive testing and research conducted by different laboratories on detectors, protective equipment, and vaccines will have comparable results. A variation in the quality of an antigen can result in a false positive or negative test result. Therefore, it is important to have a quality antigen source. Until recently, NATO was not using standardized antigens or antibodies. This made it difficult to compare results between U.S. and other NATO laboratories. Antigens do not need to be active to be detected, therefore, they are usually inactivated through cobalt irradiation, immersion in formaldehyde, or heat after they have been cultivated. The majority of antigens are inactivated, certified for inactivation, and shipped to other laboratories. In some cases, as part of the Laboratory Select Agent Registration System (operated by the CDC), activated antigens are shipped to other registered laboratories. Section 3.13.3.2, Biological Agents, describes how biological agents are managed at DPG, including shipping requirements.

DPG also participates in vaccine characterization tests, such as the Joint Vaccine Acquisition Program (JVAP). This program was conducted during the baseline

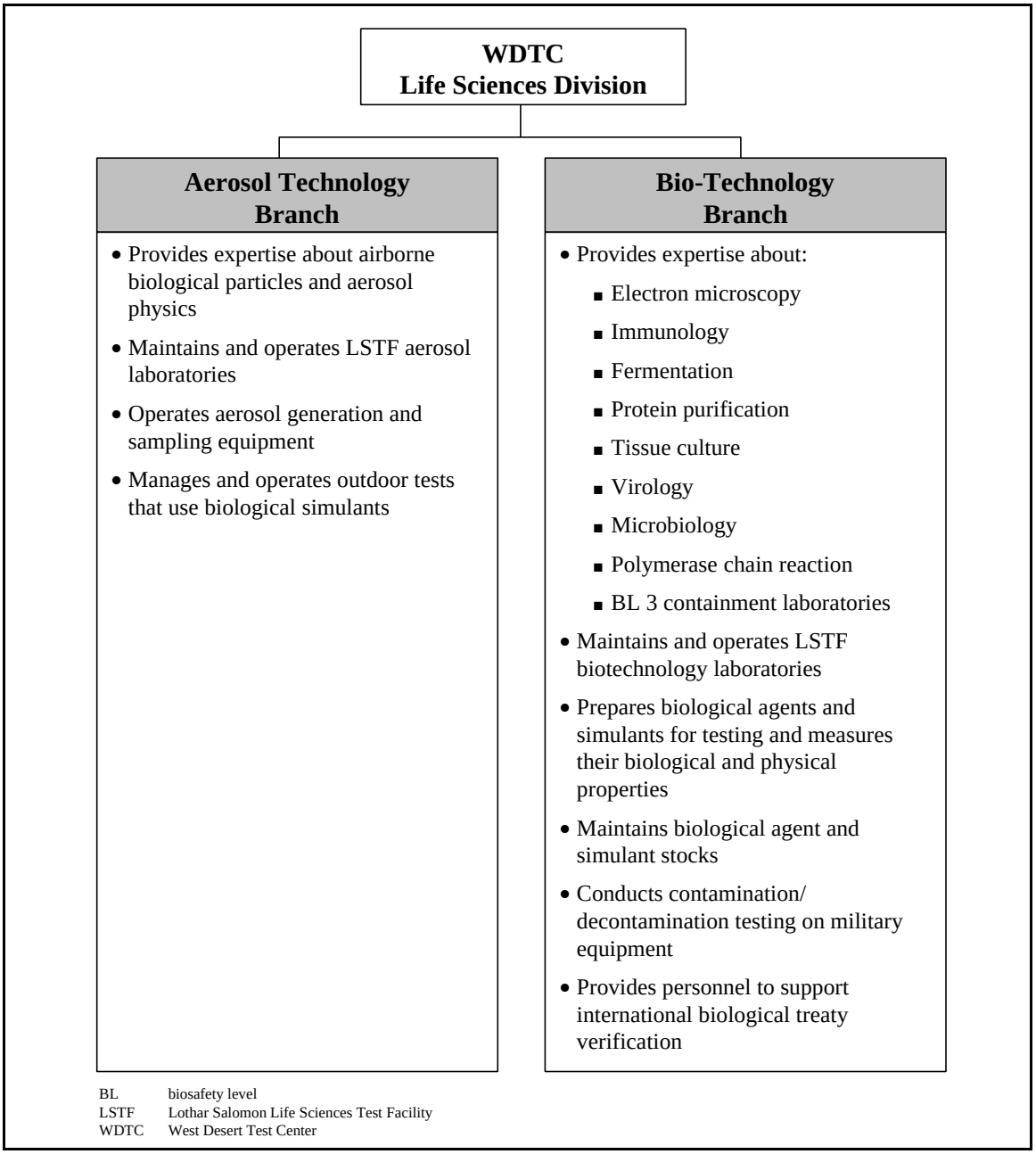
period to produce and refine vaccines to protect military forces and civilians in the event of a biological agent incident (Vogel, 1999). Under JVAP, DPG investigated a Tularenis vaccine to characterize optimal growth conditions for the vaccine, such as temperature, pH level, and oxygen concentration, and to identify how best to maintain the vaccine's effectiveness. Once these conditions were sufficiently characterized and the vaccine approved by the Food and Drug Administration, it will be manufactured and stored elsewhere.

DPG does not perform outdoor testing with biological agents. DPG does not engineer or manipulate the genetics of any organisms used in outdoor testing. All live material used outside of the LSTF are naturally harmless simulants commonly found in nature. DPG does not have a permit from the USDA to use live genetically manipulated organisms in outdoor testing. Even using live organisms manipulated to reduce their ability to survive in the environment would require a USDA permit and, in accordance with NEPA, an environmental analysis. If DPG were ever tasked in the future to perform outdoor testing with live genetically manipulated microorganisms, DPG would have to obtain a USDA permit and perform an environmental analysis before such testing would be allowed. DPG performs no genetic engineering or genetic manipulation of organisms to enhance their lethality or otherwise enhance their use as an agent of biological warfare. DPG only performs defensive biological testing.

DPG does use accepted procedures of molecular biology to support specific defensive tests. For some tests, antigens can be produced in safe organisms, so that the amount of dangerous biological agent that DPG needs to produce can be reduced. Many types of biological detection equipment use antibodies to detect antigens on biological agents. By producing the same antigens in safe organisms, DPG can use these safe organisms rather than dangerous biological agents to produce materials for these tests. Thus, DPG lowers the quantity of dangerous biological agents that is necessary for defensive testing. Additionally, techniques using polymerase chain reaction (PCR) are being developed to enhance the identification of biological agents and simulants. PCR, also known as deoxyribonucleic acid (DNA) finger printing, is under study because the method is extremely sensitive and specific for agent and simulant microorganisms.

Biological Defense Testing Organizations and Functions – Biological defense testing at DPG is performed by the WDTC's Life Sciences Division. Section 2.1.1.2, DPG Organization, describes the WDTC and its position within the organization of DPG. Figure 2.1-8, Biological Defense Testing Organization and Functions, identifies the Life Sciences Division's two testing branches and their functions.

Figure 2.1-8. Biological Defense Testing Organization and Functions.

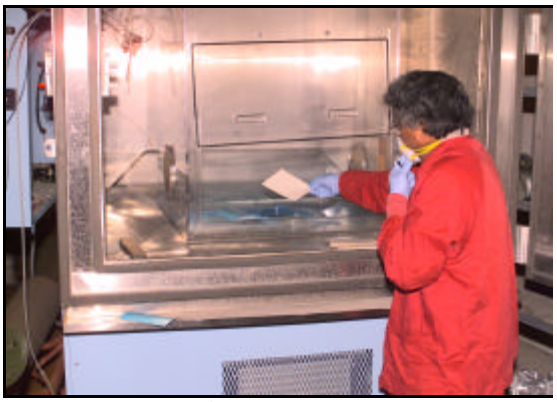


Facilities Used for Biological Defense Testing – The LSTF is the only facility at DPG where biological agents can be used. Biological simulant testing is conducted at the following outdoor locations:

- All Purpose Grid
- Downwind Grid
- German Village

- Horizontal Grid
- Multiple Impact Grid
- Tower Grid
- West Vertical Grid

Figure 2.1-9, Baseline Locations of Biological Defense Testing Activities, identifies the locations where baseline outdoor biological simulant and indoor biological agent and biological simulant testing typically occurs. Section 2.1.4.2, Primary Indoor Facilities, describes the LSTF and Appendix B, DPG Facility Control Forms, provides information about its structure and controls.



The Lothar Salomon Life Sciences Test Facility is the only DPG facility where biological agents can be used.

The LSTF has administrative and engineering controls that help ensure testing using biological agents is conducted safely and that biological agents are securely stored. A summary of these administrative and engineering controls are identified in the Final Environmental Impact Statement for the Life Sciences Test Facility (Dynamac, 1992). These administrative controls are implemented by a variety of LSTF-specific operating procedures. Many of the engineering controls are required by the AO for the LSTF as well (UDAQ, 1997a).

Biological Defense Test Process – This section describes additional test processes for biological defense tests at DPG not covered in Section 2.1.3.2, Test Process Planning and Management. The DPG biological defense test program has a Biological Safety Committee that oversees the biological test activities at DPG (Dynamac, 1992). The core members of this committee are the DPG Technical Director, Life Sciences Division Chief, Director of Health Services, Safety Office Chief, Life Sciences Division Biosafety Officer, Utah Department of Health and

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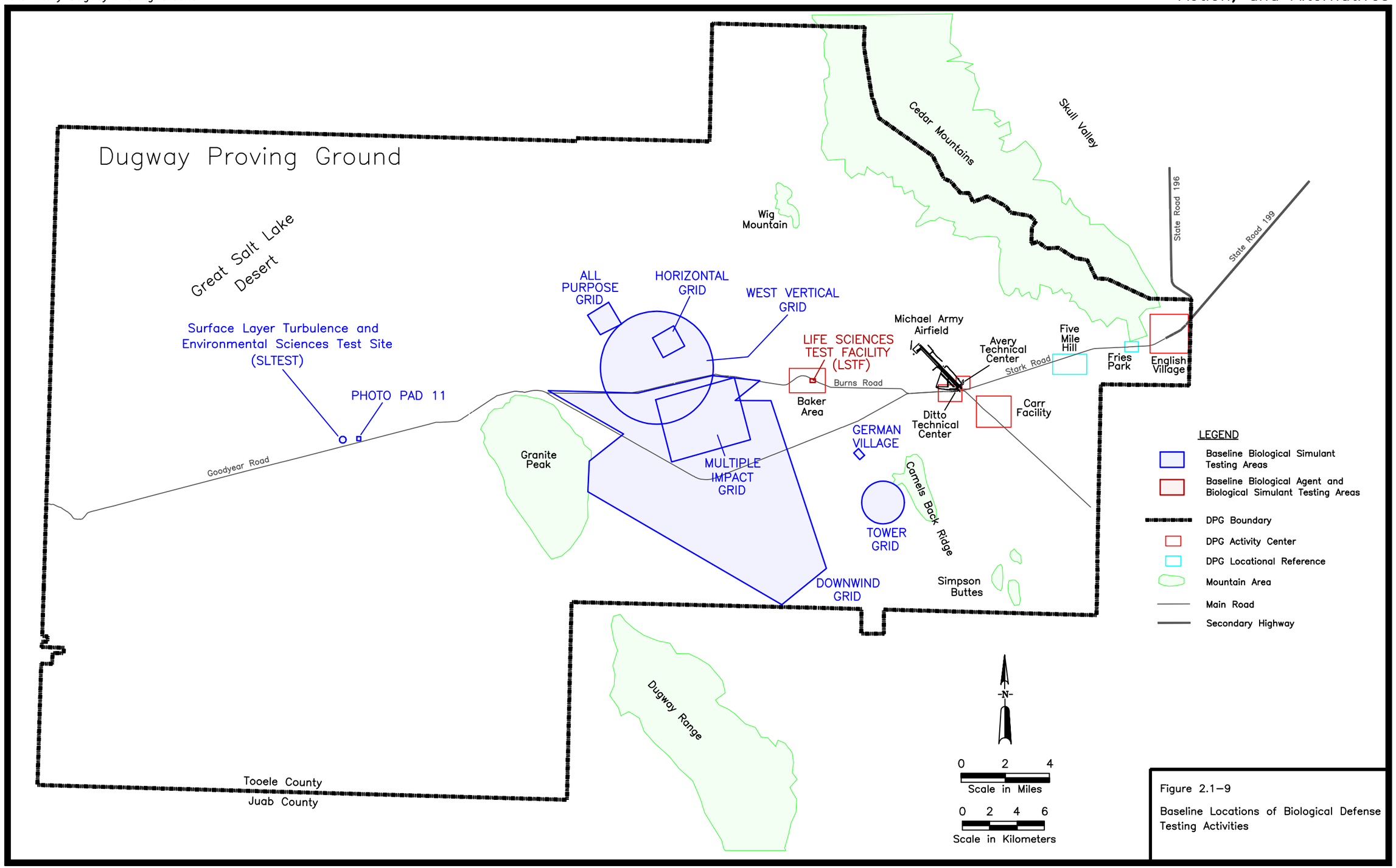

Figure 2.1–9

Baseline Locations of Biological Defense Testing Activities

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CDC. All test directors planning to conduct tests using biological agents must schedule a meeting with the committee to review their test plans. Customers, U.S. Army Developmental Test Command, Utah Department of Health, and CDC personnel are invited to attend these meetings. The Biological Safety Committee is required to review test plans to ensure the test would be conducted safely and that it complies with CDC and NIH guidelines and applicable regulations (Dynamac, 1992). Materials and wastes resulting from the biological defense test process are managed as described in Section 3.13, Materials and Wastes.

The following procedures are also followed for any indoor tests that use biological agents (DPG, 1999a):

- Review BL requirements
- Verify that test personnel meet required safety, occupational health, and medical requirements
- Ensure health clinic and emergency response personnel are readily available in case of an emergency
- Review microbiological techniques to ensure test personnel understand and are competent to perform the required test procedures
- Inspect engineering controls and test equipment

DPG submits reports as required to the Utah Department of Health listing all the biological agents and simulants that the installation plans to use in support of testing activities in the upcoming quarter. DPG also submits post-test quarterly reports to UDAQ. These reports summarize outdoor biological simulant tests that have been conducted, and include test descriptions and the amounts of materials released to the atmosphere.

Development of antibodies and antigens and vaccination tests may require the use of laboratory animals. DPG follows all policies, regulations, and guidelines developed as a result of the Health Research Extension Act of 1985, “Animals in Research.” DPG has established an Installation Animal Use Committee, in accordance with USDA regulations. This committee meets a minimum of twice per year, and must review and evaluate each proposed use of animals. The committee will prepare an animal use protocol, and will inspect the animal facilities prior to their use. The DPG Commander will then approve the use of animals based upon this protocol. The DPG Commander must approve all animal use. The committee must also inspect all animal use facilities twice a year when such facilities are in use. Animals are most

frequently used for antigen production at DPG, but occasionally they will support other aspects of biological defense testing. Whenever animals are used to support biological defense testing at DPG, DPG adheres to all USDA and other Federal regulations (7 U.S.C. § 2131-2157; 7 CFR § 2.17, 2.51, 3.71.2g; and 9 CFR § chapter 1). Wildlife is not used to support any activities at DPG.

Life Sciences Division personnel schedule and coordinate both their indoor and outdoor biological testing activities with DPG's Range Control personnel. Section 2.1.8, Baseline Mission Support Activities, summarizes Range Control operations. Outdoor biological simulant testing may require additional support from the various mission and installation support groups described in Section 2.1.5.5, Modeling and Assessment Testing, Section 2.1.8, Baseline Mission Support Activities, and Section 2.1.9, Baseline Installation Support Activities. Section 3.12.2, Occupational Health and Safety, summarizes the health and safety requirements applicable to DPG biological defense testing activities.

Baseline Quantitative Description of Biological Defense Testing – Quantitative data describing biological defense testing from 1996 through 1998 are summarized in Table 2.1-5, Summary of Baseline Biological Defense Testing at DPG.

Table 2.1-5. Summary of Baseline Biological Defense Testing at DPG.

Data Category	1996	1997	1998	Baseline Annual Average
Number of Indoor Tests	6	7	7	7
Number of Outdoor Tests	2	7	4	4
Total Number of Tests	8	14	11	11

2.1.5.2 Chemical Defense Testing

During World War I, the extensive use of poison gas resulted in over a million injured and over 100,000 deaths (ACDA, 1997). These devastating results led to the creation of the Geneva Protocol to ban the use of chemical and biological weapons in warfare. The U.S. signed the Geneva Protocol in 1925, but did not ratify it until 1975. The U.S. pursued development of chemical agent offensive and defensive capabilities during World War II due to concerns that the Axis powers, Germany, Italy, and Japan, might resort to the use of such weapons (CEIP, 1971; GPO, 1993).

Use of such (chemical) weapons has been outlawed by the general opinion of civilized mankind. This country has not used them, and I hope we never will be compelled to use them. I state categorically that we shall under no circumstances resort to the use of such weapons unless they are first used by our enemies.

President Franklin D. Roosevelt to the Axis powers

The U.S. had the following considerations about chemical defense and testing.

- Similar to biological weapons research, U.S. chemical weapons research and development continued through the 1950s and 1960s as a counter effort to the Soviet Union's programs and in 1969 President Richard M. Nixon again renounced first use of chemical weapons by the U.S. (CEIP, 1971).

- Although the U.S. signed the Geneva Protocol in 1925, it was not ratified by the U.S. until 1975. This protocol prohibits the use of chemical weapons but does nothing to prevent their development, production, or stockpiling. The 1995 poison gas attack by a religious-based terrorist group in a Japanese subway and concerns during the Gulf War increased the awareness that although the technology and materials required to design and manufacture chemical weapons is relatively simplistic, these weapons can be many times more devastating than conventional munitions (ACDA, 1997).

- As a result of global concerns regarding the proliferation of chemical weapons, the U.S. ratified the CWC in 1997 (ACDA, 1998). The CWC is a global treaty that bans the production, acquisition, stockpiling, transfer, and use of chemical weapons for offensive measures. The CWC does not prohibit the manufacture and use of small amounts of chemical agent for defensive testing measures. In addition to controlling the proliferation of chemical weapons, the CWC is a disarmament treaty and requires the destruction of existing chemical arsenals by all signatories (ACDA, 1999; GPO, 1993). The Army has several programs in place to implement this requirement.

- Although the intent of the CWC is to make the world safer by reducing the motives for nations to acquire chemical weapons and helping to impede the acquisition of chemical weapons by nations or groups, the threat of chemical weapon use by certain nations and terrorist groups remains (GAO, 1998a; GAO, 1998b; DOD, 2000).

> **"Our arms control successes have made the world safer. The overriding reality remains, however, that we still live in a dangerous world, one still bristling with overarmament and the persistent danger of proliferation by rogue regimes and terrorists."**
>
> **Mr. John D. Holum (1997), Director of the U.S. Arms Control and Disarmament Agency**

As a result of these concerns, the U.S. is focusing on strengthening its chemical agent defense program. U.S. Congressional direction to DOD's chemical defense efforts is

similar to that for DOD's biological defense efforts discussed in Section 2.1.5.1, Biological Defense Testing. These efforts include funding for research and testing of new chemical defense equipment and capabilities to better protect U.S. armed forces (DOD, 2000). As with biological defense testing measures, the Army has been given the lead among the armed services for testing and evaluation related to chemical agent defense (DOD, 1997). The U.S. must be prepared for a chemical weapons incident in order to deter nations or groups from using these weapons and to ensure that the U.S. is able to effectively defend itself (ACDA, 1998).

Understanding Chemical Defense Testing – DPG is the nation's only chemical agent defense proving ground.

DPG is the primary location for testing of chemical defense equipment for the DOD chemical defense program.

DPG uses chemical agents and simulants for the following chemical defense test purposes (DOD, 1997):

- Contamination avoidance – testing chemical agent detection, identification, and early warning equipment and battlefield management systems
- Protection – testing equipment that would sustain life and allow for continued operational capability for armed forces in chemical agent contaminated areas
- Decontamination – testing decontaminants, decontamination equipment, and tactics, techniques, and procedures for their effectiveness with equipment and personnel decontamination

Contamination avoidance, protection, and decontamination testing involve the following activities (Dynamac, 1992):

- Support to customers who are developing new detectors, protective devices, or decontamination systems
- Test methodology activities to:
    - Evaluate new types of simulants that can be used for testing purposes
    - Incorporate new scientific and engineering advances into testing activities
    - Develop test methods for new chemical defense concerns

In addition to these chemical defense tests, DPG also conducts the following activities in which chemical agent may be used:

- Testing in support of techniques, tactics, and procedures as well as other operational issues
- Operational tests to ensure the performance and reliability of chemical defense equipment by testing it under simulated battlefield conditions
- Contamination/decontamination testing on military equipment to determine its ability to withstand repeated chemical contamination and decontamination
- Chemical agent analysis to support compliance and management of chemical agent-related waste and IRP waste. The management of these wastes is discussed in Sections 3.13.4.3, Chemical Agent-Related Waste, and 3.13.5.1, Installation Restoration Program.
- Other related testing, for example, to test methods to successfully destroy chemical munitions in accordance with U.S. treaty obligations. These types of tests in support of other DOD organizations, such as Program Manager for Chemical Demilitarization (PMCD), have existing environmental documentation (DOD, 1998).

Outdoor chemical defense testing activities primarily involve large-scale decontamination and contamination avoidance testing. Chemical simulants are necessary for outdoor chemical defense testing because the release of chemical agents into the open air for such testing is strictly regulated by law (U.S.C., 1969). Chemical agents have not been used for outdoor testing at DPG since 1969.

Most decontamination tests are conducted at decontamination pads and are used to study how a chemical simulant may transfer on to an object and then determine how the object can be most effectively decontaminated. Decontamination tests can also involve testing new decontamination equipment, for example, in March 1998, a production qualification test of a new portable decontamination system was conducted at DPG (Unknown, 1998a). This experimental system was developed to replace a decontamination system from the 1970s.

Outdoor contamination avoidance tests typically involve testing detectors at test grids using dissemination equipment that disperses chemical simulant vapor or aerosol. Dispersion of chemical simulants for detector tests may involve aerial spray testing, methods which simulate a munition delivery system, or various dissemination systems as listed below:

- Puff dissemination – Uses air cannons that disseminate vapor
- Line dissemination – Uses a line source that produces chemical simulant in aerosol and vapor form
- Explosive dissemination – Uses a 208-L (55-gallon) drum and smaller containers with an explosive containment chamber built into the center for explosive dissemination; the container may be suspended from a tethered weather balloon for dissemination from altitude
- Aerial dissemination – Uses aircraft or remotely piloted vehicles
- Dissemination stack – Vaporizes chemical simulants by atomizing them into the stack where a gas turbine is used to heat them and blow them up the stack

These systems can disseminate a wide range of quantities at varying flow rates.

Indoor DPG chemical defense testing efforts use both chemical agents and simulants. Chemical agents are used for indoor tests wherever possible to obtain the most realistic test result. Chemical agents are used on developmental contamination avoidance, protection, and decontamination systems to ensure they would function appropriately in an actual chemical agent incident.

Indoor testing consists of contamination avoidance, protection, and small-scale decontamination tests that take place in test chambers and laboratories. Large DPG indoor test chamber facilities are typically used for contamination avoidance testing with detectors and protection testing of both PPE and collective equipment systems. However, chemical agent may also be used in test chambers to compare the effectiveness of new decontamination solutions. For certain indoor chamber tests of PPE using chemical simulants, troops may be brought in to wear the PPE as it is being tested (Unknown, 1998a).

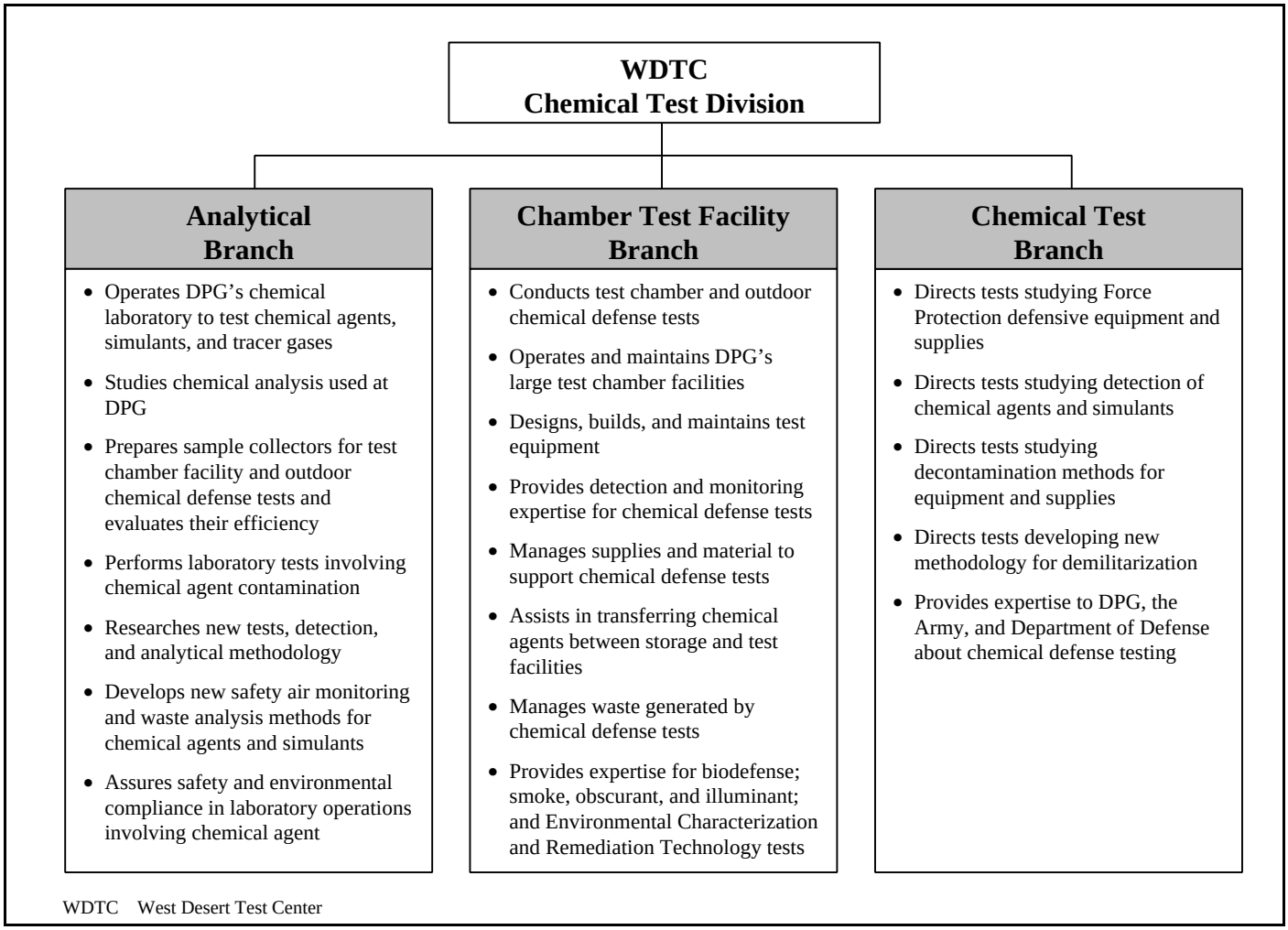
The majority of DPG laboratory tests involve PPE, small-scale decontamination, and detector tests. Indoor laboratory tests require very small amounts of chemical agent. Typically, only a few drops of chemical agent are placed on the material or equipment being tested. Most laboratory tests involving chemical agents use less than 1 milliliter (mL) (0.03 ounce (oz)) of chemical agent and generally the largest amount required would be no greater than 40 mL (1.4 oz). Chemical agent is also used in the laboratory for generating standards to calibrate instruments.

Typical chemical agents, chemical simulants, and decontaminants used at DPG are listed in Appendix C, Mission Materials. Toxicity information for these mission

materials is summarized in Appendix D, Toxicity Information About Mission Materials.

Chemical Defense Testing Organizations and Functions – Chemical defense testing is performed by the WDTC's Chemical Test Division. The position of the WDTC within the DPG functional organization is shown in Figure 2.1-2, DPG Functional Organization. Chemical Test Division's three branches and their functions are identified in Figure 2.1-10, Chemical Defense Testing Organization and Functions.

Figure 2.1-10. Chemical Defense Testing Organization and Functions.



Facilities Used for Chemical Defense Testing – DPG uses indoor facilities for chemical agent and simulant testing, including the BMTF, CCTF, and Chemical

Agent Test Chamber. In addition to these indoor chemical agent testing facilities, indoor chemical defense testing using chemical simulants occurs at the DTC.

DPG uses the following facilities for outdoor chemical defense testing:

- Downwind Grid
- Ditto Decontamination Pad
- Northwest Decontamination Pad

In addition to these primary test grids, outdoor chemical defense testing using chemical simulants could occur at other DPG locations, but most likely would occur at one of the following:

- All Purpose Grid
- German Village
- Horizontal Grid
- MAAF
- Multiple Impact Grid
- NASA Grid
- Tower Grid
- West Vertical Grid

These locations where chemical defense testing is conducted are shown in Figure 2.1-11, Baseline Locations of Chemical Defense Testing Activities.

Safety of personnel, the public, and the environment is achieved through administrative and engineering controls at the facilities that conduct chemical defense testing or store chemical agents. Administrative controls include record keeping, training, the use of PPE, and compliance with safety-related regulations, pamphlets, and operating procedures. Health and safety requirements applicable to chemical defense testing are summarized in Section 3.12.2, Occupational Health and Safety. Administrative controls also include coordination with the test director and Range Control during testing. Range Control's functions are summarized in Section 2.1.8, Baseline Mission Support Activities.

The controls in place at the chemical defense testing and storage facilities are described in Section 2.1.4.2, Primary Indoor Facilities, Section 2.1.4.3, Primary Outdoor Facilities, and Appendix B, DPG Facility Control Forms.

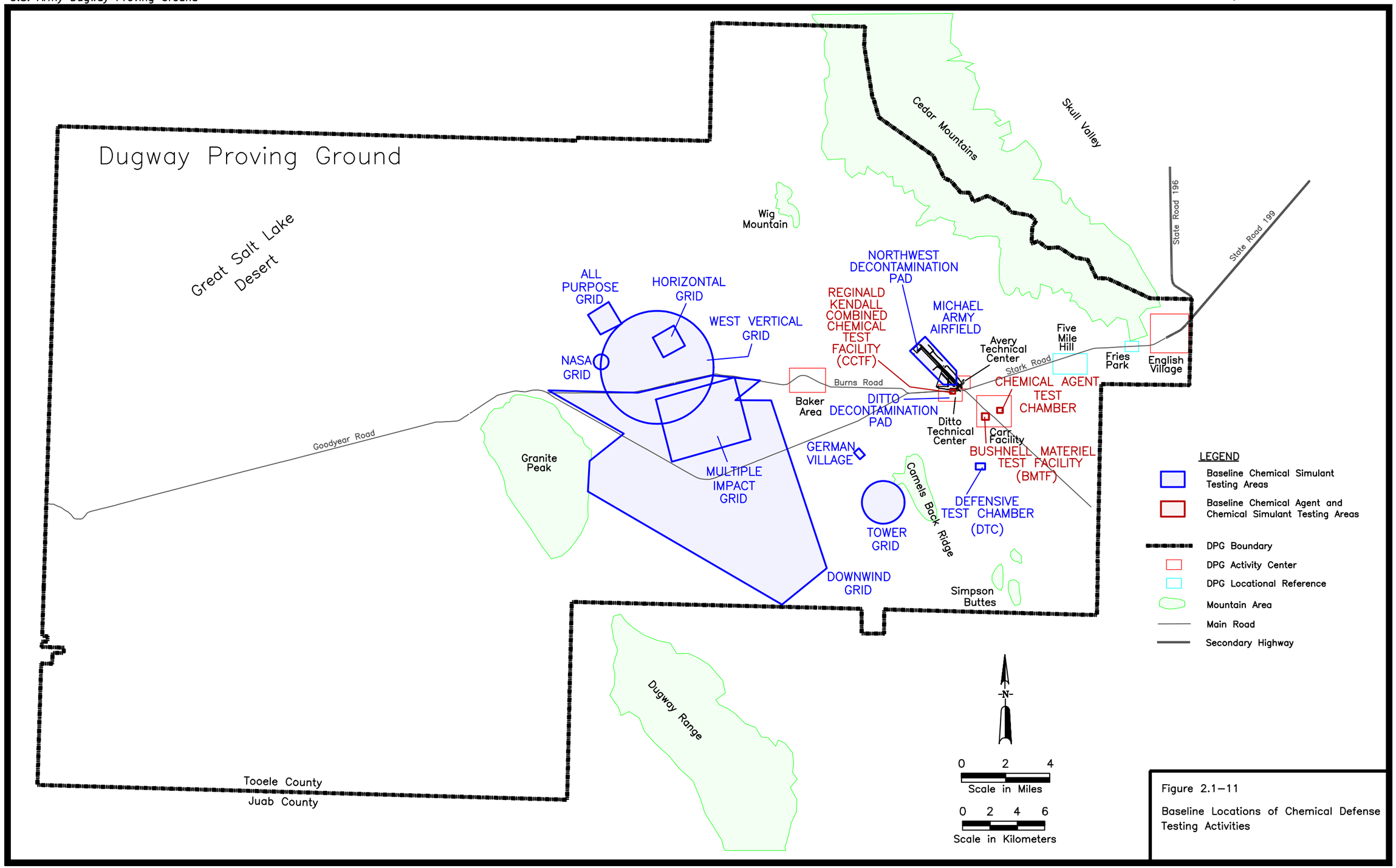


Figure 2.1–11

Baseline Locations of Chemical Defense Testing Activities

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Chemical Defense Test Process – This section discusses additional test process requirements for chemical defense tests at DPG not covered in Section 2.1.3.2, Test Process Planning and Management. In addition to DPG's standard test requirements, the following requirements apply to chemical defense testing (DPG, 1999a).

- All test and test-monitoring personnel must have proper training.
- Engineering controls must be in place and functioning correctly.
- The initial inspection, fitting, issuance, and required inspection of protective masks and PPE are the responsibility of the applicable DPG organizations. Monthly inspections (or as required) of these items are the responsibility of the user.
- Emergency response equipment specific for the type of chemical agent test conducted must be available in sufficient quantities and functioning correctly.
- Personal safeguards must be observed by personnel that work in contaminated, suspected contaminated areas, or where handling or contact with chemical agent items is involved.
- In the case of ongoing tests, an operational readiness inspection must be conducted before the commencement of any new chemical agent operation and before implementing any changes to operations. In the case of new tests, or the re-start of existing tests after a 90-day cessation of testing, a Pre-Operational Safety Check must be conducted.
- The on-installation transport of chemical agents to the chamber facilities must be in accordance with operating procedures and supporting hazard analyses.

An environmental review (usually an EA) is required on any new chemical agents or simulants that are proposed for use in a test. Monitoring and modeling of chemical simulant testing efforts are important parts of the outdoor test process. DPG's modeling capabilities are used primarily to assist in outdoor test planning and design and post-test analysis. However, these capabilities are also applied to chemical defense research studies. Section 2.1.5.5, Modeling and Assessment Testing, provides more information about these activities.

Because equipment and materials may become contaminated during the course of chemical defense testing at DPG, decontamination is an important part of the test process. Decontamination is the removal, destruction, or neutralization of contamination (Army, 1993). Decontamination solutions react with chemical agents

to destroy them (AGEISS, 1999a). Most chemical agent decontaminants used at DPG are caustics or bleaches. The decontaminants used at DPG are listed in Appendix C, Mission Materials, and their toxicity is summarized in Appendix D, Toxicity Information About Mission Materials.

DPG facilities that conduct chemical defense testing have operating procedures for chemical agent decontamination. All decontaminants that have come into contact with chemical agent are managed and disposed of as hazardous waste in compliance with applicable Federal and state laws, and Army regulations, and/or policies. Chemical agent-related wastes such as spent decontamination solutions and decontaminated test-related debris and procedures for handling these wastes are identified in Section 3.13.4.3, Chemical Agent-Related Waste. The main regulations and/or documents used to manage chemical agent-related wastes are identified in Appendix A, List of Environmental Laws, Permits, and Management Plans.

DPG submits post-test quarterly reports to UDAQ. These reports summarize outdoor chemical simulant tests that have been conducted and include test descriptions and the amounts of materials released to the atmosphere.

Many people are involved in the chemical defense test process at DPG. In addition to personnel from the Chemical Test Division, personnel from various mission and installation support organizations and DPG contractors are involved in a test. Personnel from the Meteorology and Obscurants Division, Instrumentation, Range Control, and DPG Health Clinic typically provide mission or installation support for chemical defense tests.

Baseline Quantitative Description of Chemical Defense Testing – Quantitative data describing chemical defense testing were collected for activities occurring from 1996 through 1998. Quantitative data are summarized in Table 2.1-6, Summary of Baseline Chemical Defense Testing at DPG. Information in Table 2.1-6 includes combined 1996 through 1998 data from the CCTF, DTC, BMTF, and Chemical Agent Test Chamber.

Table 2.1-6. Summary of Baseline Chemical Defense Testing at DPG.

Data Category	1996	1997	1998	Baseline Annual Average
Number of Indoor Tests	27	29	31	29
Number of Outdoor Tests	2	1	1	1
Total Number of Tests	29	30	32	30

2.1.5.3 Conventional Munitions Testing

DPG has tested conventional munitions since it was established in 1942. Conventional munitions are still tested at DPG on a regular basis.

Three factors make DPG especially attractive for testing conventional munitions:

- **Soft impact areas, which allow for the recovery of fired projectiles**
- **Large size, which provides long-range capabilities**
- **Isolated location, which minimizes noise impact on the surrounding environment**

Understanding Conventional Munitions – Conventional munitions traditionally include artillery, mortars, explosives, rockets, and missiles. This section addresses all ground-to-ground testing of these conventional munitions at DPG. Air-to-air and air-to-ground testing of rockets and missiles is performed solely by the AF at the UTTR, and is addressed in Chapter 5.0, Cumulative Impacts. Smokes, obscurants, and illuminants may be used in conventional munitions, and they are addressed in Section 2.1.5.6, Smoke, Obscurant, and Illuminant Testing.

Conventional munitions testing at DPG measures performance characteristics, such as the accuracy of firing systems, adequacy of ammunition, and effectiveness of design. The most common type of conventional munitions test at DPG is the lot acceptance test (LAT), in which a certain type of munition is tested for approval by the DOD. Munitions are manufactured in batches called lots. A specified number of munitions from each lot must be tested to approve the whole lot. An LAT is a test performed to ensure that the performance characteristics of the munitions lot meet the requirements of the appropriate military standards. Typically, a percentage of the lot will be detonated or fired to verify the performance characteristics of the lot. If the munitions LAT achieves the required performance standards, the lot is accepted for use by DOD. Different types of munitions are also tested for their ability to survive handling, storage, and climatic stresses. Section 2.1.5.7, Physical Testing, describes these types of tests.

Conventional munitions are not stockpiled at DPG. Only munitions that are required to support DPG's testing, training, and support activities are stored at DPG.

Chemical and biological agents are not used in support of conventional munitions testing. Materials used in conventional munitions testing include trinitrotoluene

(TNT), black powder, propellants, and propellant increments. Propellant increments are individual charges of field artillery or mortar propellant that are not fired with the projectile, and are destroyed separately. Information about toxicology for conventional munition components is in Appendix D, Toxicity Information About Mission Materials.

Conventional Munitions Testing Organizations and Functions – Conventional munitions testing is conducted by DPG's Obscurants and Environmental Test Branch. This branch is part of WDTC's Meteorology and Obscurants Division. The WDTC's position within the DPG organization is shown in Figure 2.1-2, DPG Functional Organization. Ammunition manufacturers and other DOD branches are other organizations that are involved with conventional munitions testing at DPG.

The office of QASAS assures that all munitions stored at DPG are accounted for, handled properly, and are safe to use. Information on QASAS is provided in Section 2.1.8, Baseline Mission Support Activities. Management of conventional munitions at DPG is described in Section 3.13.3.6, Munitions and Energetics.

Facilities Used for Conventional Munitions Testing – Conventional munitions tests take place on various ranges, including:

- 880 Range
- German Village Artillery Range
- Granite Peak Range
- Illumination Range
- Juliet Range
- West Granite Artillery Range
- White Sage Range

A number of test grids and impact areas are also used for conventional munitions tests. Figure 2.1-12, Baseline Locations of Conventional Munitions Testing Activities, identifies these locations and other locations where conventional munitions testing is conducted at DPG. These facilities are described in Section 2.1.4.3, Primary Outdoor Facilities. Conventional munitions are stored in various magazines and igloos at Carr.

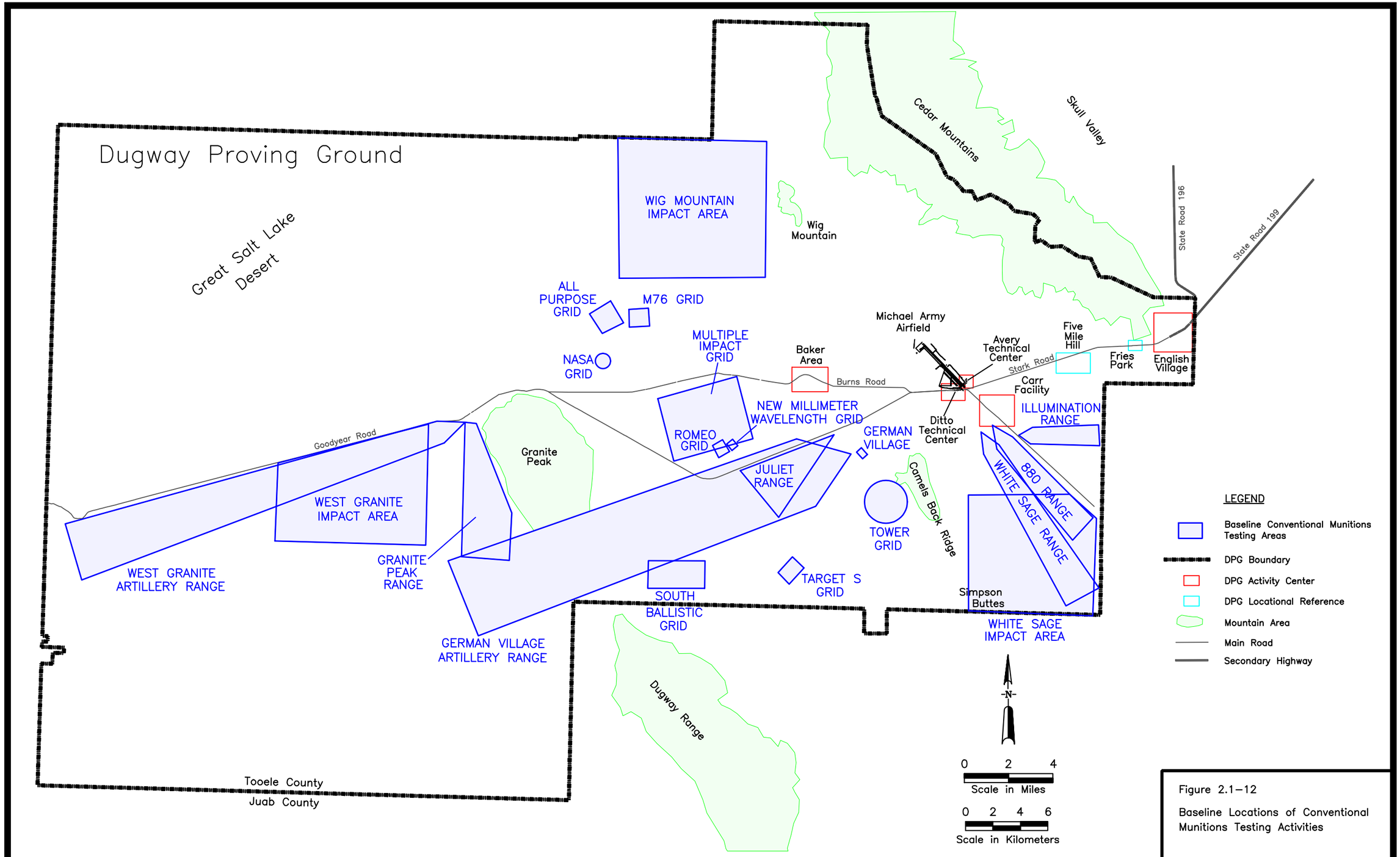

Figure 2.1–12

Baseline Locations of Conventional Munitions Testing Activities

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Both testing operations and storage facilities have engineering and administrative controls for health, safety, and security purposes. Engineering controls include the following:

- Test and storage facility design, including climatic controls, and proper storage of munitions in relation to other types of munitions
- Technological security tools, such as radios, intercoms, and fences

Administrative controls include the following:

- Operating procedures in place for tracking, storing, and using munitions
- Reporting requirements
- Proper security clearance procedures
- Training and compliance with safety and security regulations

Health and safety requirements applicable to conventional munitions are summarized in Section 3.12.2, Occupational Health and Safety.

Conventional Munitions Test Process – Before a conventional munitions test can begin, the test must be approved, as described in Section 2.1.3.2, Test Process Planning and Management. In the case of LATs, the test approval process is shortened. DPG personnel do not need to write a new test plan, instead they follow the standard test plan for the particular munition.

Conventional munitions tests are performed according to the test plan. During the test, operating procedures are followed for managing and handling propellants, projectiles, and payloads. Conventional munitions testing is coordinated with Range Control. DPG Range Control responsibilities are summarized in Section 2.1.8, Baseline Mission Support Activities.

Once a test is completed, the following occurs:

- Unexploded ordnance (UXO) is destroyed in place. UXO is explosive ordnance that has been activated, but remains unexploded, thereby presenting a hazard to operations or personnel.
- Parachutes from illumination flares are placed in the English Village Landfill
- Illumination flares that have not burned completely are destroyed in place
- Illumination flare non-explosive components are demilitarized and subsequently recycled

Additionally, some conventional munitions tests involve "conditioning" the rounds, that is some projectiles are conditioned to ambient temperature, some are heated, and some are cooled. The projectiles that are conditioned to ambient temperature are put into the Army ammunition supply system and will be subsequently fired. Rounds that are hot or cold conditioned are segregated and will only be re-fired at DPG. They will not be returned to the Army ammunition supply system. Wastes produced from conventional munitions testing include the combustion products of TNT, black powder, propellants, and propellant increments. Management of these wastes at DPG is described in Section 3.13.4.6, Munition and Energetic Wastes.

Baseline Quantitative Description of Conventional Munitions Testing – Each year, at least one LAT is conducted. An example of an LAT reported in 1996 was a M745 fuze test. During the test, approximately 110 fuzes were tested, each on an inert projectile body. Quantitative data describing conventional munitions testing from 1996 through 1998 are summarized in Table 2.1-7, Summary of Baseline Conventional Munitions Testing at DPG.

Table 2.1-7. Summary of Baseline Conventional Munitions Testing at DPG.

Data Category	1996	1997	1998	Baseline Annual Average
Number of Indoor Tests	0	0	0	0
Number of Outdoor Tests	2	1	4	2
Total Number of Tests	2	1	4	2

2.1.5.4 Environmental Characterization and Remediation Technology Testing

To maintain a constant state of readiness, DOD installations store a diverse inventory of materials including conventional munitions and energetics.

When stockpiled materials such as conventional munitions and energetics can no longer fulfill their original functions, they must be destroyed in a safe and environmentally sound manner. The process of destroying these materials is referred to as demilitarization.

In the early 1990s, the Army established a testing program at DPG to support conventional munition and energetic demilitarization efforts. This program studies options to demilitarize certain conventional munitions and energetics as well as methods to environmentally characterize the emissions resulting from demilitarization. The term ECRT testing is applied to these testing activities because demilitarization is also referred to as remediation.

Although DPG is a test site location for demilitarization technologies and test projects, actual demilitarization occurs elsewhere.

Understanding ECRT Testing – ECRT testing is conducted at DPG to:

- Develop and test the effectiveness of methods to demilitarize damaged or obsolete conventional weapons
- Characterize emissions resulting from conventional weapon and energetic demilitarization methods

In support of DOD efforts to destroy damaged or old conventional weapons and characterize the resulting emissions, DPG has conducted or is conducting the following tests.

- ECRT testing within the BangBox™ primarily involves emission characterization of explosive charges within a tightly controlled environment. BangBox™ features within the two chambers include internal environmental controls to simulate a variety of real-world conditions. The BangBox™ was the primary location for ECRT testing during the baseline period. The BangBox™ is more fully described in Section 2.1.4.2, Primary Indoor Facilities.
- Cryofracture destruction testing freezes a munition in liquid nitrogen, followed by fracture of the embrittled item(s) in an hydraulic press and thermally treats the fractured munition debris to destroy the explosives and decontaminate any residual parts. DPG has tested the possibility of using cryofracture to demilitarize a variety of conventional munitions, such as hand grenades, mortars, projectiles, rockets, and antipersonnel mines (GA, 1996b). During the baseline period of 1996 through 1998 testing was limited to one inert series of tests starting in early 1996 and ending in early 1999. Inert munitions do not contain fill components or materials: they consist of landmine, rocket, grenade and submunition metal housings or shells. A total of 78 inert munitions were tested during the baseline period. Cryofracture was not used to test simulants or agents.
- OB/OD emissions testing, uses open burning and open detonation, which is the primary means of demilitarization employed by DOD for treating energetic materials and munitions as they become unsafe, excess, obsolete, or unrepairable (Johnson, 1992). Typical disposal methods such as deactivation, recovery and recycling are inappropriate for many energetic materials and munitions because most of these materials cannot be disassembled safely and development of a similar disposal method is not practical. DPG has its own ODOBi test facility.

The ODOBi, which is used to conduct this type of testing indoors, is described in Section 2.1.4.2, Primary Indoor Facilities, and is shown on Figure 2.1-3, DPG Activity Centers and Facilities.

Studies to characterize OB/OD emissions began at DPG as a result of public and environmental agency concerns regarding the types of emissions released from detonating munitions in the outdoors. These studies were conducted with the participation of the U.S. Environmental Protection Agency (EPA). Through these studies, OB/OD has been shown to be an effective and environmentally safe disposal process with a well-established record of safety and efficiency (Johnson et al., 1994).

ECRT studies have characterized emissions for a large number of energetic materials and munitions. This information has been compiled into a unique database that is being combined with other EPA and military databases to allow regulators and others access to OB/OD emission results. Emission results from DPG's OB/OD tests have been used to acquire permits for many Federal and private facilities in the U.S. and abroad and assist environmental regulators with permitting operating OB/OD sites (DPG, 1996e). DPG can characterize emissions from small arms and artillery pieces to munitions up to 11 kg (25 lb) net explosive weight.

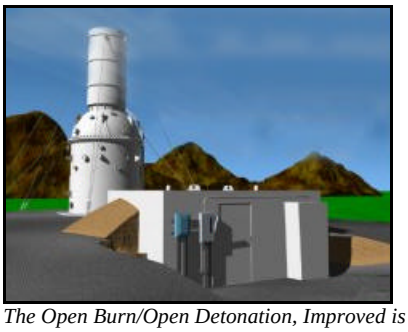
The energetic materials used at DPG as part of ECRT testing activities are listed in Appendix C, Mission Materials. Toxicity information for these materials is summarized in Appendix D, Toxicity Information About Mission Materials.

ECRT Testing Organizations and Functions – ECRT testing is performed at DPG by the Obscurants and Environmental Test Branch. This branch is part of the WDTC's Meteorology and Obscurants Division. Figure 2.1-2, DPG Functional Organization, shows the position of the WDTC within the DPG functional organization. Obscurants and Environmental Test Branch personnel are responsible for conducting all ECRT testing activities and maintaining all the various ECRT test facilities. Obscurants and Environmental Test Branch personnel serve as an expert source for DPG, Army, and DOD upper command questions concerning conventional munition and energetic demilitarization and emission characterization issues.

Facilities Used for ECRT Testing – ECRT testing at DPG is only conducted indoors. The following facilities are used for ECRT testing at DPG. No biological or chemical agent work is conducted at these facilities.

- BangBox™ is used for emission characterization testing using energetics.
- Cryofracture Test Facility is used for demilitarization testing of explosively configured conventional munitions.

- ODOBi is a test facility used for OB/OD emission characterization testing using energetics.
- Suppressive Shield Facility is used for larger shrapnel producing detonations and weapons emissions characterization.



The Open Burn/Open Detonation, Improved is one of DPG facilities used to conduct Environmental Characterization and Remediation Technology testing.

Information on the ECRT test facilities is provided in Section 2.1.4.2, Primary Indoor Facilities, and Appendix B, DPG Facility Control Forms. Locations of these facilities are shown in Figure 2.1-3, DPG Activity Centers and Facilities.

Safety of personnel, the public, and the environment is achieved through administrative and engineering controls in place at the ECRT test facilities. Administrative controls include record keeping, training, the use of PPE, and compliance with safety-related regulations, pamphlets, and operating procedures. Health and safety requirements applicable to ECRT testing are summarized in Section 3.12.2, Occupational Health and Safety. Administrative controls also include coordination with the test director and Range Control during testing. Range Control's functions are summarized in Section 2.1.8, Baseline Mission Support Activities. Typical engineering controls at the ECRT test facilities include:

- Remote controlled operations to control equipment during testing
- Remote test viewing by video cameras placed in the testing areas to view test operations
- Containment of emissions for characterization purposes

Controls in place at the ECRT test facilities are further described in Section 2.1.4.2, Primary Indoor Facilities, and Appendix B, DPG Facility Control Forms.

ECRT Test Process – Many people are involved in the ECRT test process at DPG. In addition to personnel from the Meteorology and Obscurants Division, personnel

from various mission and installation support organizations and DPG contractors are often involved before, during, or after a test. Personnel from TEU, EOD, Range Control, and DPG Health Clinic typically provide mission or installation support for ECRT tests.

DPG test process requirements for all testing activities are discussed in Section 2.1.3.2, Test Process Planning and Management. These requirements apply to ECRT testing. Procedures for transporting and storing energetics at DPG are described in Section 3.13.3.6, Munitions and Energetics.

Baseline Quantitative Description of ECRT Testing – Quantitative data describing ECRT testing were collected for activities occurring from 1996 through 1998. Quantitative data are summarized in Table 2.1-8, Summary of Baseline Environmental Characterization and Remediation Technology Testing at DPG.

Table 2.1-8. Summary of Baseline Environmental Characterization and Remediation Technology Testing at DPG.

Data Category	1996	1997	1998	Baseline Annual Average
Number of Indoor BangBox™ Tests	2	3	3	3
Number of Indoor Cryofracture Tests	0	0	1	0[a]
Number of Indoor ODOBi Tests	1	0	0	0[a]
Number of Indoor Suppressive Shield Tests	0	0	0	0
Number of Outdoor Tests	0	0	0	0
Total Number of Tests	3	3	4	3

a Tests within the Cryofracture Test Facility and the ODOBi were a very limited part of environmental characterization and remediation technology testing during the baseline period. Because they average less than one test per year over the three-year baseline period, the baseline annual average is considered zero.

ODOBi Open Detonation/Open Burn, Improved

2.1.5.5 Modeling and Assessment Testing

Modeling and assessment testing at DPG is conducted primarily to support biological and chemical defense tests, and may also be performed for smoke and obscurant tests. Modeling and assessment testing is conducted to support DPG's mission and functions as well as for customers whose activities are not part of DPG's ongoing mission program.

Understanding Modeling and Assessment Testing – DPG maintains meteorological measurement and modeling capabilities to determine atmospheric effects on transport and dispersion of materials released into the atmosphere.

Modeling and assessment testing includes developing atmospheric dispersion models and conducting special meteorological and modeling studies.

After development is completed, atmospheric dispersion models, such as models for dispersion characteristics of hazardous chemicals, undergo a process called verification, validation, and accreditation (VV&A). The VV&A process is also used for the Virtual Proving Ground models. The components of VV&A are as follows.

- Verification ensures that the design of the model is in compliance with its development specifications.
- Validation evaluates the final model by comparing its output to the real world to ensure that the model is realistic from the perspective of its intended use.
- Accreditation is an official determination that a model is acceptable for its intended purposes.

As part of the validation of atmospheric dispersion models, atmospheric dispersion databases are generated from outdoor studies that typically include the release of tracer gases such as sulfur hexafluoride, propylene, propane, and butane (DPG, 1997b). The databases are used to develop and validate the models by comparing the output from the models with the atmospheric dispersion database.

Meteorological and modeling activities under the Modeling and Assessment Branch support the development and implementation of U.S. Army Developmental Test Command's Four Dimensional Weather System, known as 4DWX, which provides weather information for the atmosphere above the U.S. Army Developmental Test Command test centers. 4DWX is part of the Virtual Proving Ground program and also supports other test programs at DPG.

The U.S. Army Developmental Test Command implements the Virtual Proving Ground program at its subordinate test centers. The purpose is to provide simulated test scenarios and therefore avoid real, and often dangerous, expensive, and environmentally damaging activities (TECOM, 1999b). DPG's role in this program is primarily to provide biological and chemical testers with meteorological and dispersion modeling services. This is done to support a variety of testing and training activities, some involving chemical and biological weapons exposure scenarios and smokes and obscurants use (DPG, 1997b).

Modeling and assessment testing also includes special meteorological and modeling studies for local, national, and international customers. These studies include outdoor atmospheric dispersion testing and fluid dynamics experiments.

Atmospheric dispersion testing includes the release of tracer gases for long range downwind tracking up to 50 km (31 mi) and tests of large area screening smokes. Fluid dynamics experiments are conducted to study the lower atmosphere that is directly influenced by the presence of the earth's surface. This layer's processes profoundly affect local and larger scale meteorological conditions and determine the fate of materials released within this layer (DPG, 1997b). Data from these controlled, high-resolution studies contribute to improved meteorological models.

Modeling and Assessment Testing Organizations and Functions – Modeling and assessment testing is conducted by DPG's Modeling and Assessment Branch, which is part of WDTC's Meteorology and Obscurants Division. The Modeling and Assessment Branch personnel use meteorological modeling to study, analyze, and model atmospheric effects and design, assess, conduct, and analyze field tests. Staff conduct visits to weather monitoring locations to obtain data, monitor field instruments, and support tests and trials as needed.

Meteorological data used in modeling and assessment testing are collected at DPG by the Meteorological Operations Branch. The Meteorological Operations Branch provides general weather forecasts and warning support for DPG and test-specific support for WDTC outdoor tests. Activities conducted by the Meteorological Operations Branch also include monitoring weather conditions at 20 Surface Atmospheric Measurement System (SAMS) stations and participating in WDTC field tests during the planning and post test review as needed. The SAMS network is the core weather data collection system in the vicinity of DPG. Data have been collected in a more or less continuous and consistent manner since approximately 1987 at most of the locations. Data from the SAMS at Ditto/Avery are shared with the National Weather Service and used to support local and regional weather forecasting. Additional atmospheric measurement equipment is maintained for meteorological and modeling support, as needed.

Facilities Used for Modeling and Assessment Testing – Modeling and assessment testing is coordinated from the Modeling and Assessment Branch office in Ditto. Modeling and assessment testing is conducted outdoors at DPG at the following locations:

- SLTEST site has been used for fluid dynamics experiments conducted in full-scale atmospheric conditions. Tests involving the release of tracer gases are conducted at the SLTEST site.

- Tower Grid and the surrounding area, including the sloping terrain at Camels Back Ridge, have been used for dense gas and atmospheric dispersion tracer

studies. The Tower Grid Command Post, a 1-story, 2-room cinder block building, has been used for building infiltration/exfiltration studies.

- Photo Pad 11, Horizontal Grid, and Target S Grid have also been used for modeling and assessment testing, including urban dispersion model testing. Urban dispersion modeling testing included placing arrays of shipping containers at one or more test grids for atmospheric dispersion testing using tracer gases.

The locations of these facilities used for modeling and assessment testing are shown in Figure 2.1-6, Baseline Locations of Grids, Ranges, and Impact Areas. Table 2.1-4, Summary of Baseline Test Grids, briefly describes these facilities.

Modeling and Assessment Test Process – DPG test requirements for all testing activities are discussed in Section 2.1.3.2, Test Process Planning and Management. These requirements apply to modeling and assessment testing. General health and safety requirements are summarized in Section 3.12.2, Occupational Health and Safety.

Baseline Quantitative Description of Modeling and Assessment Testing – Approximately one test is conducted each year to support model development or validation which includes releasing tracer gas in quantities ranging from a few hundred grams up to several kilograms per test (Biltoft, 1999). Quantitative data describing modeling and assessment testing were collected for activities occurring from 1996 through 1998. Quantitative data are summarized in Table 2.1-9, Summary of Baseline Modeling and Assessment Testing at DPG.

Table 2.1-9 Summary of Baseline Modeling and Assessment Testing at DPG.

Data Category	1996	1997	1998	Baseline Annual Average
Number of Indoor Tests	0	0	0	0
Number of Outdoor Tests	1	1	1	1
Total Number of Tests	1	1	1	1

2.1.5.6 Smoke, Obscurant, and Illuminant Testing

Although smokes, obscurants, and illuminants are considered conventional munitions, they are discussed separately from other conventional munitions because of their unique properties. Other conventional munitions are described in Section 2.1.5.3, Conventional Munitions Testing. Smoke generated from simple means such as fires has been used on the battlefield for signaling purposes dating back to the ancient Greeks (AMC, 2001b). During the Civil War, smoke screens were used to hide naval operations by burning high resin content wood in ship furnaces. By World

War I, the use of smokes had increased greatly and was frequently used to camouflage combat troop actions. The mechanical smoke generator was used to produce smoke for large-area screening of targets, beach landings, airborne assaults, and other tactical operations during World War II and the Korean War (Shinn et al, 1987).

Smoke technology has evolved to include materials known as obscurants. However the term "smokes" is still frequently applied to all smokes and obscurants since smoke was the first type of screening, signaling, and decoy mechanism used in warfare. The evolution of smokes, obscurants, and illuminants has continued in the past 20 years with the refinement of how they are traditionally used and the incorporation of infrared and microwave technologies into their deployment and operations systems (Optimetrics, Undated; Army, 1996b; AMC, 2001b).

Understanding Smoke, Obscurant, and Illuminant Testing – Because smokes, obscurants, and illuminants can substantially affect battlefield situations, military decision-makers must have the ability to assess their effectiveness under a variety of conditions including adverse weather.

Testing at DPG is conducted with smokes, obscurants, and illuminants to determine how they can be used for military operations as well as how to defend against enemy use of these systems. DPG's remote location provides an advantage for this type of testing because it allows for the dissemination of large quantities of materials. DPG is the DOD's leader in smoke and obscurant testing.

Smoke, obscurant, and illuminant systems remain a relatively low-cost, highly effective technology that can be used by the military for a variety of purposes such as:

- Screens to hide troops, equipment, and areas from enemy detection
- Decoys to confuse and mislead enemy forces
- Blinding mechanisms laid directly on enemy positions to impair their ability to see
- Lighting purposes to enhance vision for military maneuvers

Smokes and obscurants are used to simulate battlefield conditions during tests of military equipment.

Modern smokes and obscurants may be deployed by one of the following mechanisms (Shinn et al., 1987):

- Bursting which includes field artillery cannons, mortars, tank guns, aerial smoke munitions (rockets, bombs, and bomblets), and grenades
- Burning combustibles such as smoke pots and signal flares
- Aerosolization which includes smoke generators that disseminate fog oil, vehicle engine exhaust systems which vaporize and disseminate fuels into the air, and jet–turbine helicopters which spray fog oil smoke or disseminate obscurant materials while in flight

Tests with smokes, obscurants, and illuminants depend on the material to be disseminated, the method of dissemination, and the purpose of the tests. Large-area screening smoke tests typically use transmissometers and thermal imaging radiometers to characterize obscuration effectiveness. Some illumination tests use a grid of visible and infrared sensors to characterize the illumination effectiveness. Some tests are focussed on the delivery systems and are conducted with the same methods as described for conventional munitions tests. Smokes, obscurants, and illuminants are sometimes used to support operational testing and training of soldiers by simulating battlefield conditions.

The DPG Modeling and Assessment Branch of the Meteorology and Obscurants Division conducted a smoke and obscurant dispersion modeling analysis for an EA on DPG smoke and obscurant activities (DPG, 1991b). Releases of materials from smoke and obscurant tests occur on designated test ranges and are required by UDAQ to be at least 2 km (1.2 mi) from the DPG property boundary (UDAQ, 1989). Operating procedures define conditions where tests can be safely conducted (DPG, 2000e). The types of smokes and obscurants that have been tested at DPG in recent times are listed in Appendix C, Mission Materials, and toxicological information is

presented in Appendix D, Toxicity Information About Mission Materials. A description on how smokes, obscurants, and illuminants are managed at DPG is provided in Section 3.13, Materials and Wastes.

Smoke, Obscurant, and Illuminant Testing Organization and Functions – The Obscurants and Environmental Test Branch is responsible for all DPG smoke, obscurant, and illuminant tests. This branch is part of the WDTC's Meteorology and Obscurants Division (DPG, 2000e). Obscurants and Environmental Test Branch personnel are responsible for performing all outdoor smoke, obscurant, and illuminant tests and supporting all other DPG test groups that require smoke, obscurant, and illuminant technologies to be incorporated into their testing activities. Obscurants and Environmental Test Branch personnel also serve as an expert source for DPG, Army, and DOD upper command questions concerning smoke, obscurant, and illuminant issues.

Facilities Used for Smoke, Obscurant, and Illuminant Testing – Smoke, obscurant, and illuminant tests at DPG are conducted outdoors. Most of these outdoor tests are scheduled during the months of April to September when weather conditions are best (Battelle, 1988). The largest outdoor smoke and obscurant tests at DPG are either large-scale equipment tests for final acceptance of a smoke/obscurant generator system, or operational-scale battlefield simulations for development and/or testing of military doctrine and tactics. DPG also conducts lot testing outdoors of mortar or grenade-type smoke, obscurant, and illuminant rounds for quality assurance measures. Smokes and obscurants are used during indoor tests only in support of another testing activity, such as biological or chemical defense testing, and not for the purpose of testing smokes and obscurants or smoke and obscurant systems. Illuminants are not used indoors.

Figure 2.1-13, Baseline Locations of Smoke, Obscurant, and Illuminant Testing Activities, shows the locations where smoke, obscurant, and illuminant testing occurs at DPG. A description of the various test grids, ranges, and impact areas used for smoke, obscurant, and illuminant testing is presented in Section 2.1.4.3, Primary Outdoor Facilities.

A description of munition-type smoke, obscurant, and illuminant management at DPG and associated storage facilities is provided in Section 3.13.3.6, Munitions and Energetics. These facilities have engineering and administrative controls that ensure these munitions are safely stored. Health and safety requirements applicable to storage of munition-type smokes, obscurants, and illuminants are summarized in Section 3.12.2, Occupational Health and Safety.

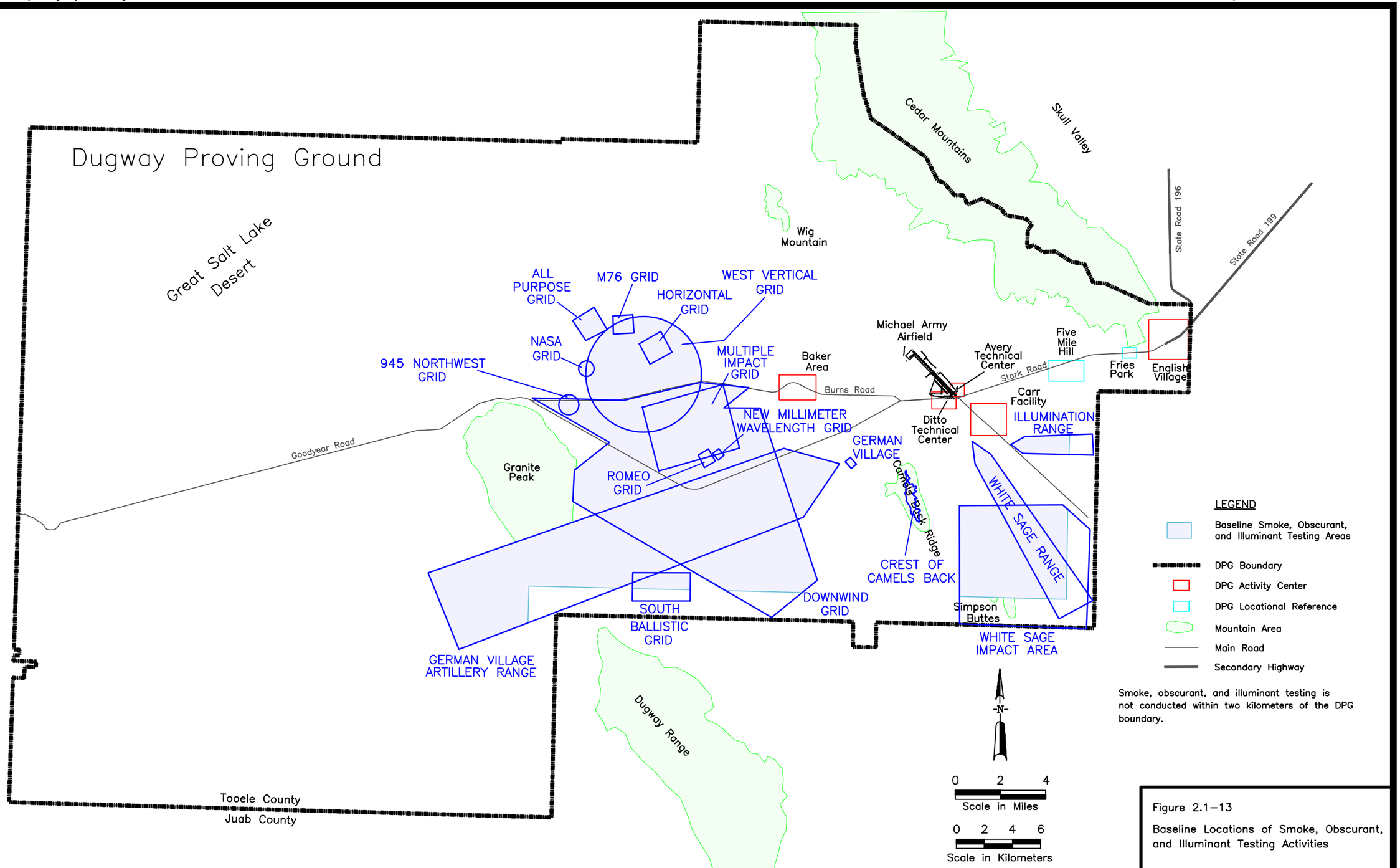


Figure 2.1–13

Baseline Locations of Smoke, Obscurant, and Illuminant Testing Activities

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Smoke, Obscurant, and Illuminant Test Process – DPG test process requirements for all testing activities including smoke, obscurant, and illuminant testing are described in Section 2.1.3.2, Test Process Planning and Management. In 1989, DPG received an AO from the Utah Department of Health authorizing their outdoor smoke and obscurant testing program. If new smoke, obscurant, or illuminant materials are to be used in testing at DPG, an environmental review must be conducted. Section 3.3.2.2, Air Quality Conditions at DPG, provides additional information on smoke and obscurant air emissions at DPG.

Obscurants and Environmental Test Branch personnel schedule and coordinate their smoke, obscurant, and illuminant testing with Range Control. Range Control operations are summarized in Section 2.1.8, Baseline Mission Support Activities. Smoke, obscurant, and illuminant tests may require additional support from the various mission support activity groups described in Section 2.1.5.5, Modeling and Assessment Testing; and Section 2.1.8, Baseline Mission Support Activities, such as Instrumentation Support, Ammunition Accountability Branch, and QASAS. The various installation support services summarized in Section 2.1.9, Baseline Installation Support Activities, may also be used during smoke, obscurant, and illuminant tests.

Smoke, obscurant, and illuminant test grids and impact areas are selected based on test requirements, materials being tested, safety, potential for environmental impact, and grid or impact availability. A typical test requires approximately a 2 sq km (0.8 sq mi) area. Some smoke and obscurant test areas at DPG are equipped to measure the effects of smokes and obscurants on electromagnetic radiation and other obscurant properties. Specific test design and objectives may require that measurements be made at distances from 0.2 to 25 km (0.13 to 15.5 mi) or greater from the release point, requiring test instrumentation to be set up at locations outside of the main test grid.

Smoke, obscurant, and illuminant tests are designed to prevent exposure of unprotected test persons to the smokes, obscurants, and illuminants and to ensure that hazardous conditions do not extend beyond DPG boundaries. Operators of smoke generators and other test persons who could come in contact with smoke clouds wear proper PPE. Health and safety requirements applicable to smoke, obscurant, and illuminants are described in Section 3.12.2, Occupational Health and Safety.

Baseline Quantitative Description of Smoke, Obscurant, and Illuminant Testing – Quantitative data describing outdoor smoke, obscurant, and illuminant testing were collected for activities occurring from 1996 through 1998. Quantitative data are summarized in Table 2.1-10, Summary of Baseline Smoke, Obscurant, and Illuminant Testing at DPG.

Table 2.1-10. Summary of Baseline Smoke, Obscurant, and Illuminant Testing at DPG.

Data Category	1996	1997	1998	Baseline Annual Average
Number of Indoor Tests	0	0	0	0
Number of Outdoor Tests	8	11	12	10
Total Number of Tests	8	11	12	10

2.1.5.7 Physical Testing

Physical testing, also known as reliability, durability, and climatic testing, is performed to ensure that military equipment is designed to withstand the physical and environmental stresses it would encounter during its life cycle (DOD, 1989b). All equipment the Army uses must undergo physical testing to ensure proper safety and function during any situation.

Physical tests are important because they analyze the ability of equipment, such as PPE and munitions, to withstand conditions that could be encountered during battlefield operations or transportation.

Understanding Physical Testing – Physical tests do not use biological agents and simulants or chemical agents and simulants. The following types of physical tests are conducted on military equipment at DPG.

- Physical tests reveal potential defects, verify corrective actions, and provide safety assessments of equipment/ammunition for suitability in its intended operational and transportation environments (Andrulis, 1992). DPG's physical test facilities provide "real world" simulations through shock, vibration, bounce, and drop testing of equipment.

  Mechanical shaker or vibration systems and bounce tables introduce shock and vibration to a test item to assess its ability to withstand transportation over rough terrain (Andrulis, 1992). This type of testing can also occur at fluctuating temperatures to determine if an item can withstand rough activity and continue to operate in a variety of climatic conditions. Mechanical shaker systems and bounce tables can also be used to determine a test item's ability to withstand sudden high intensity shock if the item were to suffer a heavy hit or drop.

  Another method used to assess the effects of strong impact on military equipment is drop testing. Test items are dropped in various orientations and from different heights. Drop testing from 12 m (40 ft) is commonly used, because munitions may be dropped from this height into a ship's cargo hold and should not explode.

- Climatic Tests disclose defects, verify corrective actions, and provide safety assessments of equipment/ammunition for suitability in its intended operational and storage environments. Environmental chambers are used to expose items to:

  - A wide range of climatic conditions including arctic, desert, and tropical environments
  - Variations in moisture, altitude, and temperature
  - Dust, salt fog, and fungus

  Climatic tests may be combined with physical tests, or may be done separately to demonstrate an item's ability to operate and function after exposure to varying environmental conditions. The climatic chambers allow conditioning of test items from -73 to 93 °C (–100 to 200 °F) at 95 percent humidity, and up to an altitude of 30,480 m (100,000 ft).

- Nondestructive tests provide the capability to inspect and analyze artillery and mortar munitions for flaws and malfunctions that may result from a physical or climatic test (Andrulis, 1992). Various methods are used for conducting nondestructive tests on equipment. X-rays are used during various stages of a test, such as upon arrival of the test item to DPG to get baseline information, following climatic or physical tests, or even several times during the tests (Ream, 1998). X-rays may also be used to inspect and identify munitions outdoors.

Physical Testing Organizations and Functions – The Obscurants and Environmental Test Branch of the WDTC's Meteorology and Obscurants Division is responsible for providing physical tests at DPG. This branch maintains, operates, and conducts tests in environmental chambers and shock, vibration, and nondestructive evaluation facilities (DPG, 2000i).

Facilities Used for Physical Testing – DPG's physical tests are conducted in either indoor or outdoor locations. Drop testing occurs at a fixed, outdoor drop tower at the RAD Pad/Drop Pad, located approximately 4.8 km (3 mi) southwest of Carr. Another fixed physical testing facility at the RAD Pad/Drop Pad is the incline impact system. This incline impact system is used to assess a test item's ability to withstand energy typical of that received during rail transport (Andrulis, 1992). Figure 2.1-6, Baseline Locations of Grids, Ranges, and Impact Areas, show the location of the RAD Pad/Drop Pad. DPG has climatic chambers for testing under a variety of climatic conditions, including salt fog, fungus, altitude, high temperature, low temperature, temperature shock, and humidity chambers.

Bounce tables used in physical tests can be transported to the outdoors where they can test high explosive munitions. Portable skid-mounted and trailer-mounted climatic chambers can be used in Carr, taken outdoors to a DPG test site, or to a remote off-installation location. Some nondestructive testing equipment such as x-ray and film processing equipment can be used outdoors to identify and inspect munitions. Section 3.12.2, Occupational Health and Safety, summarizes the general health and safety requirements applicable to physical testing.

Physical Test Process – DPG test requirements for all testing activities including physical testing are discussed in Section 2.1.3.2, Test Process Planning and Management. Indoor and outdoor physical testing is coordinated with the test director and Range Control. Range Control operations are summarized in Section 2.1.8, Baseline Mission Support Activities. Physical tests may require support from various mission and installation support activity groups, such as fire fighting and health services, summarized in Sections 2.1.8, Baseline Mission Support Activities, and 2.1.9, Baseline Installation Support Activities.

Physical tests generate different types of wastes, and as a result certain procedures must be followed for waste management and disposal. The types and management of wastes that may be generated during physical testing at DPG are described in Sections 3.13.4.4, Hazardous Wastes, and 3.13.4.6, Munition and Energetic Wastes. Toxicity information for components of conventional munitions used at DPG is listed in Appendix D, Toxicity Information About Mission Materials.

Baseline Quantitative Description of Physical Testing – In this Future Programs EIS, quantitative information is not provided for physical tests since they are conducted in support of other DPG activities such as conventional munitions testing. Quantitative information for these testing activities includes information on physical tests.

2.1.5.8 Support to Air Testing

DPG's location within UTTR airspace is central to its role in supporting military air testing activities. Most air testing activities involving DPG are based out of HAFB and are conducted as AF activities (CSC, 1990; EnviroSupport, Inc., 1998). Flight over critical test facilities is prohibited. AF air testing activities at the UTTR are not included in the baseline description or as part of the Proposed Action because DPG is not the proponent of these activities and has no control over the scope, timing, and frequency of air activities. These AF activities are included in the cumulative impacts analysis in Chapter 5.0, Cumulative Impacts.

Understanding Support to Air Testing – DPG provides support to air testing activities being performed by the AF at UTTR, such as providing ground test targets, necessary ground support facilities, and assistance to the UTTR and AF, as required.

Air Testing Support Organizations and Functions – DPG provides support to the UTTR in accordance with applicable Inter-Service Support Agreements. DPG's Range Control office works with the 299th Range Control Squadron to provide specific authorization and direction for users of DPG facilities and targets, and the airspace over DPG.

Facilities Used to Support Air Testing – Facilities at DPG available for UTTR users include land based targets, MAAF, Avery, and infrastructure such as roads. The locations of test targets are identified on Figure 2.1-5, Impact Areas for Air Testing and Training. MAAF is an emergency-landing site for all users of the UTTR. MAAF and Avery are described in Section 2.1.4, Activity Centers and Facilities. Air testing ground systems that DPG provides to the AF/UTTR, or that DPG supports include:

- High Accuracy Multiple Object Tracking System (HAMOTS) sites used to track low-flying aircraft equipped with vehicle transponder units and the HAMOTS Upgrade System, which can provide complex flight information for multiple aircraft.
- Cinetheodolite (Cine-T) and Cinesextant (Cine-S) camera sites used to track and record airborne objects. Approximately 30 camera sites are located on DPG property.
- Flight Termination System (FTS) used for precision guided missiles (PGMs) that do not adhere to prescribed flight paths.
- AF 2.4-m (8-ft) telemetry dish on Granite Peak for electronic data tracking to support military testing and target practice, including weapons performance.
- AF electronic communications system at Avery.
- Temporary storage capacity at Avery storage vaults for depleted uranium (DU) that may be included in cruise missile (CM) warheads.

Approximately 20 High Accuracy Multiple Object Tracking System sites are located on DPG.

Mission support activities for support to air testing include airfield operations such as refueling and scheduling, meteorological support for weather reports, and range control. Section 2.1.5.5, Modeling and Assessment Testing, and Section 2.1.8, Baseline Mission Support Activities, summarize these activities. Installation support activities involved in support to air testing include environmental support services, equipment maintenance, fire fighting and emergency response, security, and utilities. These activities are summarized in Section 2.1.9, Baseline Installation Support Activities. Besides these support activities, DPG also provides routine maintenance and upkeep of facilities used to support air testing. Such maintenance and support activities may include the use of wheeled vehicles, paints, solvents, repair parts, and welding.

Wastes generated from testing at DPG are managed and removed in accordance with the applicable Inter-Service Support Agreements, and are described in Section 3.13.4, DPG Generated Wastes. The types of wastes generated from support to air testing include recovered military training munitions and CM warheads potentially containing DU. Small amounts of waste may be periodically generated at MAAF as a result of aircraft servicing and repair. The main regulations and documents for the management of wastes are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

Air Test Process – The UTTR has priority of use for the airspace west of Granite Peak. DPG has priority of use for the airspace east of Granite Peak and west of Five Mile Hill. DPG and UTTR coordinate airspace usage on a weekly basis, or as needed. Depending upon specific test and/or training plans, DPG may have a requirement to use the airspace west of Granite Peak. Depending upon specific test and/or training plans, UTTR may have a requirement to use the airspace east of Granite Peak. In these cases, DPG and UTTR coordinate their airspace requirements with each other. A common schedule for both airspaces is maintained by UTTR, based upon input from DPG and UTTR.

For safety and scheduling purposes, 299th Range Control Squadron at HAFB provides airspace control on a regular basis for both airspaces above DPG. MAAF activities are scheduled and approved by DPG, and are then controlled on a daily basis by DPG Range Control. AF over-flights of critical facilities and residential areas, including Ditto, Carr, Baker, and English Village, are prohibited (DPG, 1984).

Baseline Quantitative Description of Support to Air Testing – DPG's support to air testing cannot be quantified. AF flight activities at the UTTR are not included in the baseline description or as part of the Proposed Action because DPG is not the proponent of these activities and has no control over the scope, timing, and frequency of AF activities. AF flight activities are included in the cumulative impacts analysis in Chapter 5.0, Cumulative Impacts.

2.1.6 Baseline Training Activities

DPG's remote location and large size enhance its value as a training range. This is important to training missions that include multiple units from different military organizations, such as combined training of Army and AF active and reserve units. Access to space is also important as the types of training missions evolve to keep pace with the more sophisticated weapons systems and aircraft that become available. DPG provides support to air training performed by the AF at UTTR, and training of ground-based personnel and equipment (including rotary wing aircraft) at DPG.

Training at DPG is predominantly military, consisting mostly of artillery, air, and ground combat exercises.

A very small number of training exercises involves non-military organizations such as fire-fighting crews. DPG provides overall installation support and management oversight involving coordination and planning. Training support provided by DPG include maintained roads, essential services such as power and water, short- and long-term housing and barracks, a health clinic, food, entertainment, emergency response personnel, EOD experts, range control, in addition to many other services. Support activities are summarized in Sections 2.1.8, Baseline Mission Support Activities, and 2.1.9, Baseline Installation Support Activities.

Military training at DPG occurs in designated locations, including MAAF and the following areas.

- Training Areas are locations where ground training unit operations (including rotary wing aircraft) are approved.

- Impact Areas are locations designated for the impact of munitions that have been fired from another location. Artillery, mortars, or missiles fire at impact areas.
- Maneuver Training Areas are locations within training areas where training units are specifically permitted to operate.
- Targets are ground locations realistically constructed to resemble military targets such as tank batteries, oil refineries, etc. and where weapons may be fired, or inert bombs dropped from the air. There are no live bomb targets at DPG.

The following training activities are conducted at DPG:

- Ground Training
- Counterterrorism Training
- Support to Air Training

2.1.6.1 Ground Training

DPG was first opened to Army Reserve Component for ground training in 1969. Ground training has, and continues to, consist primarily of towed and self-propelled artillery live-fire and related combat maneuver exercises, ranging from weekend unit field training exercises to annual training lasting up to 30 days and involving primarily NG, reserve, and active Army and AF units. However, active units from all branches of the services use DPG for training. Approximately twenty-three percent of DPG's total area is available for ground training, including associated munitions impact areas.

Ground training involves artillery and tactical units operating on the ground, but also may involve air support to both rotary and fixed wing aircraft and smoke, reconnaissance, and decontamination exercises performed by active and reserve component chemical defense military units. In addition, one large combined ground and air training exercise occurs each year at DPG involving substantial ground and air components and other assets.

Military personnel who train at DPG are from Department of Defense installations and National Guard units.

Off-road maneuver training outside of established firing points by heavy tracked military vehicles is not permitted at DPG. Additional prohibitions and stipulations specific to individual training exercises may be established by DPG on a case-by-case basis.

The Maneuver Training Area Management Plan (MTAMP) (AGEISS, 1996h) provides DPG and training units with a framework, founded in the science of range land management, to manage the use of the DPG training areas while minimizing long-term environmental degradation. Section 2.1.3.3, Management Plans, describes the MTAMP.

Understanding Ground Training – Ground training includes a wide variety of activities at DPG, ranging from 12-soldier weekend activities to 3,000 to 4,000-soldier tactical exercises lasting up to several weeks (AGEISS, 1996h). The DPG training areas are used for weekend inactive duty training, 2-week annual training, and other smaller and larger-scale training of both active and reserve components of all services. Training activities are scheduled throughout the year. The Army NG is the most frequent training user at DPG and conducts the ground training exercises described in this section. Artillery light forces and joint exercises are the predominant and largest ground training exercises at DPG.

Artillery exercises involve live-fire exercises with convoy movement, blackout driving, perimeter defenses, and occupation of areas. Equipment used in artillery exercises typically includes:

- Mortars
- 105-mm towed howitzer
- 155-mm self-propelled tracked vehicle and/or towed howitzer
- 2.5 and 5-ton trucks
- High Mobility Multipurpose Wheeled Vehicles (HMMWVs)

- Heavy Expanded Mobility Tactical Trucks (HEMTTs)
- Commercial Use Cargo Vehicles (CUCVs)

The largest tactical system employed at DPG is the M109 series 155-mm self-propelled howitzer. The M109A5 weighs 25,000 kg (56,000 lb) (combat loaded), and exerts ground pressure of 10.95 pounds per square inch (psi). The vehicle is 3.1 m (10.3 ft) wide, 3.0 m (10 ft) high, and 9.1 m (30 ft) long. The vehicle has a maximum speed of 56 kph (35 mph), an operating range of 349 km (217 mi), and has diesel fuel capacity of 511 L (135 gallons). The vehicle is powered by a Detroit Diesel Model 8V-71T, turbocharged, two-stroke, liquid-cooled eight-cylinder diesel engine developing 405 horsepower (hp) at 2,300 revolution per minute, with an Allison Transmission XTG-411-4A cross-drive with four forward and two reverse gears. The M109 series howitzer is supported by the M548A1 weapons carrier, which serves as a supplemental ammunition carrier for the howitzer. The M548 is based on the M113 series of Armored Personnel Carriers, weighs 18,000 kg (40,000 lb) (combat loaded), and exerts ground pressure of approximately 8 psi.

Refueling of the M109 series self-propelled howitzers occurs within the training areas at tactical refueling locations. These locations are staffed by reserve and active component military personnel specifically trained in refueling procedures. They are provided with appropriate military refueling equipment and adequate spill prevention and control training and materials. The reserve and active component artillery units training at DPG provide all personnel and equipment. M548 ammunition vehicles, and other support vehicles such as 5-ton trucks and also HMMWVs refuel at these locations. Diesel fuel is carried in 5-ton trucks or HEMTTs specifically equipped for transporting diesel fuel, and specifically configured to perform refueling operations. A 5-ton truck is equipped with two 2,271-L (600-gallon) fuel pods, and a 189 liters per minute (L/min) (50-gallons per minute (gpm)) fuel pump. A HEMTT is equipped with one 9,463 L (2,500-gallon) fuel tank, and a 1,136 L/min (300-gpm) fuel pump. The 5-ton trucks and HEMTTs refuel at garrison areas, for example, English Village at DPG, and do not perform tactical refueling.

Activities occurring in most artillery training exercises are summarized below (Johnson et al., 1996).

- Deploying personnel and vehicles either solely by highway travel to DPG or from rail facilities near Tooele Army Depot via highway to DPG. Some personnel are flown into DPG.

- Establishing the following areas:
  - Assembly, which may be used for several days or weeks, depending on the duration of the exercise. Activities occurring in assembly areas include preparation for combat training, vehicle and weapon maintenance, organization and planning, housekeeping, living in tents, food preparation, use of chemical toilets, trash collection and removal, fire control activities, and training in avoidance of enemy detection or observation.
  - Casual, which have similar uses as assembly areas but are used for a shorter-term, generally 6 to 12 hours.
  - Communication, support, and control.
- Moving equipment into firing positions.
- Deploying artillery troop units from the cantonment area to maneuver areas for combat scenarios.
- Live-firing into impact areas, with one platoon or battery per firing position.
- Providing engineering support, for example, road construction and/or improvement, terrain leveling, and berm construction.
- Laying communication wire.
- Rapidly redeploying troops and artillery units to other firing positions for additional firing, usually four or five firing positions per exercise.
- Deploying aerial support.
- Demobilizing all forward areas, troops, and equipment to points of origin after up to 33 hours in the field.

An artillery observer at DPG visually monitors each round fired into DPG impact areas using fire control instruments at an observation post within the firing area. The officer marks the locations of UXO on a master map and reports them to Range Control at the end of each day. These UXO are removed by DPG's TEU and EOD, or are destroyed in place. Obsolete vehicles are placed in impact areas as firing targets in many artillery exercises after all batteries and fluids have been removed.

Joint exercises, sometimes referred to as global exercises in the media, are large, multi-battalion, combined ground and air training exercises involving Army and AF units operating in synchronized fashion. These exercises are annual brigade-sized

events that include deployment and training of artillery and aerial units and two-way data transfers between joint-service intelligence gathering systems, target acquisition systems, and weapons delivery systems.

Joint exercises generally conform to the typical artillery training exercises, but also include extensive interaction with aerial support and infantry units. Joint exercises typically involve the following activities (Johnson et al., 1996).

- Deploying wheeled and tracked vehicles and combat support units to firing areas in and around training areas.
- Live-firing into impact areas.
- Acquiring target and surveillance from Special Operations and infantry units.
- Obtaining strategic and tactical operations by military intelligence units.
- Combining arms exercises using F-16s, other AF assets, and Army helicopters concurrent with artillery operations.
- Supporting activities of a broader scope than typical artillery exercises, including:
  - Consolidated headquarters area for command and control
  - Improved firing position surfaces
  - Increased road maintenance
- Conducting up to 20 helicopter flights per day to transport personnel and equipment to forward areas.

Helicopter training is part of joint exercises at DPG.

In addition to artillery and joint exercises, there are five other types of ground training exercises conducted at DPG (Merritt, M., 1998):

- Army Aviation training is performed as stand-alone exercises involving only rotary wing aircraft at altitudes from ground level to 460 m (1,500 ft) above ground level (AGL), or in conjunction with other ground training exercises, such as convoy movement, blackout driving, perimeter defense, and occasional live-fire with Hell fire missiles or 20-mm machine guns. Army aviation training involves a variety of combat missions such as air assault, equipment re-supply, observation, anti-personnel and anti-tank. Army aviation flights may also include security, medical evacuation, fire protection, survey, or other support missions. Rotary wing aircraft are typically OH-58 series observation helicopters, UH-1 series Iroquois utility helicopters, UH-60 series Blackhawk utility helicopters, AH-1 series Cobra attack helicopters, and AH-64 series Apache attack helicopters. HEMTTs for refueling 2.5- and 5-ton trucks, 5-ton trucks, HMMWVs, CUCVs, and generators may also be used.

  Utah NG Aviation units use AH-64 Apache and UH-60 Blackhawk helicopters at Wig Mountain, White Sage, and Wildcat as missile, rocket, and machine gun ranges. Artillery, AF A-10's, AF F-16's, and AH-64 Apache attack helicopters use the range simultaneously for Joint Air Attack Training. UH-60 Blackhawks use the area for Door Gunner Training. Ground troops are trained on Forward Area Rapid Refuel procedures, as the training area is so large that fuel is the limiting factor in helicopter training. The AH-64 Apache and UH-60 Blackhawk helicopters use the airspace at all hours of day and night. Night Vision Goggle and Night Vision Systems training is also performed. Utah NG AH-64 Apache and UH-60 Blackhawk helicopters land on the property to practice terrain and confined area approaches and takeoffs. They use MAAF and the surrounding area for Emergency Procedures training, Forward Area Rapid Refuel operations, and Re-Arm and De-Arm Operations.

  The Utah NG also places a 400 person Battalion and Group Headquarters for Field Training Exercises, Battalion Assembly Area operations, Forward Assembly Area operations, and Holding Area Operations training at DPG. They move off road, utilizing terrain for cover and concealment. They use all areas of DPG and the UTTR for UH-60 HAMOTS operations relating to maintenance of Clover Control and associated radar sites.

- Engineer Training where engineering units conduct demolitions operations using 13.6- to 227-kg (30- to 500-lb) charges, quarry and haul gravel road aggregate

and build new gravel roads, and upgrade buildings. Training activity involving civilian firefighters is included in the engineer training category.

- Special Operations exercises include dismounted (foot) tactics, airborne operations, special reconnaissance, patrolling, live fire exercises with small arms and machine guns, and demolitions.

- Logistics/Transportation/Communication activities are typically a component of other exercises and include use of HEMTTs, 5-ton trucks, 2.5-ton trucks, CUCVs, and HMMWVs.

- Close Air Support are small exercises normally with 5-soldier ground units operating in conjunction with low-flying aircraft in combat scenarios.

Ground Training Organization and Functions – DPG and training unit organizations perform ground training functions. DPG is responsible for overall management of the training ranges. Specific DPG organizations and their functions are the following.

- Base Operations, Plans and Operations Division – Scheduling, planning, coordination with test divisions and other range users, and concurrence with training operations plan

- DEP – Environmental protection, NEPA review and concurrence, land management, review of training operations plan, and recommendation of mitigation measures

- Range Control and EOD – Explosive ordnance health and safety

Procedures used by DPG organizations for managing ground training include:

- Establishing and communicating to training units points of contact
- Requesting, reviewing, and concurring with training operations plans
- Conducting pre-briefing and post-briefing sessions
- Coordinating airspace clearance and range clearance
- Implementing restrictions on firing illumination and smoke munitions from indirect fire weapons during periods of increased fire danger

Training unit organizations include the Utah Army NG, which is considered a tenant organization at DPG, and the following other training units that conduct ground training at DPG:

- Active and reserve component forces from various states
- Special Operations units, such as U.S. Army Rangers and Special Forces
- Joint Special Operations Command
- Reserve Officers Training Corps

These training unit organizations are responsible for:

- Submitting an official request for use of DPG training range(s)
- Submitting all training operations plans and other documentation required by DPG
- Incorporating all DPG stipulations into training operations plans
- Establishing an On Scene Coordinator for communication
- Attending pre- and post-training briefings

Facilities Used for Ground Training – The primary facilities used for ground training at DPG are shown in Figure 2.1-7, Baseline Locations of Ground Training Activities, and include the following facilities.

- Training areas are primary areas where training activities occur consisting of undeveloped rangeland with "developed" areas that include several widely separated unimproved roads and a series of 12 to 40 firing positions for concentrated artillery activity. Each firing position encompasses an area within a 250-m (820-ft) radius from the firing position center. Other approved field areas located within the training areas close to the firing positions include assembly, bivouac, communication, and control areas. Locations within training areas not specifically approved for activity in each training exercise are designated off-limits. The types of training and example training activities occurring in each training area at DPG are described in Table 2.1-11, Baseline Ground Training Activities at DPG. Information about each training area is provided in Section 2.1.4.3, Primary Outdoor Facilities.

Table 2.1-11. Baseline Ground Training Activities at DPG.

Training Area	Major Types of Training	Example Training Activities
Cedar Mountain	• Artillery • Air Force • Special operations	• Artillery rounds fired into the Wig Mountain Impact Area • Truck convoy/ambush training scenarios on several interconnecting roads • Tactical assault • Small unit tactics, airborne operations, and special reconnaissance

Table 2.1-11. Baseline Ground Training Activities at DPG.

Training Area	Major Types of Training	Example Training Activities
West Granite Peak	• Artillery • Special operations	• Artillery rounds fired into the Granite Peak Impact Area • Maneuvering of self-propelled artillery weapons • Maneuvering of towed artillery weapons • Combat service support activities • Ground troop tactical training • Small unit tactics, airborne operations, and special reconnaissance
White Sage	• Artillery • Multi-brigade joint force exercises • Special operations	• Artillery rounds fired into the White Sage Impact Area • Maneuvering of self-propelled artillery weapons • Maneuvering of towed artillery weapons • Combat service support activities • Ground troop tactical training • Use of tracked vehicles • Small unit tactics, airborne operations, and special reconnaissance
Wig Mountain	• Artillery training • Multi-brigade joint force exercises • Special operations	• Artillery rounds are fired into the Wig Mountain Impact Area • Live-firing and maneuver exercises with or without air support • Small unit tactics, airborne operations, and reconnaissance

- Impact areas are locations where artillery rounds are fired to the ground or at targets specifically established for combat training. Impact areas at DPG include:

  - Granite Peak Impact Area
  - White Sage Impact Area
  - Wig Mountain Impact Area

  Information about impact areas is provided in Section 2.1.4.3, Primary Outdoor Facilities.

- Bullene Barracks is a cantonment and billeting area for ground and support troops during training exercises. Bullene Barracks is located on the west side of English Village. A large fenced yard exists within the cantonment area for vehicle assembly and equipment storage.

Baseline Quantitative Description of Ground Training – During the baseline period, 1996 through 1998, DPG hosted an annual average of 15 training events involving an annual average of 3,310 military employees. Characteristics of typical and specific ground training exercises are listed in Table 2.1-12, Summary of Annual Average Baseline Ground Training at DPG.

Table 2.1-12. Summary of Annual Average Baseline Ground Training at DPG.

Training Type	Number of Events	Typical Duration (days)	Number of Troops	Number of Vehicles	Sample of Equipment Used
Artillery	4	14	980	360	• M109 series 155-mm self-propelled howitzers • 105-mm and 155-mm towed howitzers • Various cargo, supply, fuel, water, ammunition, support and maintenance trucks including M548s, HEMTTs, 5-ton and 2.5-ton trucks, HMMWVs, commercial utility trucks
Engineer and Firefighter	2	7	170	30	• 5-ton and 20-ton dump trucks, bulldozers, graders, front end loaders, excavators, backhoes, rollers • Various cargo, supply, fuel, water, ammunition, support and maintenance trucks including 5-ton and 2.5-ton trucks, HMMWVs, commercial utility trucks
Special Operations	4	45	130	12	• Fixed and rotary wing aircraft including AH-64 and AH-1 attack helicopters • UH-1 series and UH-60 utility helicopters, OH-58 series observation helicopters • Various cargo, supply, fuel, water, ammunition, support and maintenance trucks including 5-ton and 2.5-ton trucks, HMMWVs, commercial utility trucks
Army Aviation	4	10	230	36	• Rotary wing helicopters including AH-64 and AH-1 attack helicopters • UH-1 series and UH-60 utility helicopters, OH-58 series observation helicopters • Various cargo, supply, fuel, water, ammunition, support and maintenance trucks including HEMTTs, 5-ton and 2.5-ton trucks, HMMWVs, commercial utility trucks
Joint Exercises	1	14-48	1,800	480	• Artillery equipment such as M109 series 155-mm self-propelled howitzers; 105-mm and 155-mm towed howitzers • Engineering equipment such as 5-ton and 20-ton dump trucks, bulldozers, graders, front end loaders, excavators, backhoes, rollers • Rotary wing helicopters including AH-64 and AH-1 attack helicopters; UH-1 series and UH-60 utility helicopters, OH-58 series observation helicopters • Various cargo, supply, fuel, water, ammunition, support and maintenance trucks including M548s, HEMTTs, 5-ton and 2.5-ton trucks, HMMWVs, commercial utility trucks

HEMTT Heavy Expanded Mobility Tactical Truck
HMMWV High Mobility Multipurpose Wheeled Vehicle

Ground training activities are primarily concentrated at artillery firing positions and bivouac/assembly areas. Levels of training activity at these areas are best measured by the number of acres used for firing position and bivouac/assembly areas, the number of troops in off-road areas, and the number of tracked and large vehicles used. These measures for baseline ground training activity are provided in Table 2.1-13, Levels of Baseline Ground Training Activity at DPG.

Table 2.1-13. Levels of Baseline Ground Training Activity at DPG.

Measure of Training Activity	Number/Year
Acres Used for Bivouac/Assembly	66,000
Acres Used for Firing Point Activity	4,600
Troops in Off-Road Areas	3,300
Tracked Vehicles	110
Vehicles Greater than 5 Tons	230

2.1.6.2 Counterterrorism Training

In addition to ground training, DPG's expertise in chemical and biological defense testing has led to a relatively new mission component, training military and civilian emergency personnel in responding to terrorist events involving chemical or biological agents.

Understanding Counterterrorism Training – Counterterrorism training at DPG involves training to respond to terrorist threats.

Counterterrorism training involves two categories:

- **Crisis Response, which involves training for the discovery of the perpetrators before release of any substances.**
- **Consequence Management, which involves training to prepare for the consequences of an actual terrorist attack. The physical, socioeconomic, and psychological consequences of the attack must be mitigated.**

Joint Program Office for Bio Defense, 1998

Counterterrorism training at DPG focuses primarily on consequence management (Delgado, 1999). The term counterterrorism training in this Future Programs EIS includes training of first responders, active and reserve component military units, and support personnel in all aspects of consequence management including identification, detection, and remediation of substances; law enforcement; integration of technical and nontechnical components; and testing of equipment and procedures.

A training exercise was conducted for first responders, active and reserve component military units, and support personnel in simulated terrorist scenarios. The simulated terrorist incident, called "911 BIO Consequence Management Advanced Concept Technology Demonstration" and referred to as "911 BIO" was conducted in 1997 by two groups of response participants. DPG provided technical support in the sampling and identification of biological simulants released in a staged terrorist attack. 911

BIO was organized at the DOD level and had the following objectives (Wheeler, 1997):

- Evaluation of military consequence management capabilities
- Refinement of operational procedures for terrorist incidents
- Evaluation of detection technologies and warning procedures
- Decontamination of victims and PPE

Counterterrorism Organizations and Functions – There was no established division for counterterrorism training activities during the baseline period. The Life Sciences Division served as the focal point for 911 BIO.

Facilities Used for Counterterrorism Training – Although counterterrorism training can be performed at any DPG facility, MAAF, German Village, and Tower Grid are facilities that were used as staged laboratories and public areas during simulated terrorist activities. These facilities are described in Section 2.1.4, Activity Centers and Facilities.

Baseline Quantitative Description of Counterterrorism Training – During the baseline period, counterterrorism training was not a substantial mission component at DPG. The 911 BIO exercise involved less than 50 people.

2.1.6.3 Support to Air Training

DPG actively supports air training activities based at the UTTR. As described in Section 2.1.5.8, Support to Air Testing, the UTTR has priority of use for the airspace west of Granite Peak. DPG has priority of use for the airspace east of Granite Peak and west of Five Mile Hill. Most air training activities involving DPG are based out of HAFB and are conducted as AF activities. Such AF training activities frequently use the airspace west of Granite Peak, and following coordination with DPG often use the airspace east of Granite Peak. DPG does not typically perform air training activities, but DPG does provide support such as ground test targets, necessary ground support facilities, and any other assistance that the UTTR and AF may require for mission accomplishment. AF ground activities by units/teams not engaged in flight are included in this EIS.

Understanding Support to Air Training – DPG supports air training by hosting military reserve units and by contributing ground support facilities, infrastructure, and airspace. Air related training aspects of ground based units are discussed in Section 2.1.6.1, Ground Training.

DPG cooperates with the AF in providing emergency response, fire fighting, technical escort and explosive ordnance disposal, airfield operations, and medical support for all UTTR air related activities and implements health and safety procedures for tenant activities. These activities are summarized in Sections 2.1.8, Baseline Mission Support Activities, and 2.1.9, Baseline Installation Support Activities. Other DPG support to air training is similar to that described in Section 2.1.5.8, Support to Air Testing.

Air Training Support Organizations and Functions – DPG's Range Control office provides specific authorization and direction for users of DPG facilities and targets, and the airspace over DPG. The 388th RANS, the 299th Range Control Squadron, and the manner in which air testing and training activities are controlled and coordinated between multiple users are discussed in the airspace description in Section 2.1.4.3, Primary Outdoor Facilities.

DPG Facilities Used to Support Air Training – A special AF computer system, Television Ordnance Scoring System (TOSS), is available to score hits and misses of targets and to give pilots feedback so accuracy of munitions delivery can be recorded. The 388th RANS monitors TOSS from Avery for all UTTR targets. The 388th RANS operates a 2.4-m (8-ft) telemetry dish on Granite Peak to obtain data for TOSS that is monitored from a control room in Avery. Air training units also periodically use DPG housing, barracks, and other available services, as needed, to support their training objectives. Other DPG facilities that support air training are similar to those described in Section 2.1.5.8, Support to Air Testing.

Air Training Process – DPG's Range Control office authorizes and provides direction to users of DPG facilities and targets, and the airspace over DPG. The 388th RANS, the 299th Range Control Squadron, and the manner in which air testing and training activities are controlled and coordinated between multiple users are discussed in the airspace description in Section 2.1.4.3, Primary Outdoor Facilities.

Baseline Quantitative Description of Support to Air Training – DPG's support to air training can not be quantified. AF activities at the UTTR are not included in the baseline description or as part of the Proposed Action because DPG is not the proponent of these activities. AF activities are included in the cumulative impacts analysis in Chapter 5.0, Cumulative Impacts.

2.1.7 Baseline Research Support to Non-DOD Agencies

DPG is available for use by government agencies, educational institutions, and private organizations to conduct research projects not necessarily related to DPG's overall mission.

Groups conducting research projects at DPG may participate in a one-time event or may establish a longer term tenant status at DPG. An example of a one-time study at DPG took place at the SLTEST site, 48 km (30 mi) west of Ditto, and was conducted by DPG, the University of Utah, and Yale University in August, 1998 (Unknown, 1998b). This 5-day study examined turbulent wind patterns that have practical applications for aircraft, ships, ballistics, pipelines, and the atmospheric sciences. Some governmental agencies that have conducted research at DPG include the California Air Resources Board, the City of Tucson, the U.S. Department of Transportation, Dulles International Airport, and the U.S. Department of Energy. There is one DPG tenant conducting scientific research at DPG, the University of Utah's cosmic ray research program.

The University of Utah's cosmic ray research activities at DPG consist of the largest cosmic ray research facility in the world. These research activities are often referred to as the Cosmic Ray Observatory, the Fly's Eye (FE), or more recently, the High Resolution Fly's Eye (HiRes) Experiment. A FE or HiRes site consists of a series of telescopes that are designed to measure the flux, energy spectrum, and composition of cosmic rays. Cosmic ray research has been conducted at DPG since 1976.

Cosmic rays are extremely high-energy particles that travel through space at nearly the speed of light. When these particles enter the earth's atmosphere, they collide with gas molecules in the atmosphere to create a cascade of charged particles called an air shower. This air shower excites the gases of the atmosphere causing them to give off light. Scientists are attempting to determine where cosmic rays come from, what causes them, what they are made of, and why they have such high energy.

The primary mission of the FE is to conduct research in the following fields:

- Cosmic ray physics
- Particle physics
- High energy astrophysics
- Astronomy

Scientists collect cosmic ray data only on dark moonless nights so they can detect the faint light generated by the cosmic rays. DPG is an ideal location for cosmic ray research because there are no interfering lights, it is in a protected location, and the visibility is generally clear. Due to the requirement of a dark sky without a moon, data collection activities are limited to nine to 17 nights per month depending on the time of year (McDonough and Taylor, 1997).

The University of Utah is primarily responsible for cosmic ray research activities conducted at DPG (DPG, 1996a). DPG personnel coordinate cosmic ray research activities. Specific DPG personnel have been selected as sponsor and security points of contact. The University of Utah's personnel coordinate their activities with their DPG sponsor and DPG security personnel.

Three cosmic ray research facility sites are located at DPG. Having various cosmic ray research sites allows researchers a better view of an airshower when it occurs, and therefore, the ability to gather more information. Environmental implications related to each of these cosmic ray sites are addressed in EAs prepared prior to construction of the sites (DPG, 1996a). A description of the three cosmic ray research facility sites follows.

- Five Mile Hill (Little Granite Mountain) site is the location of the original University of Utah cosmic ray construction project, FE I. This unit was built in 1976. Two trailers house 67 mirror units that are used to study fluorescence (DPG, 1989). The University of Utah is presently modifying FE I into a HiRes facility. HiRes facilities have greater sensitivities and improved resolution. The National Science Foundation funds the Five Mile Hill site.

- Sand Dunes/Landfill site is the location of the FE II cosmic ray research area that is used for a variety of post-doctorate projects. FE II is located between the landfill and the sand dunes just north of Five Mile Hill. The projects at this site are continually changing. There are four trailers that store the necessary equipment for the research projects. Some of this equipment is in constant use.

- Camels Back site is the location of the HiRes facility used to study fluorescence (McDonough and Taylor, 1997). The University of Utah constructed this HiRes site which has 27 detector buildings that house two sets of cosmic ray tracking instrumentation (DPG, 1992). Forty-two detectors are used to collect data. The HiRes site also has a processing facility to process and transmit the collected data to a central processing facility. Camels Back Ridge and Five Mile Hill are two central processing facilities. All detectors are connected to a central facility by a computer network which records the data. NEVUS Laboratories designed the equipment that is operated by Columbia University. The National Science Foundation funds the Camels Back Ridge site.

There were three research project baseline activities for cosmic ray research in 1999.

2.1.8 Baseline Mission Support Activities

A variety of mission support activities at DPG provide essential services for the operation of DPG's technical mission and functions. These mission support activities consist of services provided directly by DPG as well as services provided by tenants. The mission support services supplied directly by DPG are provided by entities within DPG's Base Operations, Special Staff, and WDTC groups described in Section 2.1.1.2, DPG Organization.

Mission support activities are summarized in Table 2.1-14, Summary of Mission Support Activities, including the entity providing the activity and its location and responsibilities. Real property deficiencies related to mission support activities are limited to MAAF and are discussed in Section 2.1.4.3, Primary Outdoor Facilities.

Table 2.1-14. Summary of Mission Support Activities.

Activity	Organizational Unit	Location	Responsibilities
Airfield Operations	Base Operations	Ditto	• Provides aviation support to AF activities that take place on the DPG portion of the UTTR • Supervises and coordinates DPG's aviation planning, training, flights, airfield operations and maintenance
Ammunition Accountability	WDTC	Carr	Procures, receives, tracks, and stores munitions, energetics, and chemical agents used for DPG testing, training, and support
Instrumentation	WDTC	Ditto	• Provides, maintains, and operates instruments for WDTC's testing activities • Maintains installation grids and assists with construction of new test sites and facilities at DPG
Quality Assurance Specialist Ammunition Surveillance	Base Operations	Carr	For munitions, energetics, and chemical agents used for DPG testing, training, and support: • Administers munitions surveillance programs • Conducts tests and studies to assess the serviceability and deterioration of munitions • Administers munitions storage safety • Consults on munitions issues • Oversees chemical agent management
Range Control	WDTC	Ditto	For DPG's ranges: • Administers, schedules, assigns, and controls use • Monitors air traffic in and over DPG and coordinates airspace and ground activities • Controls entry to, travel in, and exit • Provides routine and emergency communications base station for testing and training at DPG

Table 2.1-14. Summary of Mission Support Activities.

Activity	Organizational Unit	Location	Responsibilities
Technical Escort	Tenant	Ditto	• Provides support to DPG for chemical and biological agent and munitions • Provides EOD services to detect, identify, evaluate, render safe, recover, and dispose of UXO • Provides support for IRP at sites contaminated with chemical agent • Manages munitions waste
Work Clothes Preparation	Tenant	Ditto	• Issues PPE to DPG personnel handling chemical agent and hazardous materials • Cleans decontaminated PPE used at DPG

AF	Air Force	IRP	Installation Restoration Program
Carr	Carr Facility	PPE	personal protective equipment
Ditto	Ditto Technical Center	UTTR	Utah Test and Training Range
DPG	U.S. Army Dugway Proving Ground	UXO	unexploded ordnance
EOD	Explosive Ordnance Disposal	WDTC	West Desert Test Center

2.1.9 Baseline Installation Support Activities

A variety of support activities at DPG provide services necessary to conduct the day-to-day functions of the installation and ensure that installation activities are being conducted appropriately. These installation support activities are provided by DPG and by tenants. The installation support services supplied directly by DPG are provided by entities within DPG's Base Operations and Special Staff groups described in Section 2.1.1.2, DPG Organization.

To enhance efficiency, the Army is attempting to regionalize activities by combining certain functions of the various Army installations into a centralized location. Several installation support functions at DPG, such as personnel management and accounting, have been regionalized.

Installation support activities are summarized in Table 2.1-15, Summary of Installation Support Activities, including the entity providing the activity and its location and responsibilities. Real property deficiencies related to installation support activities and specific activity centers, indoor facilities, and outdoor facilities are discussed in Section 2.1.4, Activity Centers and Facilities. Real property deficiencies related to installation-wide support activities are presented at the end of this section (AGEISS and HBA 2000).

Table 2.1-15. Summary of Installation Support Activities.

Activity	Organizational Unit	Location	Responsibilities
Army Corps of Engineers	Tenant	English Village	• Executes IRP at DPG • Provides construction and design services for DPG public works projects
Community Activities	Base Operations	English Village	Provides all morale, welfare, and recreation support to residents of DPG including: • Post office • Elementary and secondary schools • Church • Recreation center, bowling alley, movie theater, golf course, community club, and craft shop • Car care center
Environmental Programs	Special Staff	English Village	• Advises the DPG Commander on environmental issues • Provides guidance to DPG personnel on handling and disposing hazardous waste • Administers DPG's IRP • Manages DPG's environmental programs • Administers non-WDTC NEPA compliance responsibilities • Responds to fires at DPG • Responds to medical emergency calls and hazardous material emergencies at DPG • Provides fire training at DPG to local fire agencies for structural, range, and liquid fuel fires
Equipment Maintenance	Base Operations	Ditto and Carr	Maintains government-owned vehicles, construction equipment, and tools used by DPG personnel
Grounds and Road Maintenance	Base Operations	English Village	• Maintains paved and unpaved roadways at DPG • Maintains all DPG public grounds • Maintains and repairs buildings at DPG • Oversees construction and demolition projects at DPG
Health Services	Tenant	English Village	• Responds to injuries related to chemical or biological incidents • Provides health services to DPG military and their family members and DPG personnel • Provides occupational health care • Responds to emergency calls at DPG and in the local vicinity
Housing	Base Operations	English Village	Provides family, unaccompanied personnel, and transient or hotel type housing to personnel stationed or visiting DPG
Information Management	Base Operations	English Village and Ditto	• Serves as the focal point for providing Information Technology support for the entire installation, including its tenants • Provides the following services: ▪ Telecommunications ▪ Automation ▪ Records management and administration ▪ Publishing and printing ▪ Information assurance and Automated Data Processing security
Metal Shop	Base Operations	English Village	Performs machine work, sheet metal work for testing and training facilities and for maintenance, and welding

Table 2.1-15. Summary of Installation Support Activities.

Activity	Organizational Unit	Location	Responsibilities
Procurement	Tenant	English Village	Performs contract administration and purchasing for DPG and its tenants
Retail Sales	Tenant	English Village	Administers the commissary and Shopette at DPG
Security and Counterintelligence	Base Operations	English Village	Implements and administers the following security programs at DPG: • Installation Security • Installation Law Enforcement • Physical Security • Crime Prevention • Chemical Security Terrorism Counteraction
Supply Operations	Base Operations	English Village	Receives and distributes supplies for DPG
Utilities	Base Operations	English Village	Provides the following utility services to DPG: • Electrical • Heating and transportation fuel • Solid waste disposal • Stormwater drainage • Wastewater treatment • Water

Carr Carr Facility
Ditto Ditto Technical Center
DPG U.S. Army Dugway Proving Ground
IRP Installation Restoration Program
NEPA National Environmental Policy Act
WDTC West Desert Test Center

The SDP identified several real property deficiencies related to installation support activities. For example, DPG does not have ability to conduct aerial reconnaissance and provide aerial emergency response. Road pavement, parking pavement, and sidewalks throughout DPG require repair and maintenance. The regular grading of firebreaks along roads at DPG is environmentally detrimental and in direct conflict with maintenance measures outlined in the DPG Fire Management Plan (Horman et al., 2000) as well as the Noxious and Nuisance Weed Management Plan (Johnson et al., 2000). Inadequately insulated or spaced insulators have electrocuted golden eagles and other raptors. DPG does not have a stormwater permit or a waiver (AGEISS and HBA 2000).

2.2 Proposed Action

The Proposed Action for this Future Programs EIS consists of implementing DPG's planned future programs through the 7-year Proposed Action time period. The Proposed Action is DPG's preferred alternative. The preferred alternative is the alternative identified by DPG that it believes would best fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and

other factors. The Proposed Action or any action alternative cannot be implemented until the completion of the NEPA review process.

DPG's large size, remoteness, and its extensive range infrastructure combine to offer an attractive testing and training site for many clients. DPG is the only Army installation large and remote enough to permit comprehensive and realistic testing of biological and chemical defense systems, munitions, and smokes, obscurants, and illuminants with a commitment to environmental protection and personal and public safety.

DPG is increasingly serving new customers needing testing and training services. Both DOD and non-DOD customers are posing challenges for DPG to diversify to support greater numbers of tests and training events related to new enemy threats, next generation materiel, advanced conventional weapons systems, environmental concern, and demilitarization technologies.

The Proposed Action would enable DPG to effectively respond to the challenges of a diversified mission. The Proposed Action would implement DPG's specific goals:

- To protect America's warfighters, citizens, and allies against present and emerging threats
- To be the world's premier test center for chemical and biological defense systems
- To be a center of excellence for testing environmental characterization and remediation technologies
- To be globally recognized for chemical and biological defense modeling and simulation
- To support U.S. warfighting efforts
- To support U.S. anti-terrorism initiatives
- To gain new and varied missions
- To provide an appropriate quality of life for the work force

This Proposed Action includes the following three primary elements:

- Continuation of Baseline Mission Components - Under the Proposed Action baseline activities as described in Section 2.1, Baseline Description of DPG, would continue. The level of activity for most of these activities would increase.

- Diversification of DPG Operations - New types of testing, training, and technology development activities at DPG are anticipated as part of the Proposed Action. The Proposed Action includes only those new tests, training exercises, and technology development activities that are believed to be "reasonably foreseeable" as of March 2001, and for which DPG is the proponent or has a high level of control. Any future activities that are implemented but not foreseen within the scope of this Future Programs EIS would require appropriate NEPA review. New tests, training exercises, and technology development activities comprising a part of the Proposed Action are identified in this section where they apply for each DPG testing, training, or research support activity. The timing and exact names of some new tests to be conducted at DPG under the Proposed Action are unknown. The tests discussed in Diversification of DPG Operations represent the types of new tests and their associated environmental impacts expected at DPG under the Proposed Action.

- Implementation of an SDP - The SDP, prepared in conjunction with the Future Programs EIS, summarizes proposals and requirements for real property with a direction for the future development of DPG's installation. In the NOI for the Future Programs EIS, the Proposed Action called for implementation of an updated real property master plan. DPG, with input from U.S. Army Developmental Test Command, has chosen to prepare an SDP to meet the real property master plan requirement for the EIS and to serve as a tool to analyze the installation's current and future planning needs. A policy letter, Master Planning Empowerment and Documentation, issued by the U.S. Army Assistant Chief of Staff for Installation Management, dated March 5, 1996, lifted the requirement to furnish detailed real property master plans for subordinate installations and created the SDP initiative. The SDP is an initiative designed to reinvigorate the Army's Real Property Master Planning Program and complies with AR 210-20.

The recommendations of the SDP constitute planning activities, real property improvements, or in some cases, demolition, required to support the Future Programs EIS Proposed Action, namely the continuation of the baseline mission components as well as the diversification of DPG operations. Construction, renovations, and demolition activities recommended in the SDP are shown in Figure 2.2-1, Proposed Changes to DPG's Real Property. The recommendations of the SDP are incorporated into the Future Programs EIS Proposed Action and are summarized in this section. A detailed explanation of the real property findings and recommendations can be found in the SDP (AGEISS and HBA, 2000).

Baseline Activities, Proposed Action, and Alternatives

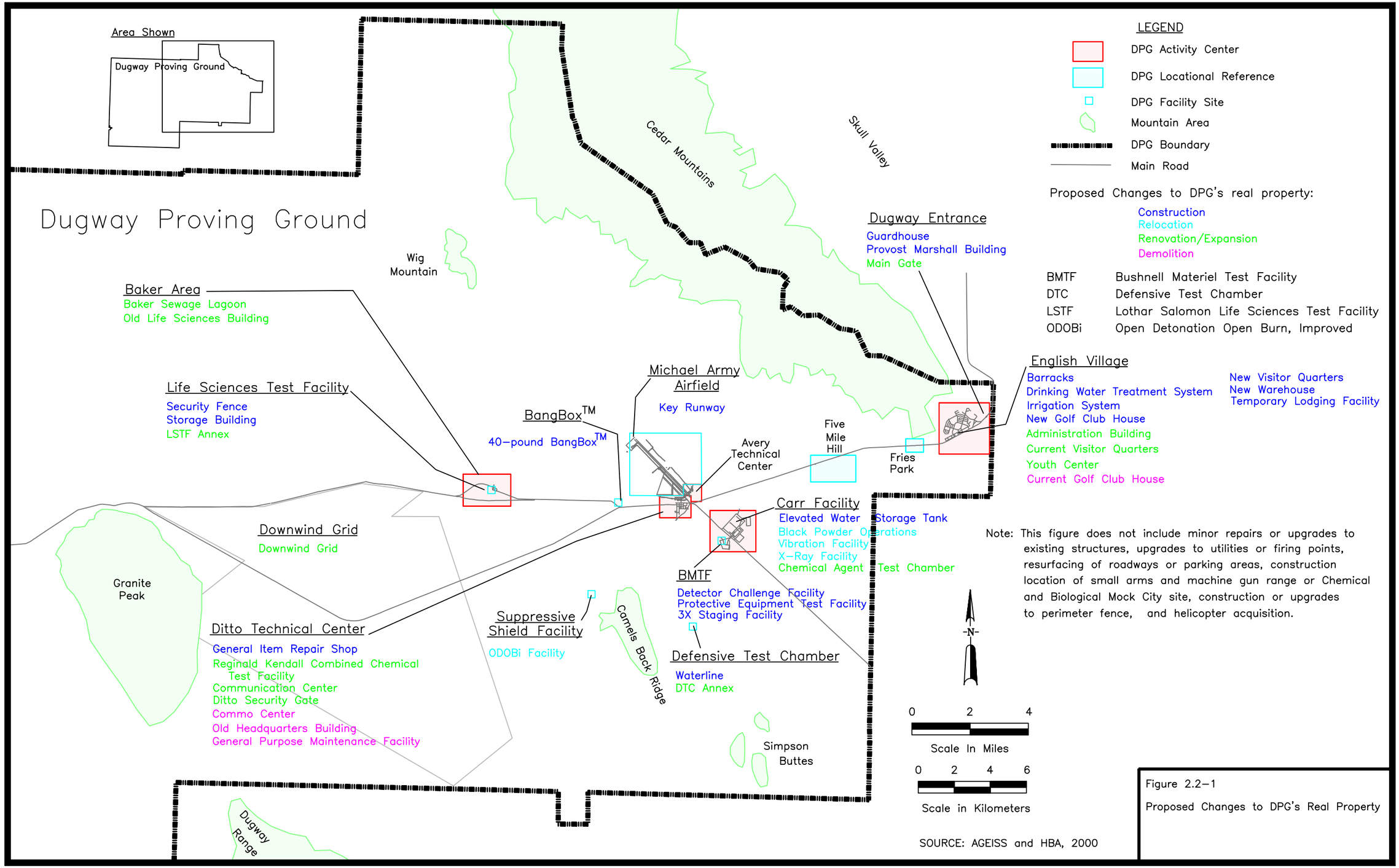

Figure 2.2–1
Proposed Changes to DPG's Real Property

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The recommendations within the SDP are designed to ensure that DPG has sufficient state-of-the-art facilities to continue developing as the Army's premier chemical and biological weapons testing and proving ground, special operations training site, and DOD active and reserve component units training center.

Baseline testing activities at DPG are described in Section 2.1.5, Baseline Testing Activities. All WDTC testing activities would increase during the 7-year Proposed Action period. The SDP includes construction of new facilities, renovation of existing buildings, and relocation of an existing facility to support the WDTC testing activities considered in the Proposed Action. Information about each DPG testing activity for the Proposed Action is provided in Section 2.2.1, Proposed Action Testing Activities.

DPG's baseline training activities are described in Section 2.1.6, Baseline Training Activities. Ground and counterterrorism training activities would continue to occur at DPG under the Proposed Action. The Proposed Action includes marked increases in existing ground training and counterterrorism training. A significant ground training increase would result from active and reserve component training activities at DPG that are anticipated to increase substantially from the baseline level through the 7-year Proposed Action period. The SDP includes construction of new facilities, adaptive re-use of an existing building, and improvements to firing points to support training activities considered in the Proposed Action. Information about each DPG training activity for the Proposed Action is provided in Section 2.2.2, Proposed Action Training Activities.

Baseline research support activities at DPG are discussed in Section 2.1.7, Baseline Research Support to Non-DOD Agencies. Research activities involving cosmic ray would continue under the Proposed Action and would remain at baseline levels. Information about research support activities for the Proposed Action is provided in Section 2.2.3, Proposed Action Research Support to Non-DOD Agencies.

Baseline mission support activities at DPG are summarized in Section 2.1.8, Baseline Mission Support Activities. The SDP includes replacement of the MAAF runway for mission support activities expected to be required under the Proposed Action. Information about the mission support activities included in the Proposed Action is provided in Section 2.2.4, Proposed Action Mission Support Activities.

Baseline installation support activities at DPG are summarized in Section 2.1.9, Baseline Installation Support Activities. The SDP includes recommendations for installation support activities expected to be required under the Proposed Action. These include construction, demolition, renovation, and upgrades for housing and

community support functions, information management, roadways, security and counterintelligence, and utilities. Information about the installation support activities included in the Proposed Action is provided in Section 2.2.5, Proposed Action Installation Support Activities.

A comparison of the difference in baseline and Proposed Action testing, training, and research activities is provided in Table 2.2-1, Number of Testing, Training, and Research Events - Baseline versus Proposed Action. Table 2.2-1 presents the increase from baseline to the Proposed Action for number of test, training, and research events only. Mission and installation support activity increases are not presented because they are affected by other increases in addition to the number of tests, training, or research events performed at DPG. Because physical testing is performed as part of other WDTC testing activities, physical testing increases are incorporated by these other testing activities.

Table 2.2-1. Number of Testing, Training, and Research Events – Baseline versus Proposed Action.

Activity	Baseline Period Average Annual Number of Events	Proposed Action Period Average Annual Number of Events		
		Continued Baseline Events	New Events	Proposed Action Total
Testing				
Biological Defense	11	16	10	26
Chemical Defense	30	40	30	70
Conventional Munitions	2	30	4	34
Environmental Characterization and Remediation Technology	3	15	0	15
Modeling and Assessment	1	1	3	4
Smoke, Obscurant, and Illuminant	10	44	0	44
Training				
Ground	15	37	72	109
Counterterrorism	2	2	56	58
Research Support to Non-DOD Agencies	4	4	0	4
Total Number of Events	**78**	**189**	**175**	**364**

It is anticipated that the DPG workforce would increase a total of about 10 to 15 percent during the Proposed Action period. Descriptions of the Proposed Action for DPG's testing, training, and support programs follow.

2.2.1 Proposed Action Testing Activities

Baseline DPG testing activities are described in Section 2.1.5, Baseline Testing Activities. DPG would continue to implement the following eight testing programs at DPG as a major focus under the Proposed Action:

- Biological Defense Testing

- Chemical Defense Testing
- Conventional Munitions Testing
- ECRT Testing
- Modeling and Assessment Testing
- Smoke, Obscurant, and Illuminant Testing
- Physical Testing
- Support to Air Testing

These testing programs would continue to be implemented under the direction of the WDTC with the exception of support to air testing. Quantitative measures comparing baseline activities during the period 1996 to 1998 to Proposed Action activities through the next 7 years for major WDTC operations are presented in the following sections describing each testing program. All quantitative measures of future DPG activities throughout this Future Programs EIS are only estimates. There are many factors that would determine the actual future number of tests, amounts of materials used, and number of people employed at DPG.

Estimates of the future DPG activities used in the Proposed Action are not regulatory limits, but rather represent best estimates given existing information on the projected needs of the various DPG operating components.

Descriptions of the Proposed Action for each DPG testing program follow. The description of each testing program includes the following:

- Continuation of baseline mission components
- Diversification of DPG operations
- Implementation of the SDP

2.2.1.1 Biological Defense Testing

Under the Proposed Action, existing biological defense testing activities, described in Section 2.1.5.1, Biological Defense Testing, would continue and show an increase over baseline levels. Additional increases in the biological defense testing program are anticipated as the result of new biological defense tests planned to occur at DPG. The levels of baseline and Proposed Action activity for the biological defense testing program, as measured by number of tests, are summarized in Table 2.2-2, Biological Defense Testing Activity Levels as Measured by Number of Tests - Baseline versus Proposed Action.

Overall, the biological defense testing program within the Proposed Action would double from baseline levels for indoor testing, and triple from baseline levels for outdoor testing, as measured by number of tests. Biological agent and simulant use would also show substantial increases with the Proposed Action.

Table 2.2-2. Biological Defense Testing Activity Levels as Measured by Number of Tests - Baseline versus Proposed Action.

Testing Group	Testing Location	Baseline Period Average Annual Number of Tests	Proposed Action Period Average Annual Number of Tests		
			Continued Baseline Tests	New Tests	Proposed Action Total
Life Sciences Division includes Joint Contact Point/ Special Programs Division	Indoor	7	9	5	14
	Outdoor	4	7	5	12
Total Number of Average Annual Tests		11	16	10	26

Continuation of Baseline Mission Components – Under the Proposed Action, the general types and sizes of tests described in Section 2.1.5.1, Biological Defense Testing, would continue. Continuing outdoor testing activities would primarily consist of contamination avoidance and decontamination tests. Outdoor tests would continue to primarily occur annually from March through October, and would continue to have a wide range from 3 weeks to 8 months or longer. The number of annual outdoor tests for continuing baseline mission components would increase from a baseline of four tests to a Proposed Action level of seven tests. Materials used to conduct these tests would increase accordingly.

Indoor testing activities for existing mission components would primarily consist of continuation of baseline levels of protection testing and an increase in decontamination testing and contamination avoidance testing. The number of annual indoor tests for continuing baseline mission components would increase from a baseline of seven to a Proposed Action level of nine tests. Biological agent and simulant use would increase substantially from the baseline for these continuing mission components.

Diversification of DPG Operations – Representative new biological defense testing activities under the Proposed Action follow.

- Equipment certification testing - Under the Proposed Action, DPG would function as a national and international equipment certification site for first responder biological test equipment. Testing would determine whether equipment meets appropriate quality and functionality requirements. The addition of certification testing would help to establish DPG as a center for

testing decontamination materials and detectors. All tests would be conducted indoors. It is projected that five to ten new items would be tested annually for a 30-day period and each item would be tested five times with simulants inside a chamber and three times with pathogens inside a chamber to obtain statistical reliability. Only those simulants and agents that have been approved for use at DPG would be used in these tests.

- Private industry/academia testing - Private industry/academia testing consists of nongovernment entities with a need to test biological first responder equipment for developmental purposes. Such testing could be performed by any private company that desires to develop a decontamination or detector system. DPG is working to recruit this type of work. Biological simulant/agent types proposed for use are the same as for equipment certification testing.

- Counterterrorism testing - Counterterrorism testing within the biological defense testing program would include DOD initiatives to test newly developed biological defense detection and protection equipment that is required to effectively prepare for potential terrorist incidents.

- Standoff detector testing - For this testing, detectors are located at distances of 1 to 10 km from the biological simulant cloud to analyze cloud formation and dispersion.

- Point biological detector testing - Testing of point detection systems would evaluate the early warning capabilities of developmental biological aerosol systems. This testing would be conducted outdoors with biological simulants. The simulants would be disseminated to imitate techniques that might be employed by the enemy. The detection systems are designed to trigger, collect, detect, identify, and warn the operator of the presence of airborne biological simulants. These systems may include a base station for control, a network of point detectors for collection and identification of the simulants, or a laser system for tracking the simulant cloud. DPG personnel would be responsible for managing the test scenario, logistics, and for the dissemination and characterization of the simulant aerosol. Characterization of the simulant aerosol includes determining the aerosol concentration, location, and particle size. Biological simulants used in this type of testing could include gamma-irradiated vaccine strains of pathogens.

- Operational testing of detector systems - Operational testing of point and standoff biological detection systems would provide the final evaluation of equipment and systems. These large outdoor tests would usually require military personnel as

operators of the equipment and testing conditions designed to simulate battlefield conditions. Biological simulants would be disseminated and the test items must trigger, collect, detect, and identify the airborne simulant aerosols. Testing would usually be conducted over large areas and movement of troops and equipment would be evaluated as well as system performance. DPG personnel would be responsible for managing the test scenario, logistics, and for the dissemination and characterization of the simulant aerosol. Biological simulants used in this type of testing could include gamma-irradiated vaccine strains of pathogens.

- Large-scale aircraft contamination control field testing - The objective of this testing would be to evaluate the way the military handles aircrew, passengers, and cargo in a chemically or biologically contaminated aircraft. Testing would validate recommended procedures for protecting aircrew and passengers and increasing their chances of survival, reducing stress and aircrew fatigue, and protecting ground support personnel. Testing would also validate recommended procedures for protecting equipment and cargo from chemical and biological contamination; reducing contamination transfer; and decontaminating ground support equipment, cargo, and the aircraft's interior. This testing would include smoke and fume elimination as well as both ground and flight operations.

- Challenge testing - Testing would challenge biological detection systems with pathogen aerosols including bacteria, viruses, and toxins. This new work would be conducted indoors in the CAC.

- Forensics testing - Testing would be performed to ascertain, confirm and/or identify the presence of suspected biological and/or chemical agents. DPG personnel would conduct the testing in the forensics laboratory that would be open to Federal and state agencies.

- Test methodology and technology development - This would consist of developing methodologies and studying the latest technologies to support testing. Methodology studies would be performed indoors in chambers and the laboratory as well as outdoors in small-scale field trials. Methods and technologies would be evaluated to improve techniques of bioaerosol dissemination, characterization, sampling, assay, and identification. Biological simulants would usually be used to support these efforts.

These new tests would add an estimated five indoor and five outdoor tests to the biological defense testing program annually during the period covered by this Future

Programs EIS. Biological agent and simulant usage for these new tests would be substantially increased compared to baseline levels.

Implementation of the SDP – Real property proposals for the biological defense testing program in the Proposed Action include the following.

- LSTF Annex - Construct a permanent building to house test research, design, analysis, and report writing area for scientists; an area for calibration, maintenance and repair of sensitive instruments used in laboratory operations; and a room for electron microscope operations.
- Investigate construction of a new storage building at the LSTF for storing outdoor test equipment and electrical power generators.
- Detector Challenge Facility - Investigate requirements to construct a new test chamber for chemical/biological simulants capable of challenging detectors in full operational mode to conduct tests associated with flow around vehicles. A wind tunnel and the building enclosing the wind tunnel are needed. This facility should be located near the BMTF and would be used for biological defense, chemical defense, modeling and assessment, and smoke and obscurant testing activities.
- Maintain and restore Fungus Building.
- Construct a new command and control facility at Downwind Grid to serve as the control point for all testing activities on Downwind Grid.

2.2.1.2 Chemical Defense Testing

Under the Proposed Action, existing chemical defense testing activities described in Section 2.1.5.2, Chemical Defense Testing, would increase over the baseline level through the 7-year Proposed Action period. Additionally, a substantial increase in chemical defense testing activities due to new tests is expected to be available and needed. Table 2.2-3, Chemical Defense Testing Activity Levels as Measured by Number of Tests - Baseline versus Proposed Action, summarizes the levels of baseline and Proposed Action activity for the chemical defense testing program, as measured by number of tests.

Overall, the chemical defense testing program within the Proposed Action would approximately double from baseline levels for indoor testing as measured by number of tests, and increase from one test to eight tests for outdoor testing. Chemical agent and simulant use would also show substantial increases with the Proposed Action.

Table 2.2-3. Chemical Defense Testing Activity Levels as Measured by Number of Tests - Baseline versus Proposed Action.

Testing Group	Testing Location	Baseline Period Average Annual Number of Tests	Proposed Action Period Average Annual Number of Tests		
			Continued Baseline Tests	New Tests	Proposed Action Total
Chemical Test Division includes Joint Contact Point/Special Programs Division	Indoor	29	36	26	62
	Outdoor	1	4	4	8
Total Number of Average Annual Tests		30	40	30	70

Continuation of Baseline Mission Components – Under the Proposed Action, the general types and sizes of tests described in Section 2.1.5.2, Chemical Defense Testing, would continue. Continuing outdoor testing would primarily consist of detector and decontamination testing, and would continue to primarily occur annually from March through October. The annual number of outdoor tests for continuing mission components in the chemical defense testing program would rise from one during baseline to four during the period covered by this Future Programs EIS. Materials used to conduct these tests would rise accordingly.

Existing indoor testing efforts would also continue and include decontamination and PPE testing. The level of indoor testing for continuing mission components, as measured by number of tests, would increase from 29 in the baseline to a projected 36 tests annually during the Proposed Action period. Materials used to conduct these tests would rise accordingly.

The chemical defense testing program would have an increased participation in the existing Joint Services' joint field trial activities, including providing laboratory support for these activities.

Diversification of DPG Operations – Representative new chemical defense testing activities under the Proposed Action follow.

- Battlefield agent destruction testing - Testing would consist of impacting a building containing drums and other containers filled with the chemical simulant triethyl phosphate (TEP) with a CM. Testing would determine how much of the TEP burns, and ultimately if a CM can adequately eliminate a storage facility. This would be an AF test, but DPG would be the local operator/project manager. DPG would build the target and analyze the samples.

- Seaport debarkation testing - This outdoor testing would consist of decontamination testing in different simulated seaport conditions.

- Collective protective equipment testing - Testing would determine the effectiveness of combinations of protective equipment under different conditions.

- Mask testing - This indoor testing would involve the testing of general-purpose masks and commercial masks for protection from the effects of chemical agent(s).

- Joint field trials - Testing would occur every other year and would primarily involve indoor chamber facilities but would also have an outdoor field component.

- Droplet dispersion testing - Testing would involve modifying the BMTF with construction of a 200- to 300-m (700- to 1,000-ft) tube to wind out of and then back into the BMTF. Chemical agent would be dispersed through this tube to evaluate how the agent reacts. The dispersion pattern and droplet size would then be measured. The purpose is to analyze what would happen if a chemical agent-filled missile was shot down but not all the agent within the missile was destroyed.

- Counterterrorism testing - Counterterrorism testing within the chemical defense testing program would include testing of newly developed chemical defense detection and protection equipment that is required to effectively prepare for potential terrorist incidents.

- Forensics testing - This testing would support analysis of potential chemical threats that are identified by first responders, active and reserve component military units, and support personnel and brought to DPG for initial identification.

- Test technology and method development - Outdoor and indoor test technology would be developed to maintain up-to-date test methods for new generations of detector, force protection, or decontamination devices and operations. An outdoor test involving chemical simulants and indoor tests using either chemical agents or simulants and various interferents would be conducted.

- Operational testing - Testing would involve new equipment developments that have been slowly moving toward field and operational testing. For example, operational tests of new detector vehicles would involve chemical simulant dispersion during movement of vehicles at test grids and other areas.

- Assembled Chemical Weapons Assessment (ACWA)-type testing – ACWA-type demilitarization tests are expected to occur to support the non-stockpile

programs. The ACWA program is an Army program for demilitarization options for chemical agent weapons and bulk chemical agent that have been stockpiled by the U.S.

These new tests would result in an estimated 26 indoor and four outdoor tests to the chemical defense testing program annually during the period covered by this Future Programs EIS. Chemical agent and simulant usage for these new tests would be substantially increased compared to baseline levels.

Implementation of the SDP – Real property proposals for the chemical defense testing program include the following.

- Detector Challenge Facility - Investigate requirements to construct a new test chamber for chemical/biological simulants capable of challenging detectors in full operational mode to conduct tests associated with flow around vehicles. This facility would also be used for biological defense, modeling and assessment, and smoke and obscurant testing activities.

- Protective Equipment Test Facility - Construct a new facility that would allow a wider range of testing than provided by the DTC. This new facility should consist of six stainless steel environmental chambers for testing PPE on individuals doing decontamination work in a contaminated chemical warfare environment. This facility should be located near the BMTF.

- 3X Staging Facility - Construct high-bay metal building to allow needed test preparation space for an upcoming test while an existing test is in progress. This would increase the efficiency of test chamber use and provide significant savings to the test managers while allowing for more critical data to be generated in a timely manner.

- DTC Annex - Investigate requirements for construction of a permanent building to replace several temporary structures. Several activities including test instrumentation, instrumentation monitoring, personnel preparation and changing rooms, personnel recovery, medical support, test preparation and setup, and ingress and egress are conducted in these separate temporary structures. The DTC Annex would increase testing efficiency and improve coordination.

- Investigate requirements to repair and restore the laboratory building at the CCTF to a usable condition for support to present and future chemical testing requirements. Upgrade the heating, ventilation, and air conditioning (HVAC) systems to operate within current building codes.

- Investigate and quantify all maintenance shortfalls in the Chemical Agent Test Chamber, the old test chamber in Carr. Renovate this building to bring this test facility up to its full operational capacity.

2.2.1.3 Conventional Munitions Testing

Under the Proposed Action, existing conventional munitions testing at DPG, described in Section 2.1.5.3, Conventional Munitions Testing, would continue.

Conventional munitions testing is anticipated to increase substantially over baseline levels through the 7-year Proposed Action time period. An additional small increase under the Proposed Action is anticipated as the result of new conventional munitions tests planned to be conducted at DPG.

Table 2.2-4, Conventional Munitions Testing Activity Levels as Measured by Number of Tests - Baseline versus Proposed Action, reflects this anticipated level of activity in terms of projected number of tests. All conventional munitions testing activities would continue to be conducted outdoors only.

Table 2.2-4. Conventional Munitions Testing Activity Levels as Measured by Number of Tests - Baseline versus Proposed Action.

Testing Group	Testing Location	Baseline Period Average Annual Number of Tests	Proposed Action Period Average Annual Number of Tests		
			Continued Baseline Tests	New Tests	Proposed Action Total
Obscurants & Environmental Test Branch includes Special Programs Division	Indoor	0	0	0	0
	Outdoor	2	30	4	34
Total Number of Average Annual Tests		2	30	4	34

Continuation of Baseline Mission Components – Under the Proposed Action, the general types and sizes of tests described in Section 2.1.5.3, Conventional Munitions Testing, would continue. The level of testing would increase substantially, with the annual number of tests rising from a baseline level of two to a Proposed Action level of 30 for these continuing mission components. New customers for these types of tests include Canada and the U.S. Navy. The most common type of conventional munitions test at DPG would continue to be the LAT, in which a munition is tested for approval by the DOD. Material use would rise as well for these tests compared to baseline.

Diversification of DPG Operations – Representative new conventional munitions testing activities under the Proposed Action follow.

- New mortar and artillery tests, as follows (Bodrero, 1999b):
  - Fuzes, high explosive rounds, and specialty rounds such as leaflet dispensers
  - Weapon systems and fire control systems
- New explosive system tests including:
  - Tests on cratering charges and mine clearing systems
  - "Slow cook off tests" where explosives are heated in a furnace to evaluate their durability

These new tests would result in an estimated four additional outdoor tests annually during the Proposed Action period. The number of rounds used in these new tests would rise substantially compared to the baseline use of materials.

Implementation of the SDP – There are no real property proposals for the conventional munitions testing program.

2.2.1.4 Environmental Characterization and Remediation Technology Testing

Under the Proposed Action, existing ECRT testing activities at DPG, described in Section 2.1.5.4, Environmental Characterization and Remediation Technology Testing, would continue.

Continuing ECRT tests are anticipated to substantially increase over the baseline level through the 7-year Proposed Action time period. No new types of tests are projected for the ECRT testing program.

Table 2.2-5, Environmental Characterization and Remediation Technology Testing Activity Levels as Measured by Number of Tests - Baseline versus Proposed Action, shows the Proposed Action ECRT test activities, as measured by number of tests. The annual level of continuing ECRT activities would increase from three tests in the baseline period to 15 under the Proposed Action.

Table 2.2-5. Environmental Characterization and Remediation Technology Testing Activity Levels as Measured by Number of Tests - Baseline versus Proposed Action.

Testing Group	Testing Location	Baseline Period Average Annual Number of Tests	Proposed Action Period Average Annual Number of Tests		
			Continued Baseline Tests	New Tests	Proposed Action Total
Obscurants & Environmental Test Branch	BangBox™	3	3	0	3
	Cryofracture	0	0	0	0[a]
	ODOBi	0	0	0	0[a]
	Suppressive Shield	0	12	0	12
	Outdoor	0	0	0	0
Total Number of Average Annual Tests		3	15	0	15

a Even though there are no Proposed Action activities for the Cryofracture Test Facility and the ODOBi, these facilities remain part of the environmental characterization and remediation technology test program infrastructure.

ODOBi Open Detonation/Open Burn, Improved

Continuation of Baseline Mission Components – Existing ECRT testing activities would continue under the Proposed Action. A total of 15 tests annually is projected during the Proposed Action period, including 12 tests planned to occur in the Suppressive Shield Facility. Testing plans for the Suppressive Shield Facility include:

- Weathering studies
- Decontamination studies
- Penetration studies

ECRT tests at the BangBox™ through the 7-year Proposed Action time period include:

- Mass balance characterization of burning munitions or energetics
- Analysis of smokes
- Characterization of emissions from muzzle blasts and burns

Implementation of the SDP – Real property proposals for the ECRT testing program include the following.

- Determine if future mission will support construction of an 18-kg (40-lb) BangBox™ to expand capabilities of detonating explosives within the BangBox™.

- Determine if future mission will support moving the ODOBi facility from its current location to a new location near the Suppressive Shield Facility for collocation of these similar activities.

2.2.1.5 Modeling and Assessment Testing

Under the Proposed Action, existing modeling and assessment testing at DPG, described in Section 2.1.5.5, Modeling and Assessment Testing, would continue.

Modeling and assessment testing is anticipated to increase over the baseline level through the 7-year Proposed Action time period as a result of new types of tests.

Table 2.2-6, Modeling and Assessment Testing Activity Levels as Measured by Number of Tests - Baseline versus Proposed Action, shows this increase as measured by number of tests.

Table 2.2-6. Modeling and Assessment Testing Activity Levels as Measured by Number of Tests - Baseline versus Proposed Action.

Testing Group	Testing Location	Baseline Period Average Annual Number of Tests	Proposed Action Period Average Annual Number of Tests		
			Continued Baseline Tests	New Tests	Proposed Action Total
Meteorology and Obscurants Division	Indoor	0	0	1	1
	Outdoor	1	1	2	3
Total Number of Average Annual Tests		1	1	3	4

Continuation of Baseline Mission Components – Under the Proposed Action, the general types and sizes of tests described in Section 2.1.5.5, Modeling and Assessment Testing, would continue. The level of continuing baseline tests is relatively small compared to other testing programs, with the baseline of one outdoor test remaining at one outdoor test with the Proposed Action. No major changes in equipment or areas used to perform outdoor testing are projected.

Diversification of DPG Operations – Representative new modeling and assessment testing activities under the Proposed Action follow.

- Addition of indoor testing to the capabilities of the Meteorological Operations Branch and the Modeling and Assessment Branch

- Use of smoke and obscurant ordnance rounds and materials for flow visualization in outdoor tests

- Possible performance of additional air quality monitoring
- Modeling and meteorological support to counterterrorism training/testing activities

Levels of these new tests under the Proposed Action would be relatively small, with one new indoor test and two new outdoor tests projected annually during the period covered by this Future Programs EIS. Materials used in the new tests would rise proportionately to the new testing level.

Implementation of the SDP – Investigate requirements to construct a new test chamber, identified as the Detector Challenge Facility, for validating dispersion models. This facility would also be used for biological defense, chemical defense, and smoke and obscurant testing activities.

2.2.1.6 Smoke, Obscurant, and Illuminant Testing

Under the Proposed Action, existing smoke, obscurant, and illuminant testing activities at DPG, described in Section 2.1.5.6, Smoke, Obscurant, and Illuminant Testing, would continue.

Smoke, obscurant, and illuminant testing activities are anticipated to substantially increase over the baseline level through the 7-year Proposed Action time period. No new types of tests are planned.

Table 2.2-7, Smoke, Obscurant, and Illuminant Testing Activity Levels as Measured by Number of Tests - Baseline versus Proposed Action, reflects this anticipated increase in terms of projected number of tests.

Table 2.2-7. Smoke, Obscurant, and Illuminant Testing Activity Levels as Measured by Number of Tests - Baseline versus Proposed Action.

Testing Group	Testing Location	Baseline Period Average Annual Number of Tests	Proposed Action Period Average Annual Number of Tests		
			Continued Baseline Tests	New Tests	Proposed Action Total
Obscurants & Environmental Test Branch	Indoor	0	0	0	0
	Outdoor	10	44	0	44
Total Number of Average Annual Tests		10	44	0	44

Continuation of Baseline Mission Components – Under the Proposed Action, the general types and sizes of tests described in Section 2.1.5.6, Smoke, Obscurant, and Illuminant Testing, would continue. No major changes in equipment or areas to

perform these continuing outdoor tests are expected to occur. Much of the increased level of smoke, obscurant, and illuminant testing would support biological defense and chemical defense testing activities. With the Proposed Action, existing smoke, obscurant, and illuminant tests that would be substantially expanded include:

- Military equipment performance testing
- Smoke and obscurant support for training activities, for example, simulating a smoke environment
- Smoke and obscurant support to counterterrorism training and testing activities
- Expanded smoke, obscurant, and illuminant developmental testing activities, rather than production activities

The annual level of testing for existing smoke, obscurant, and illuminant mission components would rise from ten tests in the baseline period to 44 tests in the Proposed Action period. All tests would continue to be conducted outdoors. Materials used for these additional continuing mission tests would rise proportionately to baseline material usage.

Diversification of DPG Operations – There are no new tests proposed within the smoke, obscurant, and illuminant testing program.

Implementation of the SDP – Investigate requirements to construct a new test chamber, identified as the Detector Challenge Facility, capable of challenging detectors with smokes and obscurants. This facility would also be used for biological defense, chemical defense, and modeling and assessment testing activities.

2.2.1.7 Physical Testing

Under the Proposed Action, existing physical testing activities at DPG, described in Section 2.1.5.7, Physical Testing, would continue.

Under the Proposed Action, physical testing activities are projected to show a slight increase in pace with most other testing programs conducted by the WDTC.

Because physical testing activities are generally performed as part of other WDTC testing programs, the type and level of physical testing activities are not specifically identified in this discussion. Rather, physical testing activities are already included within the other testing components of the Proposed Action.

Implementation of the SDP – The only real property proposal for the physical testing program is to investigate relocating the Vibration Facility, X-ray Facility, and Black Powder Operation to a new location at Carr where the receiving area is located.

2.2.1.8 Support to Air Testing

Under the Proposed Action, DPG would continue to support AF testing activities as described in Section 2.1.5.8, Support to Air Testing.

Continuation of Baseline Mission Components – Existing ground support systems and infrastructure used by the AF would be maintained and upgraded to meet future AF testing requirements. Ground based tracking systems gather and transmit optical data from remote locations on the UTTR to evaluate air tests and to verify flight performance. The 388th RANS would continue to process this data at Avery. Examples of continuing activities for ground support systems that involve DPG personnel or other resources include the following.

- Maintaining the existing HAMOTS sites used to track low-flying aircraft equipped with vehicle transponder units and the HAMOTS Upgrade System, which can provide complex flight information for multiple aircraft.
- Maintaining and upgrading the existing Cine-T and Cine-S camera sites used to track and record airborne objects.
- Upgrading the FTS used for PGMs that do not adhere to prescribed flight paths to increase redundancy and improve impact prediction.
- Maintaining the AF telemetry site on Granite Peak.
- Maintaining and/or upgrading the electronic communications system at Avery.
- Increasing temporary storage capacity for DU at Avery storage vaults.
- Continuation of the transition from high speed film to digital photography, which reduces the need to develop video film at the Avery photo laboratory.
- Maintaining and/or upgrading DPG's surface road transport network to allow access to monitoring sites and targets.
- Maintaining and upgrading MAAF runway capabilities.
- Maintaining on-installation housing for Avery employees at English Village.

Diversification of DPG Operations – DPG efforts supporting AF activities are expected to remain the same as under baseline conditions. No new DPG operations to support AF testing activities are anticipated under the Proposed Action.

Implementation of the SDP – There are no specific real property proposals for DPG's support of AF testing activities. AF testing activities would be substantially supported by MAAF improvements that are discussed under Section 2.2.4, Proposed Action Mission Support Activities.

2.2.2 Proposed Action Training Activities

Baseline DPG training activities are described in Section 2.1.6, Baseline Training Activities. Ground training, counterterrorism training, and support to air training activities would continue to occur at DPG under the Proposed Action.

The Proposed Action for training at DPG consists of marked increases in both ground training and counterterrorism training.

For both ground and counterterrorism training, baseline activities would continue at more intense levels. Training activities at DPG are also anticipated to increase substantially due to activity diversification through the 7-year Proposed Action time period. For each training activity, the following is described.

- Continuation of baseline mission components
- Diversification of DPG operations
- Implementation of the SDP

2.2.2.1 Ground Training

Under the Proposed Action, baseline ground training activities at DPG, described in Section 2.1.6.1, Ground Training, would continue.

Existing ground training activities would increase substantially over the baseline level through the 7-year Proposed Action time period.

Table 2.2-8, Ground Training Activity Levels - Baseline versus Proposed Action, and Table 2.2-9, Baseline and Proposed Action Ground Training Activity, summarize the levels of baseline and Proposed Action activity for ground training.

Table 2.2-8. Ground Training Activity Levels - Baseline versus Proposed Action.

Training Type	Baseline Number (Annual Average, 1996-1998)	Proposed Action Number (Annual Average)
Artillery		
Events	4	18[a]
Days	14	114
Troops	980	1,300
Vehicles	360	370
Engineer and Firefighter		
Events	2	9
Days	7	37
Troops	170	890
Vehicles	30	420
Special Operations[b]		
Events	4	40
Days	45	120
Troops	130	1,300
Vehicles[c]	12	84
Army Aviation		
Events	4	13
Days	10	34
Troops	230	370
Vehicles[c]	36	70
Joint Exercises		
Events	1	1
Days	14 to 48	15 to 45
Troops	1,800	2,900
Vehicles[c]	480	430
Reserve Component Chemical Units		
Events	0	3
Days	0	21
Troops	0	1,000 to 4,000
Vehicles	0	100 to 600
Support to Fort Leonard Wood/U.S. Army Chemical School		
Events	0	25
Days	0	100
Troops	0	800
Vehicles	0	18

a Includes Paladin activities
b Includes military intelligence units, law enforcement special weapons and tactics teams (SWAT) and infantry units
c Does not include rotary wing aircraft

Table 2.2-9. Baseline and Proposed Action Ground Training Activity.

Measure of Training Activity	Average Annual Baseline Number	Average Annual Proposed Action Number
Acres Used for Bivouac/Assembly	66,000	75,000
Acres Used for Firing Point	4,600	7,500

Table 2.2-9. Baseline and Proposed Action Ground Training Activity.

Activity		
Troops in Off-Road Areas	3,300	6,800
Tracked Vehicles	110	170
Vehicles Greater than 5 Tons	230	350

Continuation of Baseline Mission Components – Under the Proposed Action, the general types of ground training activities described in Section 2.1.6.1, Ground Training, would continue. Continuing ground training activities would include the following.

- Artillery Training - M109 series self-propelled (tracked vehicle) artillery exercises, towed artillery exercises, and command and control operations would continue under the Proposed Action. The baseline activity of battalion-sized annual training exercises involving both self-propelled and towed artillery units would increase in frequency. Additionally, weekend artillery training events are anticipated.

- Engineer and Firefighter Training - One annual engineer training event would continue to occur as would weekend events for both engineers and firefighters.

- Special Operations Training - Existing training activities would substantially increase from baseline activities under the Proposed Action.

- Army Aviation - The Proposed Action calls for continued aviation training flights by Utah NG, other reserve components, and active duty units. It includes a modest expansion, particularly additional air observation missions performed in conjunction with Paladin fielding.

- Joint Exercises - The Proposed Action calls for continuation of one joint training exercise per year with an increase in intensity of the exercise from one artillery with one Apache helicopter battalion to two artillery battalions with three helicopter battalions now supported by engineer operations. The number of associated vehicles would remain approximately the same, while the number of people involved in the joint exercises would increase approximately 60 percent.

Diversification of DPG Operations – Diversified ground training activities are proposed to occur in both the baseline activity programs and through totally new ground training activities at DPG. Representative activities that would diversify ground training at DPG under the Proposed Action follow.

- Artillery Training using the M109A6 Paladin Self-Propelled Howitzer Ground Training Activities - A major component of ground training activities included in the Proposed Action would be fielding of the M109A6 155-mm Paladin Self-Propelled Howitzer by the Utah NG and other state NG artillery units. The M109A6 Paladin represents an upgrade of the M109 series 155-mm self-propelled howitzer, which was used during baseline artillery activities and has been in service with the Army since the 1960s. The Paladin program was a major product improvement program aimed at providing enhancements to the reliability, availability, maintainability, survivability, lethality, and responsiveness of the older model howitzers. These system improvements include:

  - Armament changes
  - Crew safety enhancements
  - Automotive upgrades
  - Onboard computer and navigation systems
  - Improved vehicle electronics and cooling
  - Mechanical and suspension improvements

  The tracked Paladin vehicle is powered by a 2-cycle diesel, 440 hp, DDEC 8V71T engine from Detroit Diesel Corporation. The vehicle has a range of 340 km (210 mi) with a maximum speed of 64 kph (40 mph). The Paladin's combat weight is 29,000 kg (63,600 lb). The vehicle is 9.75 m (32 ft) long, 3.15 m (10.3 ft) wide, 3.25 m (10.6 ft) high, and exerts ground pressure of 10.95 psi. It has a fuel capacity of 511 L (135 gallons) of diesel fuel.

The Paladin Self-Propelled Howitzer with the field artillery ammunition support vehicle is a major component of diversified ground training at DPG.

An integral component of the Paladin howitzer system is the M992A2 field artillery ammunition support vehicle (FAASV), essentially an M109 carriage that transports additional ammunition for the Paladin howitzer. The FAASV's performance specifications are similar to those for the Paladin howitzer. The

FAASV's combat weight is 26,300 kg (58,000 lb), and it exerts a ground pressure of 10.95 psi. The FAASV would replace the M548 ammunition carrier in Paladin batteries. Once fielded, the Paladin and FAASV will replace the M109A5 and M548A1 as the largest tactical system employed at DPG.

To support the new Paladin artillery program, the Utah Army NG proposes using 300 firing points throughout DPG, including new firing points at Camels Back Ridge and a new training area at Granite Peak. Paladin vehicles would be authorized to use existing artillery firing points at DPG (see Figure 2.1-7, Baseline Locations of Ground Training Activities) with the following exceptions (Merritt, M., 2001):

- Tracked vehicles such as Paladin are not permitted to use firing points within the Cedar Mountain Training Area.
- A specific portion of firing points within the White Sage Training Area could be used for Paladin training purposes, but Paladin live fire from these positions would not be permitted.

Each of the new Paladin firing points would consist of a 2,000 by 1,000 m (6,000 by 3,000 ft) ellipse, occupied for no longer than 15 minutes or three rounds. Each firing point would typically be occupied by 1 to 3 guns. The Paladin system would frequently and routinely re-deploy between firing positions. Maximum ranges of the Paladin would be 24,000 m (78,745 ft) with conventional munitions, or 33,000 m (108,275 ft) using High Explosive Rocket Assisted (HERA) munitions.

As a result of the recurring movement of the Paladin howitzer system, tactical refueling is anticipated to occur more frequently and in more locations than with the other M109 series self-propelled howitzers. For some training activities, Paladin would perform tactical refueling at individual firing points at DPG under the Proposed Action. Tactical refueling would be performed as described for the baseline period in Section 2.1.6.1, Ground Training.

Management of the Paladin is included in DPG's MTAMP and the Programmatic Environmental Assessment for Fielding the Paladin Weapon System (U.S. Army Corps of Engineers Mobile District, 1997).

♦ Engineer Training - Diversified activities include:

- Demolition operations with 13.6- to 227-kg (30- to 500-lb) charges detonated at an undecided site

- Vertical construction operations consisting of upgrading buildings at DPG
- Multiple new sites for quarrying operations at Little Granite, Camels Back Ridge, East Granite Mountain, and Wig Mountain

♦ Special Operations Training - Diversified activities include offensive and defensive maneuvers, isolation facility, mortar range, and land navigation operations that would increase the annual average number of people from 130 during the baseline period to 1,300 under the Proposed Action.

♦ Joint Exercises - The Utah NG proposes the following additional activities that may take place as a component of joint exercises, or during individual unit training (Nelson, 1999):

- Firing incendiary devices, such as smoke, illumination rounds, and white phosphorus, into the White Sage Impact Area
- Using tracked vehicles in the Wig Mountain Training Area
- Establishing new firing points at the Wig Mountain Training Area and new bivouac sites near the Cedar Mountains and around Granite Peak
- Establishing an equipment maintenance facility at the Utah NG Vehicle Maintenance Building in English Village, and a nearby vehicle wash facility
- Developing an ammunition supply point for Category 1 ammunition (rockets and missiles)
- Constructing secondary containment sites for aviation refueling operations
- Identifying and designating multiple drop zones and landing zones to support air insertion and airborne operations, including using the runway at MAAF as an air assault strip
- Including an Army Reserve component for smoke generating companies or battalions employing smoke during tactical exercises

♦ Reserve Component Chemical Units – Reserve Component Chemical Units ranging in size from Chemical Companies through Chemical Brigades would routinely train at DPG under the Proposed Action. This would be a new ground training program at DPG. These chemical units would typically perform smoke generation, reconnaissance, and decontamination as described below.

Smoke generation would involve the operation of smoke generators mounted on the M56 Coyote (a HMMWV mounted smoke generator) that burns fog oil to produce obscurant smoke. The M56 Coyote is a motorized system mounted on a

HMMWV. The Coyote HMMWV has a gross vehicle weight of 5,216 kg (11,500 lb), and can produce 90 minutes of visual and 30 minutes of infrared obscuration without re-supply. Typically, a platoon of six Coyotes would be deployed simultaneously. Fog oil would be transported in 208-L (55-gallon) drums, and the fog oil would be transferred from these drums to the smoke generators with the use of small hand-operated or electrical pumps. The empty 208-L (55-gallon) drums may contain fog oil residue, and would be treated as fuel contaminated drums by DPG, as discussed in Section 3.13, Materials and Wastes. DPG Range Control would approve the location and operation of smoke generators, and provide wind and climate restrictions for their operation. The Smoke Generators (Wolf and Coyote) would probably not conduct cross-country operations.

Under the Proposed Action, mechanized chemical units employing the M58 Wolf Smoke Generator System (an M113 Armored Personnel Carrier mounted smoke generator) would also train at DPG. The M58 Wolf Smoke Generator System is a tracked armored vehicle that provides obscurant screening for mechanized military units. The Wolf has a combat vehicle weight of approximately 12,247 kg (27,000 lb), can travel at speeds up to 64 kph (40 mph), and is powered by a 275 horsepower diesel engine. The Wolf has a length of 486 centimeters (cm) (192 inches), a width of 269 cm (106 inches), a height of 220 cm (87 inches) and ground clearance of 220 cm (87 inches). The Wolf has a fuel tank capacity of 360 L (95 gallons). The Wolf can produce up to 90 minutes of visual and 30 minutes of infrared obscuration without re-supply. Typically, a platoon of seven Wolves would be deployed simultaneously. Additionally, graphite oil might be introduced to generate smoke. Fog oil smoke would continue to be used under the Proposed Action.

Reconnaissance would involve the operation of a Fox six-wheeled, light-armored, reconnaissance vehicle to detect the presence of chemical and biological hazards, and then employ appropriate marking signage to warn accompanying soldiers of the appropriate hazards. The Fox M93A1 Nuclear, Biological, and Chemical Reconnaissance System is essentially a rolling laboratory that takes air, water, and ground samples and immediately analyzes them for signs of weapons of mass destruction. The Fox is intended to detect, identify, mark, sample, and report chemical, biological, and radiological contamination on a battlefield. The Fox holds a crew of three, weighs approximately 20 tons, will typically move at speeds from 32.18 to 64.4 kph (20 to 40 mph), and is capable of moving as fast as 104.6 kph (65 mph). It is powered by a 320-horsepower V8 Diesel Engine. Operation of the Fox would

involve detection activities performed on a training grid, and possibly cross-country operations. Chemical or biological simulants may be used to provide more realistic training sessions.

Decontamination involves the decontamination of large vehicles and heavy equipment potentially contaminated with chemical and/or biological agents. Decontamination training would use soap and water with common scrubbing and washing materials and equipment. Chemical or biological simulants may be used to provide more realistic training scenarios.

- Support to U.S. Army Chemical Center and School, Fort Leonard Wood, Missouri – Under the Proposed Action, DPG would provide new field training exercise support in the following areas:

  - Smoke training
  - Decontamination
  - Reconnaissance

  The purpose of this training would be to provide a location for courses at the U.S. Army Chemical School and Center, Fort Leonard Wood, Missouri to perform integrated Field Training Exercises. Approximately twice a month 20 to 50 soldiers (both trainers and trainees) would deploy from Fort Leonard Wood to DPG to perform a 3 to 5 day Field Training Exercise. The principal purpose of the Field Training Exercise would be to operate Coyote and Wolf smoke generators. Additional purposes of the Field Training Exercise would include decontamination exercises using simulants, and operation of the Fox reconnaissance vehicle using simulants. For those times when the soldiers are staying in garrison at DPG, the officers would stay at bachelor officer's quarters/visitor officer's quarters at DPG and the enlisted soldiers would stay at NG Barracks at DPG. However, the vast majority of the time they would be in the field, so housing at DPG would not be necessary. As this would be a training deployment, no permanent personnel are anticipated to be stationed at DPG. Personnel from the U.S. Army Chemical Center and School, Fort Leonard Wood, Missouri would operate the Fox, Coyote and Wolf military vehicles at DPG.

  Pre-positioning of approximately 18 wheeled and tracked vehicles from the U.S. Army Chemical Center and School, Fort Leonard Wood, Missouri may be necessary at DPG. Wheeled administrative and support vehicles would be provided by either DPG, or administrative and support vehicles would have to be pre-positioned at DPG. When not in use, these vehicles would be parked in the NG parking lot. DPG would require an additional mechanic to maintain these

vehicles, and some marginal additional maintenance activities would be mandated. The deploying soldiers might fly into Salt Lake City and use commercial transportation to DPG, or they may fly into MAAF on military or chartered aircraft. While at DPG, they would perform smoke generator operations on the level of platoon operations (6 to 7 smoke generators operating for 30 to 90 minutes at a time), using either fog oil or graphite oil. The Smoke Generators (Wolf and Coyote) would probably not conduct cross-country operations. Operation of the Fox could involve detection activities performed on a training grid, and possibly cross-country operations.

Implementation of the SDP – The following are proposed real property projects to facilitate ground training at DPG (AGEISS and HBA, 2000):

- Make permanent the existing and proposed firing points through the planting of resilient grasses or most durable vegetation in these areas to avoid further environmental damage.
- Conduct a cost-benefit analysis to determine the feasibility of constructing a small arms and machine gun range suited for weapons qualifications for a variety of users at DPG in a safe location near Wig Mountain or White Sage Training Area.
- Replace the runway at MAAF, discussed in Section 2.2.4, Proposed Action Mission Support Activities, to substantially support joint training use by the Army NG and Utah NG to include ground operations and AF operations as a Joint Air Attack Team.

2.2.2.2 Counterterrorism Training

Baseline counterterrorism training is described in Section 2.1.6.2, Counterterrorism Training. Counterterrorism training is expected to increase under the Proposed Action. The WDTC's Special Programs Division is responsible for managing counterterrorism training and coordinating with each of the military branches interested in counterterrorism training at DPG.

Continuation of Baseline Mission Components – Baseline counterterrorism training at DPG was focused on consequence management. These types of exercises would continue under the Proposed Action.

Diversification of DPG Operations – The Proposed Action for DPG consists of marked increases in counterterrorism training.

Counterterrorism training is proposed to increase from a minimal activity during the baseline period to one that would be a substantial mission component, covering all aspects of response to terrorist incidents involving suspected chemical and biological material.

Typical new counterterrorism training activities under the Proposed Action would include (Delgado, 1999):

- Periodic classroom training in and evaluation of procedures and program development for emergency first responders, personnel who are first on the scene in a terrorist incident involving or potentially involving chemical or biological agents, active and reserve component military units, and support personnel.

- Training of Federal Emergency Management Agency, Weapons of Mass Destruction Civil Support Teams (WMD-CST) members on the procedures for Crisis and Consequence Management of Terrorist Incidents involving chemical and biological weapons of mass destruction.

- On-installation classroom training primarily consisting of DOD personnel and state, local, and Federal emergency civilian responders focused on reviewing and evaluating their programs and suggesting enhancements.

- Training scenarios in which terrorist incidents are simulated to challenge civilian and military emergency first responders, active and reserve component military units, and support personnel to test their expertise and procedures. Responders would identify the situation and materiel, establish and implement a plan of action, and clean-up residues on soil, buildings, clothing, and equipment. Scenarios would include:

  - Device(s) found in a car, room, or luggage
  - Person(s) exhibiting symptoms
  - Threatening communications indicating where there would be or has been an incident

- Chemical and Biological Mock City activities for essential training in urban terrorism management.

- Support to U.S. Army Chemical School, Fort Leonard Wood, Missouri. This activity is described in Section 2.2.2.1, Ground Training. In addition to ground training exercises, support to the Fort Leonard Wood Chemical School could involve counterterrorism training exercises as well. These counterterrorism

exercises would involve the same equipment, materials, and other resources described in Section 2.2.2.1, Ground Training.

The facilities that would be used for training scenarios include Ditto, BMTF, DTC, German Village, Baker Test Facility, MAAF, Vertical Grid, Granite Peak, and the Wig Mountain Training Area (Delgado, 1999). Outdoor training encompasses detection, protection, and decontamination/containment. Primary equipment would include decontamination equipment, tankers, vans, and crime scene protective gear. For indoor and outdoor use, chemical and biological simulants used at DPG would be available, as appropriate. Indoor counterterrorism training is anticipated to involve use of chemical and biological agents already in use at DPG. Chemical agents would usually be very dilute and would be used in training with detectors and biological agents would be used in BL 3 laboratory conditions.

Two different types of personnel are anticipated to be trained in counterterrorism techniques (Delgado, 1999):

- Military personnel including:
  - WMD-CST - military units consisting of approximately 20 people to be billeted at DPG
  - International teams
  - Other DOD forces
- Nonmilitary personnel including:
  - Special reaction teams
  - Special Weapons and Tactics (SWAT) teams consisting of 20 to 30 people
  - Hazardous material teams of up to 15 people
  - International teams
  - Local, state, and Federal agencies

A total of 50 team visits, involving approximately 1,000 military employees, are anticipated per year. The size of each team visit would vary, depending upon the specific exercise. Most frequently these team visits consist of laboratory or classroom training, but some exercises may involve the use of rotary and fixed wing aircraft, and wheeled vehicles including CUCVs, HMMWVs, 5-ton trucks, 2.5-ton trucks, etc. Larger wheeled vehicles such as HEMTTs, and tracked vehicles of any kind, would not be used for these team visits (Glass and Harris, 2001).

Implementation of the SDP – The following are proposed real property projects to facilitate counterterrorism training at DPG (AGEISS and HBA, 2000):

- Identify a suitable site and construct a Chemical and Biological Mock City for urban chemical/biological training activity (AGEISS and HBA, 2000). As of January 2001, four possible sites have been identified, Cedar Mountain, Wig Mountain, Granite Peak, and Camels Back Ridge and the Cedar Mountain site is the most viable site; however, a definitive decision has not been made. It is anticipated that three to five years would be required for final site selection, design, and construction of the facility. The Chemical and Biological Mock City would provide environmental features unique to cityscapes. It would involve use of standard military pyrotechnics and training ammunition (Glass and Harris, 2001).

- Investigate potential for using the Baker Test Facility as a mock biological weapons factory for technology demonstration.

There are no demolition projects in the SDP related to counterterrorism.

2.2.2.3 Support to Air Training

Baseline DPG support to air training activities is described in Section 2.1.6.3, Support to Air Training. Under the Proposed Action, DPG would continue to support AF training activities at levels near baseline.

Continuation of Baseline Mission Components – Air-to-ground training conducted by the AF is anticipated to continue at more or less baseline levels through the 7-year Proposed Action time period. For the Proposed Action, DPG support to air training activities would remain consistent with baseline levels, as described in Section 2.1.6.3, Support to Air Training.

Diversification of DPG Operations – In addition to the upgrades to DPG ground support facilities and infrastructure described in Section 2.2.1.8, Support to Air Testing, the Proposed Action would entail some equipment-related changes, including maintaining and updating the ground support facilities and infrastructure at DPG to sustain a state-of-the-art capability for the UTTR. The following upgrades would take place to support air training under the Proposed Action:

- Improve and expand threat capabilities at the existing training impact targets on DPG, which include Baker Strong Point and the Sand Island Complex shown in Figure 2.1-5, Impact Areas for Air Testing and Training.

- Update the weapons scoring system at Baker Strong Point to a more accurate system, the Weapons Impact Scoring System.
- Expand mini-Multiple Threat Emitter Systems at the Sand Island Complex and Baker Strong Point. These are simulated air defense systems mounted on all-terrain vehicles.
- Develop and provide a laser scoring system, possibly to include a system at Baker Strong Point.

Implementation of the SDP – The Proposed Action contains no new construction or demolition components from the SDP relevant for support to air training.

2.2.3 Proposed Action Research Support to Non-DOD Agencies

Existing research support activities occurring at DPG are described in Section 2.1.7, Baseline Research Support to Non-DOD Agencies. Cosmic ray research would continue under the Proposed Action. The University of Utah plans to continue cosmic ray research at DPG through the Proposed Action time period at the baseline level of activity.

The Snake Array Cosmic Ray research project may result in building several more detectors similar to those at the Camels Back Ridge site. DPG's existing cosmic ray facility would be the northern part of the Snake array. Any potential new sites for additional detectors would be located outside of DPG and "snake" down the western side of Utah, ending in Millard County (Matthews, 1999a). This would not increase the number of tests or other cosmic ray research activities, although the capabilities of the facility would be enhanced and expanded.

There are no construction or demolition projects in the SDP related to cosmic ray projects or to other research support to non-DOD agencies.

2.2.4 Proposed Action Mission Support Activities

Baseline mission support activities at DPG are summarized in Section 2.1.8, Baseline Mission Support Activities. Mission support activity levels are expected to increase for the Proposed Action.

Continuation of Baseline Mission Components – Baseline mission support activities are expected to continue and increase under the Proposed Action.

Diversification of DPG Operations – No new mission support activities are proposed under the Proposed Action.

Implementation of the SDP – Under the Proposed Action, replacement of the key runway at MAAF is proposed to avoid closing this facility and to provide more operational flexibility for landings of a variety of aircraft at DPG. Damaged airfield lighting systems would also be replaced (AGEISS and HBA, 2000).

2.2.5 Proposed Action Installation Support Activities

Baseline installation support activities at DPG are summarized in Section 2.1.9, Baseline Installation Support Activities. Installation support activity levels are expected to increase for the Proposed Action to support the increases in testing and training under the Proposed Action. Real property improvements for installation support activities are substantial to upgrade DPG's facilities to support DPG's goal of being the world's premier test center for chemical and biological defense systems.

Continuation of Baseline Mission Components – Baseline installation support activities are expected to continue and increase under the Proposed Action.

Diversification of DPG Operations – No new installation support activities are proposed under the Proposed Action.

Implementation of the SDP – Under the Proposed Action, a substantial number of installation support construction projects, renovations, repairs, and demolitions are proposed to DPG's real property (AGEISS and HBA, 2000). These real property proposals relate to the installation support activities of general support functions, housing and community support functions, information management, roadways, security and counterintelligence, and utilities. Proposals for general support functions would increase operational efficiencies by minimizing delays from travel for parts and services, provide necessary warehousing space, relocate three operations at Carr to maintain safe distances from explosive testing, and ensure that building revitalization alternatives are evaluated before demolition. Housing and community support function proposals are important to provide an appropriate quality of life for the work force. Information management proposals would improve communications by relocating communication activities from two locations to one and upgrading some communication systems. Roadway improvements are important for safety concerns as well as appearance. Security and counterintelligence proposals are to ensure security is not compromised. Also included in this proposal would be the acquisition of one utility helicopter, UH-1, to provide support for DPG security, fire protection, training and testing activities. Proposals to improve or add new utilities are to maximize efficiency, ensure health and safety standards are being met, and upgrade substandard facilities to meet current construction and operational codes.

Details of the SDP proposals for installation support follow.

- General support function proposals include:
  - Construct a general item repair shop attached to the Vehicle Maintenance Shop to accommodate all shop functions and to maintain and repair mobile generators and associated equipment used to support testing activities.
  - Conduct a space utilization survey to quantify and qualify existing space requirements for warehousing and storage at DPG. Allow a contingency for growth and design and construct a new climate-controlled warehouse/storage facility to serve English Village.
  - Ensure that revitalization alternatives are examined before buildings are placed on the demolition list to eliminate uncertainties concerning ideas for adaptive reuse as for the old Headquarters Building, Communications Center and General Purpose Maintenance Facility.
- Housing and community support function proposals include:
  - Investigate and conduct a cost-benefit analysis of renovating three 1950s housing units that are serving as visitors quarters in English Village into a modern Army hotel operation for official and temporarily assigned personnel versus construction of a new visitors quarters at English Village.
  - Investigate partnering with a major hotel provider for new and improved facilities that meet Army standards.
  - Construct a new temporary lodging facility at English Village.
  - Demolish the existing golf clubhouse and maintenance building and construct a new clubhouse and supporting facility.
  - Renovate and construct an addition to the existing youth center to meet standard of modern youth center operations, to accommodate a middle school program, and to bring the total space up to that of Army standards.
  - Refinish the exterior of all Mountain View housing units with a styrofoam board, heavy-duty fiberglass mesh, and high quality stucco finish.
  - Replace the shingles on the east and west Wherry housing units.
  - Construct a new barracks at English Village.

- Information management proposals include:
  - Identify relocation area and move materials from Above Ground Oil Storage Facility to accommodate the move of the communications technicians and communication materials from the Communications Center and General Purpose Maintenance Facility to the Above Ground Oil Storage Facility.
  - Investigate construction of an addition to the Communication Facility for relocation of communication technicians and communication materials from the Communications Center and General Purpose Maintenance Facility.
  - Improve communications at Downwind Grid and the Administration Building and install new telephone systems at the English Village Army Health Clinic.
- Roadway proposals include:
  - Conduct a survey to determine pavement and sidewalks that are salvageable and adjust the Real Property Inventory records to better quantify these areas.
  - Apply preventative maintenance measures to prolong the useful life of road pavement, parking pavement, and sidewalks.
  - Repair all damaged roads, parking lots, sidewalks, and driveways in the Wherry and Mountain View housing areas.
  - Replace grading of firebreaks along side roads with mowing.
- Security and counterintelligence proposals include:
  - Install a security fence around the perimeter of the LSTF as Force Protection Funding becomes available.
  - Alter existing parking lots to maintain a 30-ft clear zone around buildings to meet security requirements.
  - Construct a new Provost Marshall building, Main Gate, and Guardhouse. Provide parking, serpentine roadway approach and double-gated vehicle enclosure.
  - Acquire one helicopter for support of security, fire protection, testing, and training to be reimbursed mainly through user fees.

- Investigate the need for installation and maintenance of a perimeter fence around DPG.

♦ Utility proposals include:

- Install a new 950,000-L (250,000-gallon) elevated water storage tank, a new well, and a new pump to ensure adequate water is available to Carr and the BMTF.
- Investigate installation of a new waterline to ensure that a reliable source of water is available to the DTC.
- Modify the English Village water distribution system by elevating water storage tanks.
- Provide a separate water irrigation system for English Village.
- Provide a treatment system for the English Village water system to reduce total dissolved solids content in drinking water.
- Investigate potential CWA requirements of reduction of arsenic concentrations in DPG drinking water and treatment alternatives and cost.
- Repair and upgrade the English Village Bulk Fuel Storage Facility.
- Construct a new 80,000-liters per day (L/day) (20,000-gallons per day (gpd)) closed cell lagoon with lift station and piping from the old Baker Lagoon to provide sufficient retention capacity of wastewater from the LSTF.
- Repair the English Village steam trap.
- Improve electrical power, construct a new monitoring and control point to meet the needs of newer technology now in use, and repair asphalt roads at the Downwind Grid.
- Change the supply and exhaust air valve controllers and the variable speed drive controllers in fume hoods for nonchemical surety rooms in the laboratory building at the CCTF, to meet improved control for health and safety standards.
- Improve interior of the Administration Building to consolidate many of the desired administrative functions, to upgrade power, lighting, HVAC systems, and security, and to meet American Disabilities Act standards.

- Conduct a systems analysis and replace the sewer mains in Baker, Carr, and Ditto to prevent unnecessary maintenance costs associated with leaks, collapse and clogging.
- Replace fuel oil furnaces in all east and west Wherry housing units with propane gas furnaces and replace air conditioning units with exterior condensers.
- Trim and/or prune tree branches out of overhead power lines in the Wherry housing area.
- Institute a tree replanting program for English Village.
- Replace all sewer drain lines from each house in the Wherry housing area.
- Upgrade deficient power lines to meet requirements of the Bald Eagle and Golden Eagle Protection Act and preclude raptor electrocution.
- Investigate regulatory compliance and permitting requirements for stormwater and if DPG is determined to be exempt apply for waiver.
- Ensure that new landscaping features are native and drought tolerant to prevent forage and browse from large ungulates.
- Install a dehumidifier for the small cooling chamber to dehumidify the air before it is put into the cooling coil for the CSC in the LSTF.
- Install an equipment elevator in the BMTF for improved movement of equipment and material between the first and second floors.
- Repair the deteriorated HVAC system in the English Village Army Health Clinic and install a new heating system.
- Investigate need for ambulance enclosures at the English Village Army Health Clinic.
- Conduct a study to determine if user fees or project-specific licenses can be instituted.
- Investigate the reliability of the power system and explore alternatives to eliminate power outages.

2.3 Alternatives to the Proposed Action

CEQ regulations implementing NEPA require the EIS to identify and examine reasonable alternatives to the Proposed Action, including a no action alternative. Alternatives were developed by the Future Programs EIS team after a detailed review of:

- Reasonably foreseeable activities that could occur at DPG through the Proposed Action time period
- Consideration of scoping comments provided by the public and other government agencies

Each potential alternative was evaluated against the three following criteria:

- Does the alternative meet the purpose and need for action as described in Section 1.2, Purpose and Need for Action?
- Is the alternative reasonably foreseeable given existing knowledge about DPG's missions?
- Is the alternative operationally feasible in the Future Programs EIS time frame through the 7-year Proposed Action time period?

Alternatives that satisfy the above criteria are described in the following sections:

- No Action Alternative
- Decreased Mission Alternative
- Maximum Expanded Mission Alternative

Table 2.3-1, Comparison of Number of Events for Each Alternative, compares annual events defined as programs, projects, tests or similar activities for the Proposed Action and three alternatives that received detailed environmental evaluation in this Future Programs EIS. The number of annual events for the No Action Alternative (Baseline) and Proposed Action are estimated numbers based on ongoing or anticipated activities. The numbers for the Decreased Mission Alternative and Maximum Expanded Mission Alternative are estimated numbers which are intended to bound the maximum and minimum quantity of activities anticipated to occur at DPG, as further described in Sections 2.3.2, Decreased Mission Alternative, and 2.3.3, Maximum Expanded Mission Alternative.

Table 2.3-1. Comparison of Number of Events for Each Alternative.

Activity	No Action Alternative (Baseline)	Proposed Action (Preferred Alternative)	Decreased Mission Alternative	Maximum Expanded Mission Alternative
Testing				
Biological Defense	11	26	7	52
Chemical Defense	30	70	15	140
Conventional Munitions	2	34	0	34
Environmental Characterization and Remediation Technology	3	15	0	15
Modeling and Assessment	1	4	0	8
Smoke, Obscurant, and Illuminant	10	44	0	44
Training				
Ground	15	109	11	109
Counterterrorism	2	58	2	70
Research Support to Non-DOD Agencies	4	4	3	4
Total Number of Events	**78**	**364**	**38**	**476**

Alternatives that did not satisfy the three criteria have been eliminated from detailed evaluation in this Future Programs EIS and are described in Section 2.4, Alternatives Eliminated from Detailed Evaluation.

While the alternatives that have been selected for detailed evaluation in this EIS process provide a range of potential future DPG activities, it is likely that some mission components that could occur at DPG through the Proposed Action time period are not known and therefore cannot be specifically considered in this Future Programs EIS. This is because DPG's primary mission of testing military material and equipment responds to constantly evolving defense threats that cannot be projected. Additional NEPA analysis, primarily through EAs tiered to this Future Programs EIS, would be conducted for future activities occurring at DPG not foreseen in this Future Programs EIS.

2.3.1 No Action Alternative

Pursuant to NEPA and CEQ regulations, the no action alternative must be considered. Under this alternative, DPG's baseline operations and management intensity, as described in Section 2.1, Baseline Description of DPG, would continue through the Proposed Action time period. No major changes to activity levels, locations of activities, and the infrastructure would be necessary to support the baseline activities. No new missions or new facilities would be implemented at DPG with this alternative, although several SDP initiatives would be implemented in accordance with routine facility maintenance needs. The number of potential No Action Alternative events is provided in Table 2.3-1, Comparison of Number of Events for Each Alternative.

2.3.2 Decreased Mission Alternative

Although a decrease in activity at DPG is not anticipated, this scenario is included as an alternative because of scoping comments and the need to compare a full range of possible alternatives.

This alternative assumes:

- Reduction in DOD funding for testing, training, and other activities that occur at DPG
- Relocation of DPG activities to other DOD facilities with capabilities similar to DPG

Under this scenario, the number and scope of activities at DPG would be less than that of the Proposed Action. Because of DPG's unique capabilities, baseline chemical and biological defense testing and training would continue. However, this alternative assumes that chemical and biological defense testing would be performed at levels reduced by approximately half from the baseline. Ancillary activities such as conventional munitions testing, ECRT testing, smoke, obscurant, and illuminant testing, and modeling and assessment testing would be transferred to other government facilities, and would not occur at DPG under this alternative. DPG support to AF activities at the UTTR would be expected to continue. Because of the distance from Utah NG units to alternate training areas, it is anticipated that Utah NG units would continue to conduct ground training at DPG. However, it is assumed that the Utah NG would not implement its proposed artillery training using the Paladin self-propelled howitzer system, and training by active duty components and reserve component units from other states would be transferred from DPG to other DOD training areas. This would result in a substantial decrease in ground training events compared to the baseline and to the Proposed Action. Because of DPG's unique biological and chemical defense testing and training capabilities, counterterrorism training would continue at DPG at approximately half the baseline level of activities. Research support to non-DOD agencies would decline slightly compared to baseline.

The result of the transfer or termination of various testing and training activities would be a substantial decrease in DPG activities. As these various activities depart DPG, installation and mission support activities such as ammunition accountability, instrumentation, range control, technical escort, car care, retail sales, procurement, metal shop, etc. would all be reduced in scope and size. These services would be continued at DPG, but at lower levels of operation.

Although the overall level of events and activities at DPG would be substantively reduced, DPG would continue providing critical chemical and biological defense training and testing support to DOD under this alternative. The number of potential Decreased Mission Alternative events is provided in Table 2.3-1, Comparison of Number of Events for Each Alternative.

2.3.3 Maximum Expanded Mission Alternative

Under this alternative, testing activity would substantially increase in response to a maximum foreseeable expanded mission at DPG. Although such an increase in activity at DPG is not anticipated, this scenario is included as an alternative because of scoping comments and the need to compare a full range of possible alternatives. Such an expanded mission might occur in response to:

- Domestic chemical and/or biological incident(s)
- Development or appearance of serious new biological and/or chemical threat(s) against U.S. interests
- Large deployment of U.S. military forces overseas against suspected or identified biological and/or chemical threat(s)

Under this alternative, biological and chemical defense testing and modeling and assessment testing would approximately double above the level of testing in the Proposed Action. Conventional munitions, ECRT, and smoke, obscurant and illuminant testing would remain at approximately the same level as under the Proposed Action. DPG support to AF activities at the UTTR would be expected to continue. Ground training would remain at about the same level as the Proposed Action and counterterrorism training would slightly increase compared to the Proposed Action.

The result of the expansion of various testing and training activities would be a substantial increase in the number and scope of DPG activities. As these additional activities are performed at DPG, installation and mission support activities such as ammunition accountability, instrumentation, range control, technical escort, car care, retail sales, procurement, metal shop, etc. would all be increased in scope and size, and all services would continue at greater levels.

This alternative provides the maximum quantity, complexity, and size of tests, training and other activities that could reasonably be performed at DPG. The number of potential Maximum Increased Mission Alternative events is provided in Table 2.3-1, Comparison of Number of Events for Each Alternative.

2.4 Alternatives Eliminated from Detailed Evaluation

Alternatives that were discussed by the public during scoping but have been eliminated from further evaluation in this Future Programs EIS are described in the following sections:

- Discontinue Mission and Close Installation
- Modify Mission Components
- Accommodate Biosafety Level 4 Activities
- Accommodate Nuclear Defensive Testing

2.4.1 Discontinue Mission and Close Installation

Installations that are targeted for closure must undergo a separate EIS process as part of the Base Realignment and Closure (BRAC) process. DPG is vital to national security because it is the only proving ground that can support both chemical and biological defense testing. Increasing world sophistication in chemical and biological weapons has intensified the need for DPG to support counterterrorism testing and training capabilities. Because of these national security concerns, discontinuing DPG's mission and closure of the installation is not considered a reasonably foreseeable alternative and has been eliminated from evaluation in this Future Programs EIS.

2.4.2 Modify Mission Components

DPG's mission is established by Congress, DOD, and national security requirements. The purpose of this Future Programs EIS is not to examine or question these requirements. Rather, the purpose is to examine impacts of activities associated with reasonably foreseeable future mission programs at DPG. Therefore, modifying mission components has been eliminated from detailed evaluation in this Future Programs EIS.

2.4.3 Accommodate Biosafety Level 4 Activities

DPG's LSTF provides the third highest level of biological protection called BL 3. This level of protection accommodates testing of all biological agents except for dangerous agents, known as BL 4 material, that pose a high individual risk of life-threatening disease, which may be transmitted via the aerosol route and for which there is no available vaccine or therapy. There are no plans to implement a BL 4 program at DPG. These high-risk agents require BL 4 facilities that DPG does not have. Because DPG cannot accommodate BL 4 testing and support activities for DOD or other Federal agencies, a BL 4 program is not considered reasonably

foreseeable at DPG and has been eliminated from evaluation in this EIS. If, in the future, DOD were to consider a program to test BL 4 materials at DPG, the installation would have to initiate a separate NEPA review to specifically examine the impacts of constructing and operating a BL 4 facility.

2.4.4 Accommodate Nuclear Defense Testing

DPG's mission includes nuclear survivability testing. However, there are no baseline tests for nuclear survivability testing, nor are any new tests anticipated under the Proposed Action. DPG may use radiological materials as tracer materials in laboratory tests and at the DPG health clinic. Due to the moratorium on nuclear testing, the U.S. Department of Energy has excess capacity available to conduct this mission. If, in the future, DOD were to consider nuclear survivability testing at DPG the installation would have to prepare an EIS to specifically examine the impacts of nuclear survivability testing.

2.5 Comparison of Environmental Impacts and Mitigation Measures

This section provides a compilation of all environmental impacts resulting from the Proposed Action and the three alternatives analyzed in this EIS. Each environmental impact was analyzed for the level of significance (significant, nonsignificant, or no impacts), and whether the impact would be beneficial or adverse to the natural and human environment. Table 2.5-1, Summary of Impact Analysis Conclusions for Proposed Action and Alternatives, Mitigation, and Residual Impacts, identifies environmental resources and topics analyzed in this EIS, related impact(s), appropriate mitigation measures, and residual effects. Topics in this table are presented in the same order as the EIS for easy reference.

DPG's existing mitigation activities would continue under the No Action Alternative. This installation-wide EIS has identified a broad array of proposed mitigation measures that would supplement DPG's existing mitigation activities to avoid or lessen potential future impacts. These proposed mitigation measures are relevant to, and would be implemented for, all action alternatives (the Proposed Action, Decreased Mission Alternative, and the Maximum Expanded Mission Alternative). However, the timing and intensity of these mitigation measures would vary by alternative.

For example, if the Decreased Mission Alternative was chosen as DPG's future, the proposed mitigation measures could potentially be implemented at a slower and less intensive manner than for the Proposed Action, because the magnitude, duration, and location of impacts would be different. Concomitantly, if the Maximum Expanded Mission Alternative was chosen, proposed mitigation measures would likely be implemented at a faster and more intensive manner than for the Proposed Action.

Since the EIS broadly assesses the potential environmental impacts, mitigation measures must be somewhat broad as well. These broad mitigation measures can be clarified, if necessary, within the ROD after a decision has been reached. In order for any mitigation measures to be enforceable, they must be clearly defined in the ROD even if they are discussed in the EIS text. Furthermore, any future proposed action requiring case-specific NEPA analysis would likely include more specific mitigation measures that would support the broad mitigation measures identified in this EIS.

Table 2.5-1. Summary of Impact Analysis Conclusions for Proposed Action and Alternatives, Mitigation, and Residual Impacts.

Environmental Resource	Resource Subtopic/Issue	Impacts from the Proposed Action (Preferred Alternative)	Impacts from the No Action Alternative	Impacts from the Decreased Mission Alternative	Impacts from the Maximum Expanded Mission Alternative	Mitigation and Monitoring Measures	Residual Impacts
Geology and Soils	Soil Physical Quality	♦ Increased soil compaction and erosion ♦ Reduced soil productivity ♦ Increased exposure of buried munitions	Same as the Proposed Action but less	Soil compaction and erosion would be considerably reduced in the frequency and lateral extent of occurrence	♦ Dramatic increase in soil compaction and erosion ♦ Soil productivity would be reduced to nonproductive	♦ Continue implementation of the Army ITAM Program ♦ When possible, limit tracked vehicles and prohibit cross-country use ♦ When possible, without jeopardizing realistic training, vary intensity of training and testing seasonally to reduce the impact on vegetation and to avoid high fire conditions ♦ When possible, use only existing roads, or if new roads need to be created, place in areas that would minimize impacts to vegetation ♦ When feasible, construct new buildings and roads in current built-up areas ♦ Rotate use of training areas to allow for a 4-7 year rest period ♦ Continue to monitor established photopoints in impact areas for seasonal and yearly comparison of habitat ♦ Focus ground training in areas with existing high ground disturbance; other areas used should follow compensation guidelines within the MTAMP and the INRMP ♦ Implement management of the Paladin Weapons System as described in the MTAMP ♦ Manage all fires in accordance with the DPG Fire Management Plan ♦ Complete greenstrip firebreaks established by ITAM and test with new and better fire resistant and site adapted species ♦ Obtain financial compensation from training missions for fire management or revegetation according to the MTAMP and the INRMP	Significantly reduced soil productivity would occur.
	Soil Chemical Quality	Potential accumulation of SVOCs and heavy metals in soils	Same as the Proposed Action but less	Same as the Proposed Action but much less chemical accumulation in soils	Accumulation of chemicals in soil to the extent that chemical uptake by humans, plants, and animals could potentially result in adverse effects	♦ Continue the IRP program to address contaminated soils at HWMUs and SWMUs ♦ Implement investigation of testing and training ranges in use when they become inactive ♦ Include appropriate monitoring for SVOCs in soil	Chemical degradation of soil would still occur.
	Geologic Features and Resources	♦ Presence of UXO at DPG renders development of geologic resources impossible due to safety conditions ♦ Possible destruction of some metallic and non-metallic mineral resources ♦ Potential damage to Devil's Postpile, a unique geologic feature	♦ Presence of UXO at DPG renders development of geologic resources impossible due to safety conditions ♦ Potential damage to Devil's Postpile, a unique geologic feature but less than the Proposed Action	Approximately the same as the No Action Alternative	Approximately the same as the Proposed Action	♦ Continue to prohibit any development and/or use of mineral resources at Granite Peak ♦ Continue enforcing restrictions in the vicinity of the Devil's Postpile from use by ground troops	Development of geologic resources would remain impossible due to the likely presence of UXO virtually in perpetuity at DPG.

Table 2.5-1. Summary of Impact Analysis Conclusions for Proposed Action and Alternatives, Mitigation, and Residual Impacts.

Environmental Resource	Resource Subtopic/Issue	Impacts from the Proposed Action (Preferred Alternative)	Impacts from the No Action Alternative	Impacts from the Decreased Mission Alternative	Impacts from the Maximum Expanded Mission Alternative	Mitigation and Monitoring Measures	Residual Impacts
Water Resources	Surface Water Quantity	♦ Estimated 10 percent increase in wastewater ♦ Expansion of Baker Lagoon provides for a sufficient retention capacity for the undersized wastewater treatment facility ♦ Requires construction permit from UDWQ ♦ Increase in localized surface water runoff	Partially-treated wastewater would continue to be discharged to the ground	♦ Estimated 10 percent decrease in wastewater ♦ Partially-treated wastewater would continue to be discharged to the ground	♦ Estimated 25 percent increase in wastewater ♦ Expansion of the Baker Lagoon provides for a sufficient retention capacity for the undersized wastewater treatment facility ♦ Expansion of the Baker Lagoon requires construction permit from UDWQ ♦ Increase in localized surface water runoff ♦ Would require expansion of English Village Wastewater Treatment Facility	♦ Implement best management practices, such as installing metering devices at lagoons and periodically calibrate and maintain them ♦ Use silt fences and berms during construction projects to minimize surface water runoff and soil erosion	♦ Localized effects from runoff would occur. ♦ Some soil erosion would still occur.
	Surface Water Quality	♦ Potential surface water degradation from deposition of airborne mission materials in the springs near the playa, the playa, and Fish Springs National Wildlife Refuge ♦ Potential physical and chemical surface water degradation at the springs in the Cedar Mountains and Whiskey Jim Springs from ground training ♦ Expansion of the Baker Lagoon would minimize the potential for migration of partially-treated wastewater to the playa and into the groundwater ♦ Requires construction permit from UDWQ	♦ Partially-treated wastewater would continue to be discharged to the ground ♦ Degradation of surface water is approximately the same as the Proposed Action; however, Whiskey Jim Springs would not be affected	♦ Partially treated wastewater would continue to be discharged to the ground ♦ Degradation of surface water less than the Proposed Action and Whiskey Jim Springs would not be affected	♦ Surface water degradation from deposition of airborne mission materials in the springs near the playas, the playa, and Fish Springs National Wildlife Refuge to the extent that the health of humans, plants, and animals could be impacted through chemical uptake ♦ Physical and chemical surface water degradation could also result at the springs in the Cedar Mountains and Whiskey Jim Springs to the extent that the health of humans, plants, and animals could be impacted through chemical uptake ♦ Expansion of the Baker Lagoon would minimize potential for migration of partially-treated wastewater to the playa and into the groundwater ♦ Requires construction permit from UDWQ	♦ Enforce restrictions regarding bivouacking and ground training near springs ♦ Continue use of wildlife guzzlers that DPG has established in the area near the springs in the Cedar Mountains ♦ Conduct periodic water quality monitoring of the springs in the Cedar Mountains ♦ Conduct periodic water quality monitoring at the springs near the playa, including monitoring support at Fish Springs National Wildlife Refuge, and at select locations within the playa	Insignificant chemical and physical degradation to water quality could occur.
	Groundwater Quantity	♦ Anticipated increase of water use of 10 percent would cause slight lowering of water table but (less than historical water use at DPG) ♦ No identifiable impacts to aquifer recharge	No identifiable impacts	Less groundwater usage than the Proposed Action and no additional lowering of water table	♦ Anticipated increase of water use of 25 percent would slightly lower water table (still less than historical water use at DPG) ♦ No identifiable impacts to aquifer recharge	None needed	Insignificant additional water use and a slight lowering of water table would occur.

Table 2.5-1. Summary of Impact Analysis Conclusions for Proposed Action and Alternatives, Mitigation, and Residual Impacts.

Environmental Resource	Resource Subtopic/Issue	Impacts from the Proposed Action (Preferred Alternative)	Impacts from the No Action Alternative	Impacts from the Decreased Mission Alternative	Impacts from the Maximum Expanded Mission Alternative	Mitigation and Monitoring Measures	Residual Impacts
Water Resources (Continued)	Groundwater Quality	Provides protection of groundwater quality by eliminating the need to discharge partially-treated wastewater to the surface at the Baker Lagoon	Partially-treated wastewater would continue to be discharged to the ground	Partially-treated wastewater would continue to be discharged to the ground	Provides protection of groundwater quality by eliminating the need to discharge partially-treated wastewater to the surface at the Baker Lagoon	♦ Continue groundwater monitoring programs already established at English Village ♦ As a best management practice, properly abandon all nonessential, inactive water supply and test wells ♦ Continue ongoing studies (not associated with this EIS) about the nature and extent of potential groundwater contamination at identified areas within DPG ♦ For a new drinking water system at Carr, update the Drinking Water Source Protection Plan and monitor and test the pump	No new residual impacts
Air Resources	Air Quality	♦ PM_{10} emissions and fugitive dust would be principal emission types ♦ Existing permits would allow projected increased emissions in continuing programs ♦ If any new program area requires new permits or modification of existing permits, DPG would apply to UDAQ for approval ♦ Emissions from wildland fires would continue with short-term impacts from PM_{10}, CO, and VOCs ♦ Existing controls would be sufficient to prevent release of biological and chemical agents under normal conditions	♦ Existing emissions levels would remain the same as current conditions ♦ Existing permits would be sufficient for continued operations	♦ Emission levels would be reduced compared to the No Action Alternative ♦ Existing permits would be sufficient for continued operations	♦ Emission levels would be substantially increased compared to the Proposed Action ♦ Existing permits may require modification, pending air quality modeling results	♦ Evaluate substitutes for military-specific materials that potentially impact air ♦ Investigate fugitive dust control methods for military training on unpaved roads and in training areas ♦ Prepare models of fugitive dust generated from training exercises to better understand its effects on ambient air quality values ♦ Manage all fires in accordance with the DPG Fire Management Plan ♦ Obtain financial compensation from training missions for fire management according the MTAMP and the INRMP	Air emissions would occur as long as DPG implements its mission, but the permitting process would keep emissions within regulatory framework.
Biological Resources	Vegetation	♦ Increased direct disturbance or destruction of vegetation ♦ Soil compaction and erosion ♦ Decrease in cryptobiotic soil ♦ Increase in bare ground ♦ Trenching and cratering of affected lands ♦ Wildland fires would continue to be caused by both natural causes and DPG mission-induced causes ♦ Wildland fires are a significant disruption to the ecology of the affected area, and would promote the infusion of invasive plants such as cheatgrass ♦ Likelihood of spill would not increase; potential for a spill cannot be eliminated ♦ Smokes and obscurants, including fog oil, could cause direct and indirect loss of vegetation	Same as the Proposed Action but with a lesser magnitude of impact	Same as the Proposed Action, but with a lesser magnitude of impact	Same as the Proposed Action, but with a greater magnitude of impact	♦ Continue implementation of the Army ITAM Program ♦ Educate users of DPG lands on protecting, preventing damage, and mitigating damage to natural resources ♦ When possible, limit tracked vehicle use and prohibit cross country use ♦ When possible, without jeopardizing realistic training, vary intensity of training and testing seasonally to reduce the impact on vegetation and to avoid high fire conditions ♦ When possible, use only existing roads, or if new roads are needed, place them in areas that would minimize vegetation impacts ♦ When feasible, construct new buildings and roads in current built-up areas ♦ Obtain financial compensation from training missions for fire management or revegetation according to the MTAMP and the INRMP ♦ Rotate use of training areas to allow for a 4-7 year rest period ♦ Avoid training in shrub and juniper areas ♦ Establish more permanent vegetation plots in training areas to study changes in vegetation ♦ Continue to monitor established photopoints in impact areas for seasonal and yearly comparison of habitat ♦ Depending on need, maintain and use existing quarry sites, and permanently close others ♦ Focus ground training in areas with high existing ground disturbance; other areas used should follow compensation guidelines within the MTAMP and the INRMP ♦ Manage all fires in accordance with the DPG Fire Management Plan	♦ Vegetation would continue to be damaged or lost with mission activities, especially ground training. ♦ Restoration of damaged or lost vegetation is a long-term process. ♦ Reversal of invasive plant problem needs long-term management. ♦ Wildland fires would still occur. ♦ Any wildland fires, regardless of cause, would result in extensive ecological damage. ♦ Potential for spills can be minimized but cannot be totally eliminated. ♦ Air emissions can be managed but would still occur.

Table 2.5-1. Summary of Impact Analysis Conclusions for Proposed Action and Alternatives, Mitigation, and Residual Impacts.

Environmental Resource	Resource Subtopic/Issue	Impacts from the Proposed Action (Preferred Alternative)	Impacts from the No Action Alternative	Impacts from the Decreased Mission Alternative	Impacts from the Maximum Expanded Mission Alternative	Mitigation and Monitoring Measures	Residual Impacts
Biological Resources (Continued)	Vegetation (Continued)					♦ Complete greenstrip firebreaks established by ITAM and test with new and better fire resistant and site adapted species ♦ Clean up spills immediately and monitor the site ♦ As part of test planning and where appropriate, monitor dispersion clouds to validate models and monitor biological resources ♦ Limit use of fog oil on extremely windy days ♦ Minimize the spread of weeds through noxious and nuisance weed management ♦ Minimize ground disturbance as specified in the INRMP ♦ Implement biomonitoring program at the landscape level ♦ Quantitatively assess vegetation using permanent sample plots	
	Wildlife	♦ Smokes/obscurants, dust, and other materials in large quantities could cause direct and indirect loss of vegetation and affect wildlife respiratory systems ♦ As land is disturbed, vegetation comprising wildlife habitat can be damaged or lost ♦ Habitat disturbance or loss can result in indirect impacts to wildlife including: ▪ Reduced ability to hunt and provide for itself ▪ Displacement into less favorable habitats ▪ Interruption of feeding or nesting ♦ Potential decline in the overall survival rates for some species ♦ Noise and overhead motion cause environmental stress to wildlife (especially the startle effect), which has highest impact during reproductive and over wintering periods ♦ Human presence affects wildlife patterns and behaviors in many ways	Same as the Proposed Action, but with less potential for impacts compared to the Proposed Action	Same as the Proposed Action, but with less potential for impacts compared to the No Action alternative	Same as the Proposed Action, but with higher potential for impacts compared to the Proposed Action	♦ Avoid using ordnance or testing near permanent surface water sources ♦ As part of test planning and where appropriate, monitor dispersion clouds to validate models and monitor biological resources ♦ Limit use of fog oil on extremely windy days when large dust particles may be present ♦ Investigate fugitive dust control methods for military training on unpaved roads and in training areas ♦ Identify and protect important habitats to each species where possible ♦ Use temporary closures to avoid training and testing in areas of high wildlife population concentrations, nesting sites or wintering ranges ♦ Minimize ground disturbance as specified in the INRMP ♦ Monitor patterns, trends, and health of wildlife species as needed on both a local scale and installation-wide scale ♦ Create a new vegetation map every 5 years to monitor vegetation changes ♦ Implement a biomonitoring program at the landscape level ♦ Minimize vehicular-caused animal deaths by enforcing speed limits ♦ Report all injured or dead large animals immediately to DEP ♦ Minimize disturbance areas from construction of new buildings and roads	♦ Air emissions can be managed but would still occur. ♦ Some habitat disturbance and loss would still occur. ♦ Long-term health and survival of some species could be affected. ♦ Noise events can be managed but cannot be eliminated with DPG's mission. ♦ Human presence at DPG is necessary to implement its mission; impacts from human presence would still occur.
	Special Status Species	Negligible impacts to state threatened and endangered species and species of special concern within DPG boundaries	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	♦ Enforce restrictions regarding bivouacking and ground training near springs and stable dunes ♦ Continue to protect Wig Mountain Cave and the abandoned mines on Granite Peak ♦ Protect Granite Peak and the winterfat-gray molly vegetation community	Potential for impacts to special status species or important habitats cannot be totally eliminated.

Table 2.5-1. Summary of Impact Analysis Conclusions for Proposed Action and Alternatives, Mitigation, and Residual Impacts.

Environmental Resource	Resource Subtopic/Issue	Impacts from the Proposed Action (Preferred Alternative)	Impacts from the No Action Alternative	Impacts from the Decreased Mission Alternative	Impacts from the Maximum Expanded Mission Alternative	Mitigation and Monitoring Measures	Residual Impacts
Socioeconomics	Employment and Economy	♦ No more than 10 percent increase in DPG employment ♦ Substantial increase in temporary personnel ♦ DPG continues as a major Tooele County employer and is a stable economic influence	♦ No change in existing conditions or impacts ♦ DPG continues as a major Tooele County employer and is a stable economic influence	♦ Reduced employment levels at DPG ♦ Loss of income from DPG employment within the regional economy	♦ Increased employment of up to 300 jobs at DPG ♦ Increased indirect employment opportunities supported by new direct jobs at DPG ♦ Increased importance of DPG in the regional economy	Maintain close contacts with elected officials, public administrators, the media, and community leaders in Tooele County informing them of important events and activities as they relate to DPG and its relationship with the regional community and economy	Additional employment and increase in temporary workers would continue DPG's importance in the regional economy.
	Population	♦ Minimal permanent population change ♦ Substantial increase in number of visitors and temporary personnel	No change in existing conditions or impacts	♦ Likely decline in the population of English Village ♦ Laid-off workers would likely leave area, but overall Tooele County population increase trend would not be substantially affected	Substantial population growth at English Village and off-installation due to direct and indirect employment increases	None needed	The number of temporary workers and visitors at DPG necessary to carry out mission elements would increase.
	Public Services and Infrastructure	No identifiable impacts	No change in existing conditions or impacts	♦ Decline in enrollments at DPG schools with potential for DPG school closures ♦ Potentially reduced community infrastructure at DPG	♦ Need for additional community services and infrastructure at DPG ♦ Need for additional mission-related infrastructure, likely requiring construction of new buildings and facilities	Increase focus on essential community support functions and facilities at DPG	Infrastructure at DPG would be improved and upgraded.
	Housing and Lifestyle	A higher level than current conditions	No change in existing conditions or impacts	♦ Potentially reduced family housing opportunities at DPG ♦ Potential adverse social and lifestyle changes for DPG residents	♦ Potential expansion of English Village housing opportunities including new housing construction ♦ Competition by new residents looking for off-installation housing with others in tight housing market	Increase focus on maintenance of existing housing facilities as noted in SDP findings and recommendations	Community stability and sense of community at English Village as a center for DPG residents would increase.
Environmental Justice	Disproportionate Impacts to Minority or Low-Income Populations	♦ Minority and low-income persons would not be disproportionately affected compared to the general population ♦ DPG would be in compliance with EO 12898	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	♦ Encourage persons within minority and low-income populations and Native Americans to become involved in EIS process ♦ DOD, Army, and DPG are committed to fair and equitable treatment of all persons ♦ Consider locations of minority and low-income persons when locating new facilities and activities to ensure that these populations are not disproportionately affected	None
Land Use	Land Uses and Ownership	♦ Continuation of DPG's land-use philosophy of dominant use would ensure military mission has the priority over all other land uses at DPG ♦ No changes in DPG land holdings ♦ Very minor changes of land uses within DPG such as additional firing points ♦ DPG's operations would be consistent with Tooele County and Army land use plans	♦ Continuation of DPG's land-use philosophy of dominant use would ensure military mission has priority over all other land uses at DPG ♦ No changes in DPG land holdings ♦ DPG's operations would be consistent with Tooele County and Army land use plans	♦ Potential reduction in DPG land holdings ♦ Less intensive land use within DPG as mission programs are scaled back	♦ Potential acquisition of nearby BLM lands ♦ More intensive land use within DPG ♦ Potential land use changes within DPG land holdings to accommodate more intensive land use	Coordinate with BLM on land use issues such as DPG ground training impacts and regional land use issues	Use of DPG lands supports the "dominant use" land management philosophy, but also results in long-term impacts to land use.

Table 2.5-1. Summary of Impact Analysis Conclusions for Proposed Action and Alternatives, Mitigation, and Residual Impacts.

Environmental Resource	Resource Subtopic/Issue	Impacts from the Proposed Action (Preferred Alternative)	Impacts from the No Action Alternative	Impacts from the Decreased Mission Alternative	Impacts from the Maximum Expanded Mission Alternative	Mitigation and Monitoring Measures	Residual Impacts
Land Use (Continued)	Land Quality	♦ Reduced land quality in some areas due to wildland fires, ground disturbance, and potential damage to natural areas and special features ♦ Continued adverse effects from spread of invasive plants such as cheatgrass	Same as the Proposed Action	Same as the Proposed Action, but less than the Proposed Action	Same as the Proposed Action, but greater than the Proposed Action	♦ Continue coordination efforts with the BLM regarding the effects of DPG ground training, fire management, and the spread of invasive plants such as cheatgrass ♦ Continue implementation of the Army ITAM Program ♦ Adopt and protect the natural areas and special features on DPG land identified by the Nature Conservancy ♦ Implement a range management program for the rehabilitation of the desert environment in and around DPG ♦ Continue coordination efforts with the U.S. Fish and Wildlife Service on Fish Springs National Wildlife Refuge issues and impacts	Use of DPG lands supports the "dominant use" land management philosophy, but also results in long-term impacts to land quality.
	Access to DPG Facilities	No change in existing conditions and impacts	Same as the Proposed Action	Potential for reduced access to DPG facilities with some road closure	Increased access to DPG facilities with likelihood of new road construction	None needed	None
	Construction and Demolition Activities	♦ Proposed construction projects, would directly impact a minimal amount of DPG land ♦ Localized impacts involving changed land use and changes in drainage patterns, noise, and dust	♦ Fewer construction and demolition projects and associated impacts than the Proposed Action ♦ Localized impacts involving changed land use and changes in drainage patterns, noise, and dust	♦ Minimal new construction and potential for accelerated demolition of existing buildings ♦ Localized impacts involving changed land use and changes in drainage patterns, noise, and dust	♦ Accelerated construction program to provide for expanded mission facilities ♦ Localized impacts involving changed land use and changes in drainage patterns, noise, and dust	Consider topography, soils, drainage, water, vegetation, cultural resource location, access, utilities, and noise in all decisions regarding construction of new buildings and facilities	Minor localized impacts to land use, drainage patterns, noise, and dust would occur.
Cultural Resources	Paleontologic Resources	Potential damage to or unexpected discovery of paleontologic resources	Potential damage to or unexpected discovery of paleontologic resources but less than the Proposed Action	Approximately the same as the No Action Alternative	Approximately the same as the Proposed Action	Require notification of DEP regarding discovery of any observable paleontologic resource prior to construction work in the area	Some paleontologic resources could be lost.
	Unsurveyed Cultural Resource Sites	♦ Most of DPG land holdings would remain unsurveyed for cultural resources ♦ Potential direct and/or indirect damage to or loss of sites from mission-related activities, especially ground training	Same as the Proposed Action, although potential for direct and/or indirect damage or loss of sites would be slightly less than with the Proposed Action	Same as the Proposed Action, although potential for direct and/or indirect damage or loss of sites would be slightly less than in the No Action Alternative	Same as the Proposed Action, although potential for direct and/or indirect damage or loss of sites would be greater than with the Proposed Action	♦ Comply with the guidelines and procedures in the ICRMP and associated standard operating procedures to reduce potential for significant impacts ♦ Continue use of the priority system in determining cultural resource site locations to reduce potential for damage or loss of resources	♦ In some situations, protecting a cultural resource may not be possible – knowledge of lost site would be gained through site documentation and data recovery. ♦ Cultural resources that are not eligible for the NRHP or are not Native American sacred sites or traditional cultural places are not afforded further protection.
	NRHP-Eligible Cultural Resources	Potential for situations when the importance of a DPG mission activity exceeds the importance of an NRHP-eligible site, leading to loss of site but with required mitigation	Same as the Proposed Action	Same as the Proposed Action, but less likelihood of loss of NRHP-eligible site	Same as the Proposed Action, but more likelihood of loss of NRHP-eligible site	♦ Comply with the guidelines and procedures in the ICRMP and associated standard operating procedures to reduce potential for significant impacts ♦ Continue use of the priority system in determining cultural resource site locations to reduce potential for damage or loss of resources	In some situations, protecting a cultural resource may not be possible – knowledge of lost site would be gained through site documentation and data recovery.

Table 2.5-1. Summary of Impact Analysis Conclusions for Proposed Action and Alternatives, Mitigation, and Residual Impacts.

Environmental Resource	Resource Subtopic/Issue	Impacts from the Proposed Action (Preferred Alternative)	Impacts from the No Action Alternative	Impacts from the Decreased Mission Alternative	Impacts from the Maximum Expanded Mission Alternative	Mitigation and Monitoring Measures	Residual Impacts
Cultural Resources (Continued)	Sacred Native American Sites	Sites are afforded special protection when identified, but DPG has little information on sites within unsurveyed areas	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	♦ Comply with the guidelines and procedures in the ICRMP and associated standard operating procedures to reduce potential for significant impacts ♦ Once sites are identified, they would be protected through the ICRMP and Federal legislation ♦ Continue consultation with Native American tribes on potential cultural resources site locations	No new residual impacts
	Access to Cultural Resources	♦ Increased access from more activity on DPG lands may occur in some areas, which could lead to increases in cultural resource vandalism and theft ♦ Access to Native American sacred sites may be improved	No change in existing conditions or impacts	If some roads are closed, access could be reduced	♦ Additional roads could result in greater access, thereby increasing the potential for vandalism and theft of resources ♦ Potential improved access to Native American sacred sites	Make all employees, contractors, tenant personnel, and other persons with access to DPG land aware of ICRMP and associated standard operating procedures protecting cultural resources	Some vandalism and theft would still occur.
Traffic and Transportation	Roadways	♦ Minor changes in traffic patterns and traffic volumes both within DPG land and off-installation; existing roads can handle potential volume increases ♦ Potential increase to road maintenance requirements on DPG roads ♦ Potential for increased conflict between ground training mobilization and local traffic ♦ Potential for small access roads for new facilities	No change in existing conditions or impacts	Decreases in traffic volumes associated with DPG operations on- and off-installation	♦ Increases in traffic volumes on- and off-installation associated with increased mission; existing roads can handle potential volume increases ♦ Higher traffic volumes increase likelihood for more road maintenance on- and off-installation	None needed	No new residual impacts
	Airports and Airspace	Improvement of MAAF runways would increase use and capabilities of MAAF	No change in existing conditions or impacts	No change in existing conditions or impacts	Same as the Proposed Action	None needed	No new residual impacts
	Railroads	Potential for increased need for rail access	No change in existing conditions or impacts	No change in existing conditions or impacts	Same as the Proposed Action	None needed	No new residual impacts
	Transportation of Materials and Wastes	♦ Changes in materials and wastes quantities may require a small increase in the number of shipments to some programs ♦ No impacts to the existing transportation route	No change in existing conditions or impacts	Fewer shipments associated with reduced mission	Same as the Proposed Action, with a larger increase in the number of shipments compared to the Proposed Action	None needed	No new residual impacts
Visual Resources	Quality of Visual Resources	♦ New activities that introduce new or changed forms, lines, colors, and textures would affect quality of existing visual resources ♦ Impacts would be limited in scope because of small numbers of viewers affected ♦ Short-term and localized impacts to visibility	No change in existing conditions or impacts	No change in existing conditions or impacts	Same as the Proposed Action, but at a larger magnitude than the Proposed Action	Use the Installation Design Guide within the SDP to consider visual resources in construction and maintenance of DPG facilities and landscaping	♦ Changes to existing visual resources would occur, but these impacts are necessary for DPG's mission. ♦ The panoramic, scenic, open and expansive nature of DPG's setting would be retained.

Table 2.5-1. Summary of Impact Analysis Conclusions for Proposed Action and Alternatives, Mitigation, and Residual Impacts.

Environmental Resource	Resource Subtopic/Issue	Impacts from the Proposed Action (Preferred Alternative)	Impacts from the No Action Alternative	Impacts from the Decreased Mission Alternative	Impacts from the Maximum Expanded Mission Alternative	Mitigation and Monitoring Measures	Residual Impacts
Noise	Changes from Noise Events	♦ Primary impact to people is from annoyance, although there is also a potential for a health hazard from very loud noise events ♦ No identifiable economic impacts with isolated location of DPG ♦ Minor localized impacts involving structural vibrations, and rattle of hanging pictures ♦ Noise is an environmental stressor to wildlife (especially the startle effect), which has highest impact during reproductive and over wintering periods	Same as the Proposed Action	Same as the Proposed Action, with fewer noise events compared to the Proposed Action	Same as the Proposed Action, with more frequent noise events compared to the Proposed Action	♦ Update the ENMP to reflect the current status of DPG missions, programs, activities, and facilities ♦ Model and monitor noise for testing and training activities that could result in major noise impacts ♦ Notify the public in advance of DPG activities that could result in major atypical noise events	Noise occurs on an irregular basis at DPG; there is no regular pattern of noise events, although noise from aircraft occurs most frequently compared to other noise sources.
Health and Safety	Occupational Health and Safety	♦ New laboratory for unidentified materials would require new health and safety requirements and additional mitigation ♦ Changes to injury/illness rate are not expected	No change in existing conditions or impacts	No change in existing conditions or impacts	Same as the Proposed Action, but higher likelihood of need for changes to health and safety procedures and additional NEPA analysis for new chemical or biological agents and hazardous materials	♦ Assess the proposed use of any new agent or hazardous material ♦ Develop an SOP to handle materials that have not been identified or characterized ♦ Follow existing controls and management plans to handle all materials currently approved for use at DPG ♦ Continue worker safety programs and procedures ♦ Continue to enforce speed limits to minimize injury as a result of vehicular accidents	Potential for accidents would always exist as long as DPG implements its mission.
	Public Health and Safety	♦ Low potential for events and/or impacts would be limited to within DPG boundaries ♦ Significant impacts if accidental release of chemical or biological agent would occur ♦ Increased firing at White Sage Impact Area would increase the probability of munitions missing their target and striking BLM land ♦ Increased training could increase the number of wildland fires associated with training	No change in existing conditions or impacts	No change in existing conditions, except probability of an accidental release of chemical or biological agent would decrease compared to the No Action Alternative	♦ Same as the Proposed Action, except probability of an accidental release of chemical or biological agent would slightly increase ♦ The potential for wildland fires would increase compared to the Proposed Action	♦ Continue periodic evacuation exercises for various potential threats ♦ Expand Memorandum of Understanding with Tooele County to include the County in evacuation exercises ♦ Explore the potential need to obtain additional land around the White Sage Impact Area from BLM to act as a buffer for existing targets ♦ Manage all fires in accordance with the DPG Fire Management Plan ♦ Obtain financial compensation from training missions for fire management according to the MTAMP and the INRMP	Potential for accidents would always exist as long as DPG implements its mission.
Materials and Wastes	Materials	♦ New laboratory for unidentified materials would require new health and safety requirements and additional mitigation ♦ Materials usage would increase; storage facilities and handling/use procedures would be adequate for projected volumes	No change in existing conditions or impacts	No change in existing conditions, except materials usage would decrease compared to the No Action Alternative	♦ Same as the Proposed Action, except materials usage would increase ♦ Potential increase for storage capacity for some materials	♦ Assess the proposed use of any new chemical or biological agent or hazardous material ♦ Develop an SOP to handle materials that have not been identified or characterized ♦ Follow existing controls and management plans to handle all materials currently approved for use at DPG	Use of materials is a necessary and unavoidable part of implementing DPG's mission.

Table 2.5-1. Summary of Impact Analysis Conclusions for Proposed Action and Alternatives, Mitigation, and Residual Impacts.

Environmental Resource	Resource Subtopic/Issue	Impacts from the Proposed Action (Preferred Alternative)	Impacts from the No Action Alternative	Impacts from the Decreased Mission Alternative	Impacts from the Maximum Expanded Mission Alternative	Mitigation and Monitoring Measures	Residual Impacts
Materials and Wastes (Continued)	Wastes	♦ Increased waste volumes of biological and chemical agent and simulant-related waste ♦ Management of hazardous waste streams and volumes would remain highly regulated	No change in existing conditions or impacts	Need for materials would be reduced, potentially leaving some facilities under-utilized or unnecessary	♦ Same as the Proposed Action, except wastes generated would increase ♦ Potential need to revise waste management procedures and facilities, depending on the specifics of any new materials, wastes, or programs	♦ Follow existing controls and management plans to handle all wastes currently generated at DPG ♦ Assess new waste streams to determine proper procedures	Generation of wastes is a necessary and unavoidable part of implementing DPG's mission.

Army	U.S. Army
BLM	Bureau of Land Management
CO	carbon monoxide
DPG	U.S. Army Dugway Proving Ground
DEP	Directorate of Environmental Programs
DOD	Department of Defense
EO	Executive Order
ENMP	Environmental Noise Management Plan
HWMU	Hazardous Waste Management Unit
ICRMP	Integrated Cultural Resource Management Plan
INRMP	Integrated Natural Resource Management Plan
IRP	Installation Restoration Program
ITAM	Integrated Training Area Management
MAAF	Michael Army Airfield
MTAMP	Maneuver Training Area Management Plan
NEPA	National Environmental Policy Act
NG	National Guard
NRHP	National Register for Historic Places
PM_{10}	particulate matter less than 10 microns
SDP	Summary Development Plan
SOP	standing operating procedure
SVOC	semi-volatile organic compound
SWMU	Solid Waste Management Unit
UDAQ	Utah Division of Air Quality
UDWQ	Utah Division of Water Quality
UXO	unexploded ordnance
VOC	volatile organic compound

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3.0 Affected Environment

This chapter of the Future Programs EIS describes the following DPG environmental resources and other topics that could be affected by the Proposed Action or alternatives:

- Geology and Soils
- Water Resources
- Air Resources
- Biological Resources
- Socioeconomics
- Environmental Justice
- Land Use and Access
- Cultural Resources
- Traffic and Transportation
- Visual Resources
- Noise
- Health and Safety
- Materials and Wastes

The descriptions of these resources and topics provide a baseline of the natural and human environment for identification and evaluation of potential environmental impacts, described in Chapter 4.0, Impacts of the Proposed Action and Alternatives, resulting from the Proposed Action and alternatives, described in Chapter 2.0, Baseline Activities, Proposed Action, and Alternatives. Additionally, this baseline information will be used in tiering NEPA documentation required for future DPG activities. The tiering concept, described in Section 1.5.3, Tiering and Relationship to Other Documents, allows additional, updated, or more specific environmental data and impact analysis for future NEPA analyses to supplement the information in this Future Programs EIS.

This chapter is based on existing information and is focused on environmental resources within DPG boundaries, unless noted otherwise. No new major environmental data collection efforts were conducted on DPG lands specifically for this EIS. Data used to describe the existing environment are the latest available which may differ among resources and topics. The quality and quantity of environmental information describing existing conditions at DPG has increased substantially in recent years in response to regulatory permitting and closure requirements. Historic impacts from past DPG activities are considered part of the existing environment, and are described as appropriate.

Legal, regulatory, and environmental management considerations are also discussed in this chapter as appropriate. A list of the existing legal and regulatory framework affecting DPG operations is presented in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.1 Geology and Soils

This section provides an overview of the geology and soils at DPG by describing the following elements:

- Regulatory Overview
- Physical Geography
- Geologic Overview
- Soils
- Seismicity
- Geologic Resources

3.1.1 Regulatory Overview

There are no laws or regulations that apply specifically to geology and soils at DPG relevant to this Future Programs EIS.

3.1.2 Physical Geography

DPG is located within the Great Basin subdivision of the Basin and Range Physiographic Province. A physiographic province is a region that has similar geologic structure, climate, and developmental history. The Basin and Range Physiographic Province includes parts of Idaho, Oregon, Nevada, Utah, California, Arizona, New Mexico, and northern Mexico. This province is characterized by a series of mostly isolated north-south trending mountain ranges that are separated by wide desert plains (Press and Siever, 1982).

The majority of DPG lies within the Great Salt Lake Desert, with mountains and low-lying basin areas covering the remaining portions of DPG. DPG is bordered to the northeast by the Cedar Mountains and to the south by a series of ranges and valleys, the closest of which is the Dugway Range.

The Onaqui Mountains and Davis Mountain lie to the east of DPG. The Deep Creek Range lies to the west and marks the boundary of the Great Salt Lake Desert. The Stansbury Mountains lie to the northeast of the Cedar Mountains. DPG covers approximately 3,234 sq km (798,855 acres). Local topography is shown in Figure 3.1-1, Topographic Map of DPG. Topographic elevations at DPG range from 1,290

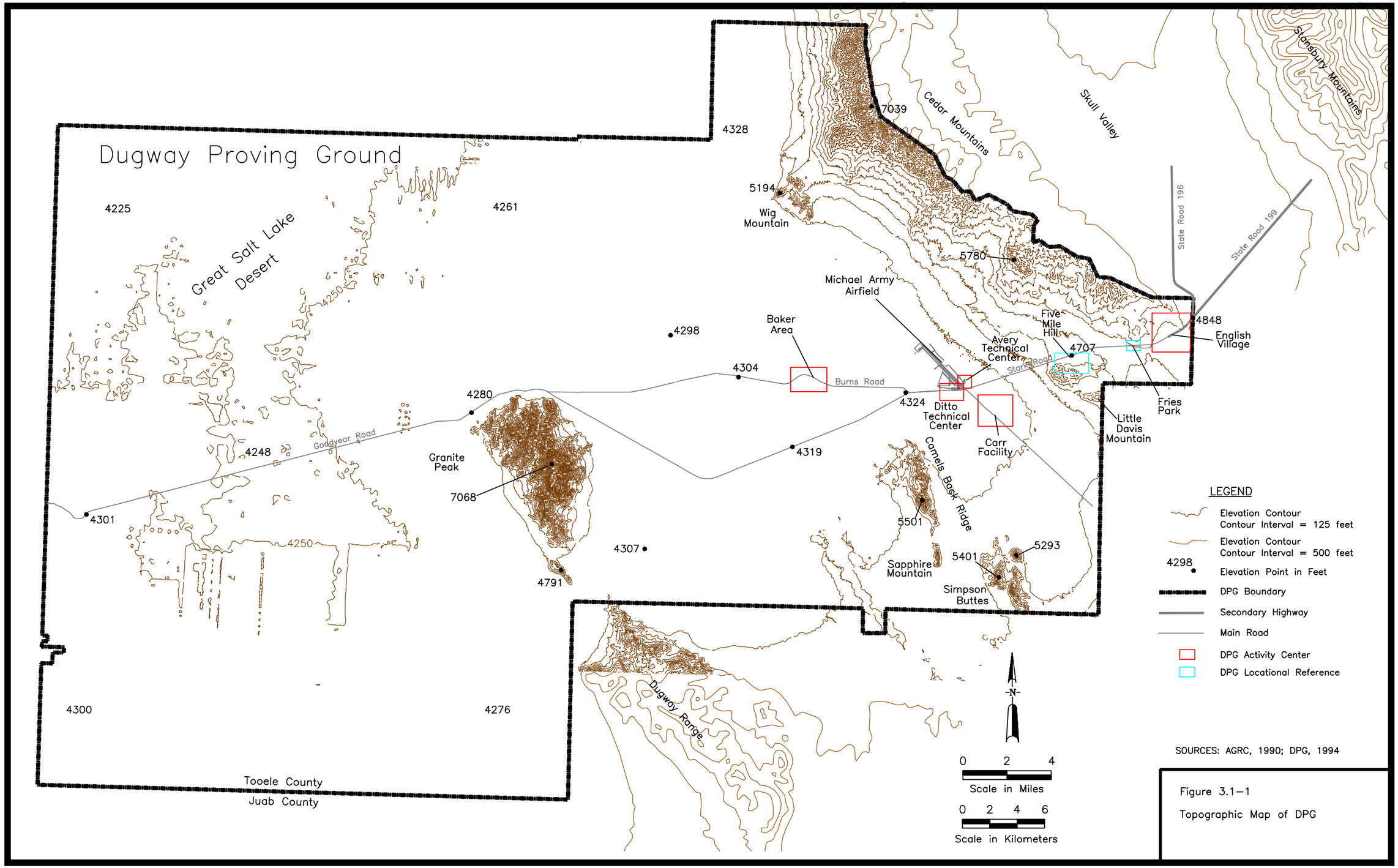

Figure 3.1–1

Topographic Map of DPG

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m (4,225 ft) above mean sea level (MSL) on the lowest point of the desert floor to 2,150 m (7,068 ft) above MSL at the summit of Granite Peak.

The Stansbury Mountains are part of the DPG geography.

The relatively extensive basin areas are broken by the topographic relief of the Cedar Mountains, Little Davis Mountain, Simpson Buttes, Camels Back Ridge, Wig Mountain, Granite Peak, and Sapphire Mountain. There are no large perennial surface water bodies that lie within or border DPG. However, two large playas are located in the western and southern portions of DPG, the DPG Playa and the Downwind Grid Playa. Vegetated and nonvegetated sand dunes are also located in the eastern and central portions of DPG and along DPG's northern and western boundaries.

Vegetation stabilizes the movement of the vegetated sand dunes, while the nonvegetated sand dunes can change shape and move over time. However, little movement has been observed in the positions of the nonvegetated sand dunes during the last 15 years (Wheeler, 1999).

3.1.3 Geologic Overview

Late Cenozoic crustal extension created the north-south trending fault-block topography that characterizes the northern half of the Basin and Range Physiographic Province (Hintze, 1988), including the topography found in the DPG area. The extensional activity is ongoing in western Utah as evidenced by numerous Quaternary fault scarps, such as those that occur in Skull Valley (Sack, 1993), to the east of DPG. Section 3.1.5, Seismicity, describes earthquake activity and identifies faults located in the vicinity of DPG.

The geologic map for DPG is shown on Figure 3.1-2, Geologic Map of DPG. The mountain ranges within or adjacent to DPG are composed primarily of Paleozoic sedimentary rocks of marine origin and small exposures of volcanic and intrusive Tertiary igneous rocks. With the exception of Granite Peak and the Simpson Mountains, which are composed mainly of Precambrian metamorphic and igneous

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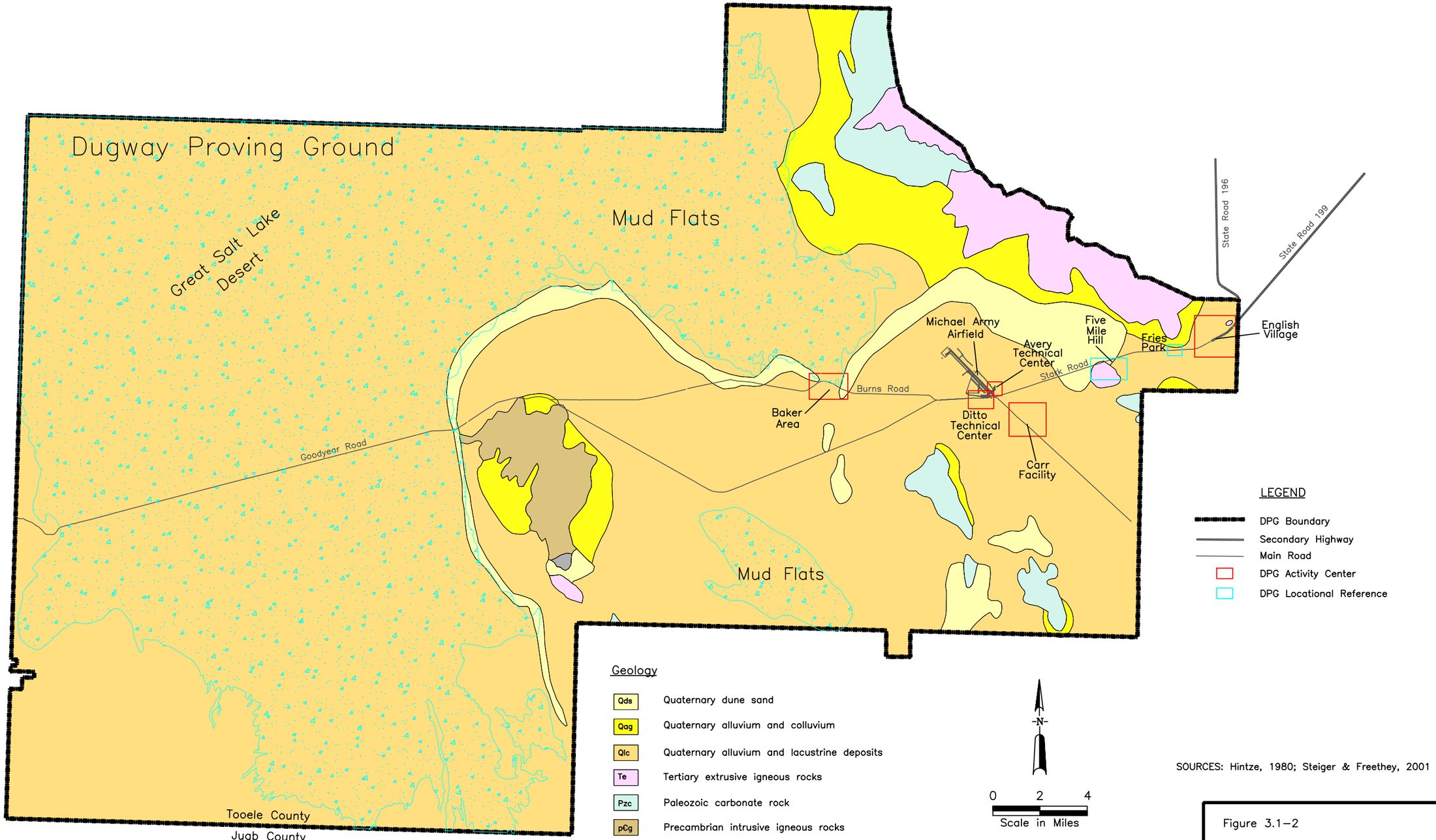

SOURCES: Hintze, 1980; Steiger & Freethey, 2001

Figure 3.1–2

Geologic Map of DPG

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rocks, the low-lying basin areas are filled with thick accumulations of sediment derived from erosion of the uplifted mountain ranges. The sediments consist of Tertiary to Quaternary alluvial, colluvial, lacustrine, eolian, and volcanic material. The basin-fill sediments are described as follows (NRCS, 1992).

- Alluvial and colluvial deposits generally occur as coalescing fans consisting of medium grained to coarse grained sediment sloping from the main mountain masses to the valley floors.
- The valley floors are underlain by lakebed deposits from Lake Bonneville and poorly developed alluvial flood plains, as described below:
  - The lakebed deposits consist mainly of clay and silt and some sand and gravel.
  - Floodplain deposits include a more evenly distributed range of sediment sizes of clay, silt, and sand and some gravel.
- Playa deposits of saline evaporites and mud flats and eolian sediments also underlie the valley floor.

Lake Bonneville, a large freshwater lake, covered much of western Utah and adjacent parts of Idaho and Nevada during the Pleistocene (Stephens and Sumsion, 1978). Preserved segments of two major Lake Bonneville shorelines, the Bonneville and Provo, are evident in the eastern portion of DPG near English Village (Sack, 1993). The Bonneville shoreline is the highest of the lake's shorelines, its elevation varied across Skull Valley from approximately 1,594 to 1,619 m (5,230 to 5,310 ft) in the southern to northern portions of the valley, respectively (Sack, 1993). The maximum elevation of Lake Bonneville at DPG has been estimated to be 1,565 m (5,135 ft), or approximately 267 m (875 ft) above the present-day basin floor (Ebasco, 1995a).

During the recession of Lake Bonneville, the Old River Bed, located in the southeastern portion of DPG, carried drainage from the Sevier Desert toward the Great Salt Lake Desert (Stephens and Sumsion, 1978).

Steiger & Freethey (2001) indicate that the thickness of the basin-fill deposits in the DPG area is not well known. Few wells have penetrated the basin-fill deposits and reached underlying consolidated rock. Those few that have been drilled into consolidated rock are near the basin margins and are of limited value in estimating thickness at the center of the valleys. The deepest well in Dugway Valley penetrated to 168 m (551 ft) without encountering consolidated rock. Wells drilled in the Old River Bed have penetrated as much as 178 m (585 ft) of basin-fill deposits, and the

deepest well in Government Creek Valley is 137 m (450 ft) deep. Hood and Waddell (1968) estimated that the basin-fill deposits are 366 m (1,200 ft) thick to the east of Davis Mountain and 1,829 to 2,134 m (6,000 to 7,000 ft) thick near the eastern flank of the Cedar Mountains.

Lithologic data recorded during the drilling of several English Village water supply wells indicate that the upper 152 m (500 ft) of sediment in this area consists predominantly of sand and gravel, and sediments below this depth consist primarily of fine-grained clay, tuffaceous sand, and volcanic ash. Well logs from the Ditto water supply wells indicate that sediments in this area consist primarily of lacustrine clay with lesser amounts of sand and gravel to a depth of approximately 100 m (330 ft). Sand and gravel were predominately identified in a Carr water supply well, drilled to a total depth of 98 m (320 ft) (USAEHA, 1987). Recent hydrogeologic studies in the Ditto and Carr area indicate that the basin-fill deposits in this area consist of silty sand units interbedded with clay layers. The upper interbedded sand and clay unit host shallow groundwater and is referred to as the shallow water-bearing zone called the shallow aquifer in this EIS. A persistent clay layer exists at approximately 27 m (90 ft) below ground surface (bgs) and is between 20 to 24 m (65 to 80 ft) thick in this area. Data indicate that this layer is continuous throughout the Ditto and Carr areas. This clay layer acts as a barrier to vertical groundwater movement and is referred to as the confining-clay layer. The lower sand is the regional aquifer in this area called the mid-level aquifer in this EIS and is the potable source of groundwater for the Ditto and Carr areas (PES, 2000).

Baker water supply wells also encountered predominantly sand and gravel in the upper 100 m (300 ft) and primarily clay with small amounts of gravel below this depth. Bedrock was not encountered in the deepest well borehole drilled at DPG. This borehole was drilled to a total depth of 306 m (1,003 ft) at Baker (USAEHA, 1987).

3.1.4 Soils

This section discusses the existing soil environment at DPG by describing the natural quality of soils and providing an overview of the ongoing soil contamination investigations and the Army's Integrated Training Area Management (ITAM) Program.

3.1.4.1 Natural Quality of Soils

This section describes the natural quality of soils at DPG by discussing the following elements:

- Description of Soils
- Agricultural Significance of Soils
- Wetland Soils
- Cryptobiotic Soil
- Soil Erosion
- Frost Heaving

Description of Soils – The distribution of soil types at DPG is shown on Figure 3.1-3, Soils Map of DPG. Thirty-three map units have been identified at DPG. A map unit represents an area dominated by one or more major kinds of soil or water. Thirty-two of the 33 map units are soil map units and are described in Table 3.1-1, Description and Extent of Soil Types at DPG, including percent slopes, permeability, runoff potential, water erosion hazard, and wind erosion hazard. This table also identifies the percent of the total area that each soil map unit covers at DPG.

Three map units cover approximately 58 percent of the total area at DPG. These include the Playas (27 percent), the Playas-Saltair Complex (22 percent), and the Saltair-Playas Complex (9 percent). The Playas map unit is 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 this map unit is strongly calcareous, stratified silt, clay, and sand containing sufficient amounts of salt to limit or prohibit the growth of vegetation. The Saltair map unit is a very deep and poorly drained soil that is also found on lake plains. This soil type is formed in alluvium and lacustrine sediments derived from mixed rock sources (NRCS, 1992).

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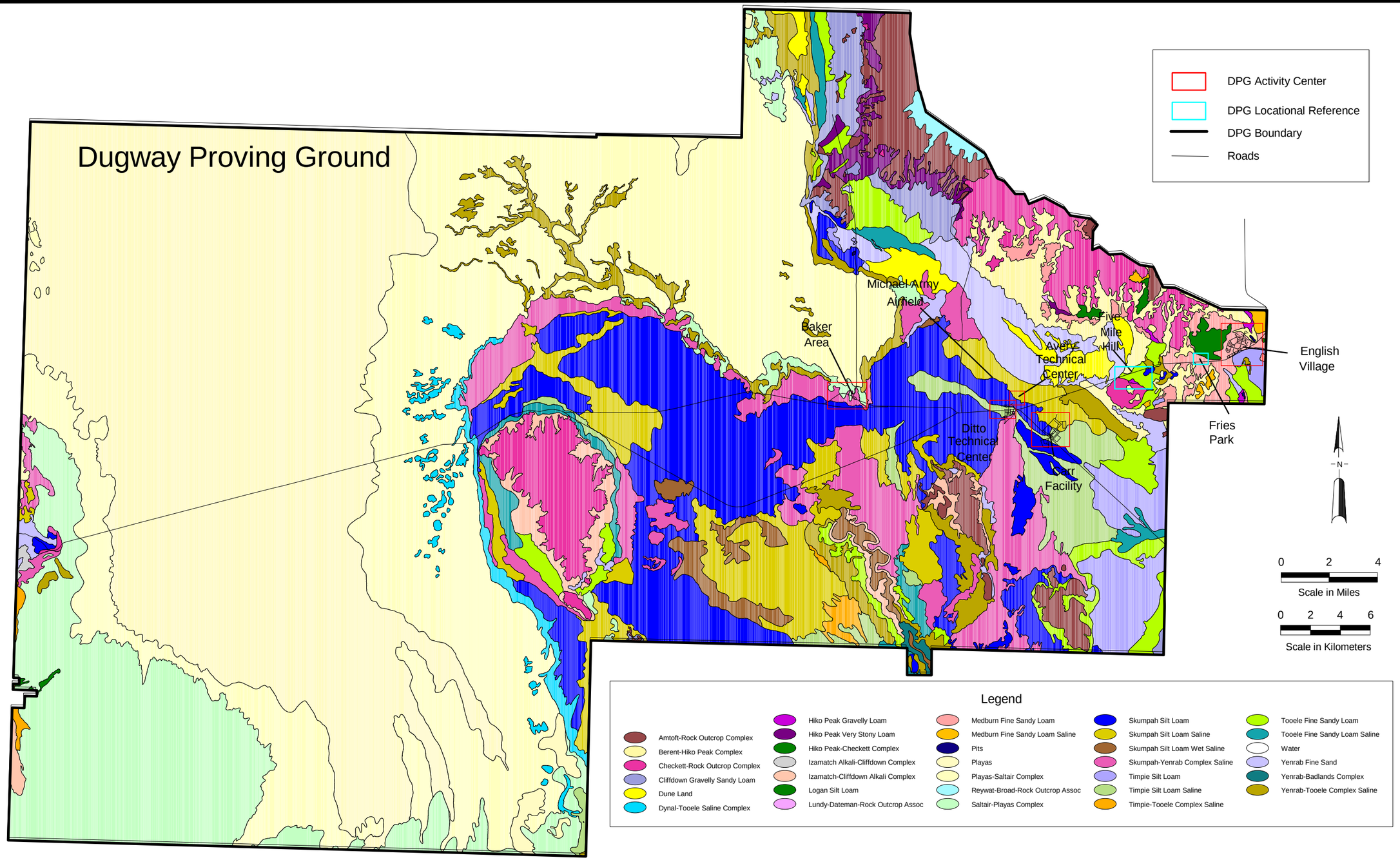

Figure 3.1-3

Soils Map of DPG

SOURCE: NRCS, 1992

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Table 3.1-1. Description and Extent of Soil Types at DPG.

Map Unit Name	Percent Slopes	Permeability	Runoff Potential	Water Erosion Hazard	Wind Erosion Hazard	Map Unit Percent of Total Area
Amtoft-Rock Outcrop Complex	30 to 70	Moderately Rapid	Very Rapid	Severe	Slight	2.11
Berent-Hiko Peak Complex	2 to 15	Moderately Rapid to Rapid	Very Slow to Medium	Slight to Moderate	Slight to Severe	1.59
Checkett-Rock Outcrop Complex	10 to 40	Moderate	Very Rapid	Severe	Slight	3.03
Cliffdown Gravelly Sandy Loam	2 to 15	Moderately Rapid	Medium	Slight	Moderate	1.01
Dune Land	*	*	*	*	*	0.79
Dynal-Tooele Saline Complex	0 to 15	Moderately Rapid to Rapid	Very Slow to Slow	Slight	Moderate to Very Severe	0.86
Hiko Peak Gravelly Loam	2 to 15	Moderately Rapid	Medium	Moderate	Slight	0.03
Hiko Peak Very Stony Loam	2 to 8	Moderately Rapid	Medium	Slight	Slight	0.65
Hiko Peak-Checkett Complex	2 to 40	Moderate to Moderately Rapid	Medium to Very Rapid	Moderate to Severe	Slight	0.19
Izamatch Alkali-Cliffdown Complex	2 to 15	Moderately Rapid to Rapid	Very Slow to Medium	Slight	Slight to Moderate	0.04
Izamatch-Cliffdown Alkali Complex	2 to 8	Moderately Rapid to Rapid	Very Slow to Medium	Slight	Slight to Moderate	1.05
Logan Silt Loam	0 to 1	Slow	Slow	Slight	Moderate	0.02
Lundy-Dateman-Rock Outcrop Association	30 to 70	Moderate	Very Rapid	Severe	Slight	0.00
Medburn Fine Sandy Loam	2 to 8	Moderately Rapid	Medium	Moderate	Moderate	0.71
Medburn Fine Sandy Loam Saline	2 to 4	Moderately Rapid	Slow	Slight	Moderate	0.09
Pits	*	*	*	*	*	0.01
Playas	*	*	*	*	*	26.78
Playas-Saltair Complex	0 to 1	Slow	Slow	Slight	Moderate	22.12
Reywat-Broad-Rock Outcrop Association	30 to 60	Moderately Slow	Very Rapid	Severe	Slight	0.20
Saltair-Playas Complex	0 to 1	Slow	Slow	Slight	Moderate	8.85
Skumpah Silt Loam	0 to 2	Moderately Slow	Slow	Slight	Moderate	9.37
Skumpah Silt Loam Saline	0 to 2	Moderately Slow	Slow	Slight	Moderate	4.13
Skumpah Silt Loam Wet Saline	0 to 1	Moderately Slow	Slow	Slight	Moderate	0.83
Skumpah-Yenrab Complex Saline	0 to 15	Moderately Slow to Rapid	Very Slow to Slow	Slight	Moderate to Severe	4.55
Timpie Silt Loam	0 to 3	Moderately Slow	Slow	Slight	Moderate	1.50
Timpie Silt Loam Saline	0 to 4	Moderately Slow	Slow	Slight	Moderate	1.65
Timpie-Tooele Complex Saline	0 to 5	Moderately Slow to Moderately Rapid	Slow	Slight	Moderate	0.27
Tooele Fine Sandy Loam	0 to 5	Moderately Rapid	Slow	Slight	Moderate	2.03
Tooele Fine Sandy Loam Saline	0 to 5	Moderately Rapid	Slow	Slight	Moderate	0.98
Yenrab Fine Sand	2 to 15	Rapid	Very Slow	Slight	Very Severe	1.79
Yenrab-Badlands Complex	2 to 15	Rapid	Very Slow	Slight	Very Severe	0.08
Yenrab-Tooele Complex Saline	0 to 15	Moderately Rapid to Rapid	Very Slow to Slow	Slight	Moderate to Severe	2.69
Total						**100.00**

* Information is not available or not applicable.

SOURCE: NRCS, 1992

The remaining area at DPG is covered by 27 soil map units and three miscellaneous area map units. The 27 soil map units cover approximately 41 percent of the total area at DPG. However, individually each soil map unit covers less than 5 percent of the total area at DPG, with the exception of the Skumpah Silt Loam which covers approximately 9 percent of DPG. The three miscellaneous area map units cover approximately 1 percent of the total area at DPG. The Unpublished Soil Survey of Tooele Area, Utah, Tooele County and Parts of Box Elder, Davis, and Juab Counties, Utah, and Parts of White Pine and Elko Counties, Nevada (NRCS, 1992) describes these soil and miscellaneous area map units.

Agricultural Significance of Soils – The soils at DPG are not considered agriculturally significant. The identified soil types do not meet prime farmland classification requirements because of inadequate precipitation, insufficient water for irrigation, high alkalinity, high salinity, or steep slopes. However, the following nine soil map units that cover approximately 8 percent of the total area at DPG would meet the requirements for farmland of state-wide importance if an adequate and dependable supply of irrigation water was available (NRCS, 1992):

- Cliffdown Gravelly Sandy Loam
- Hiko Peak Gravelly Loam
- Medburn Fine Sandy Loam
- Medburn Fine Sandy Loam Saline
- Timpie Silt Loam
- Timpie Silt Loam Saline
- Timpie-Tooele Complex Saline
- Tooele Fine Sandy Loam
- Tooele Fine Sandy Loam Saline

Wetland Soils – Two wetland delineation studies have identified hydric soils at DPG (ESA, 1994; Lichvar et al., 1995). Hydric soils are defined by the USDA, Soil Conservation Service, as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Lichvar et al., 1995). Anaerobic conditions exist in the absence of free oxygen. The Saltair soil type has been identified as a hydric soil in the DPG area (ESA, 1994). To be identified as a wetland, three indicator parameters must be present, including hydric soils, hydrophytic vegetation, and wetland hydrology (Lichvar et al., 1995). Section 3.2.2.1, Surface Water Features at DPG, describes the wetland areas that have been identified at DPG.

Cryptobiotic Soil – Areas containing cryptobiotic soil have also been identified at DPG. This black soil crust is described in Section 3.4.2.1, Cryptobiotic Soil, including its composition and relative distribution at DPG.

Soil Erosion – Soil erosion refers to the group of processes (via water, ice, or wind) whereby soil is loosened or dissolved and moved to another location. Areas impacted by soil erosion have been identified at DPG. Table 3.1-1, Description and Extent of Soil Types at DPG, identifies the water and wind erosion potential for the soils at DPG.

Five soil map units have a water erosion hazard of severe, including Amtoft-Rock Outcrop Complex, Checkett-Rock Outcrop Complex, Hiko Peak-Checkett Complex, Lundy-Dateman-Rock Outcrop Association, and Reywat-Broad-Rock Outcrop Association. These units cover approximately 5 percent of the total area at DPG, have a very rapid runoff potential, and have slopes that range from 2 to 70 percent.

Six soil map units have wind erosion hazards of severe to very severe, including Berent-Hiko Peak Complex, Dynal-Tooele Saline Complex, Skumpah-Yenrab Complex Saline, Yenrab Fine Sand, Yenrab-Badlands Complex, and Yenrab-Tooele Complex Saline. These units cover approximately 12 percent of the total area at DPG and have slopes that range from 0 to 15 percent.

Soil erosion can occur by natural or man-made influences at DPG. Soil erosion has been noted along the base of the Cedar Mountains, north of Ditto. In August 1998, a range fire destroyed vegetation in this area and surface water runoff has subsequently caused a significant amount of soil erosion in the burned areas. Figure 3.1-4, Fires Occurring at DPG from 1994 through 1998, shows the locations of recent range fires at DPG. Soil erosion could occur in any of these burned areas.

Soil erosion generally noted in the DPG range training areas is thought to be due to training activities. In the White Sage Training Area, soil has been mounded around the base of numerous juniper trees forming soil pedestals due to vehicle traffic around these trees during bivouacking activities. Soil erosion has also been noted in the Wig Mountain Training Area.

Frost Heaving – The depth of freezing in soil at DPG is approximately 0.46 m (1.5 ft). However, the actual depth of freezing may vary considerably depending on cover, soil type, soil moisture, topography, and weather (Spangler and Handy, 1982). Frost heaving may cause the upward movement of buried munitions in the range and impact training and testing areas. Additionally, soil erosion can also expose buried

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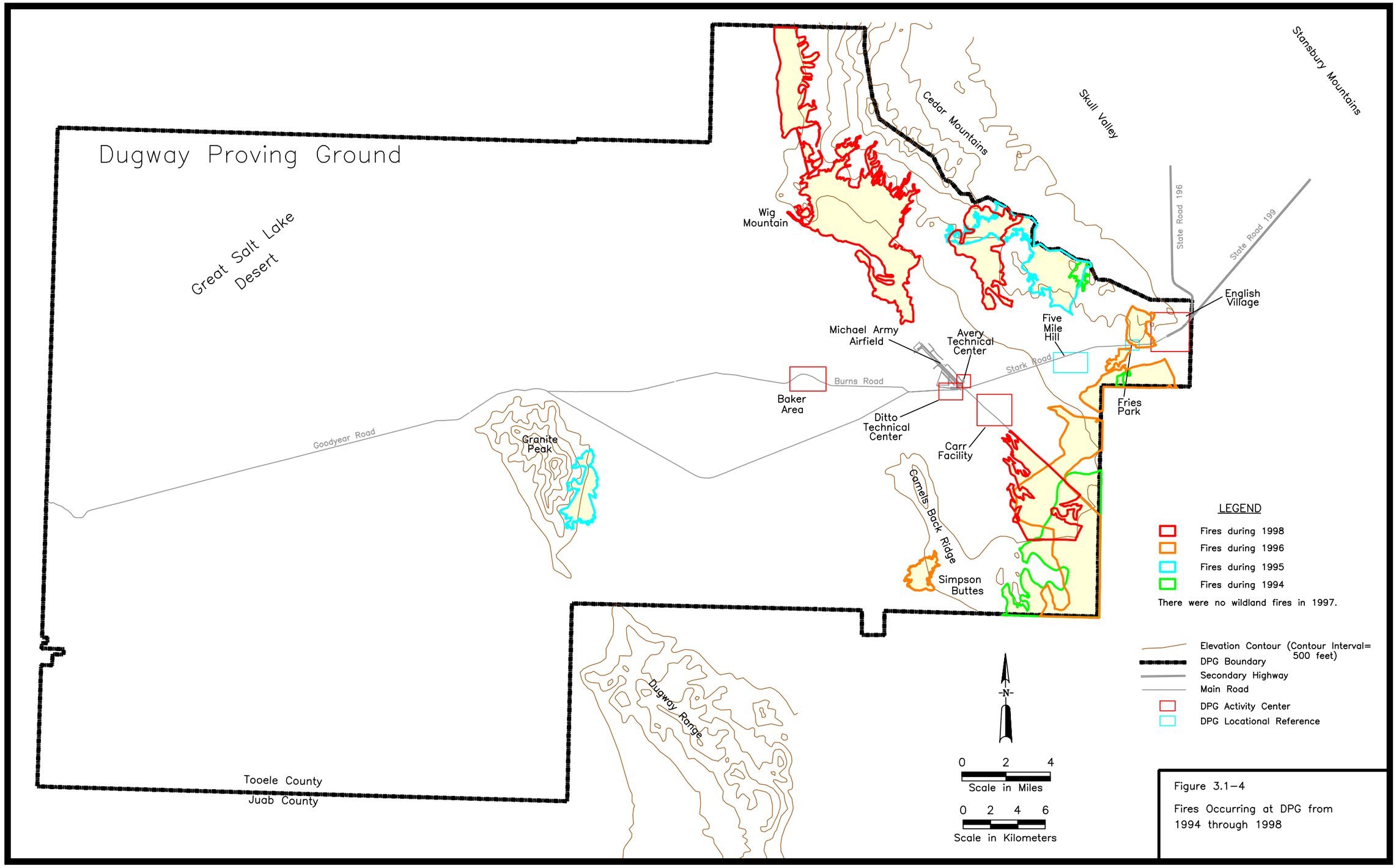

Figure 3.1–4

Fires Occurring at DPG from 1994 through 1998

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munitions. The munitions are not intentionally buried. Rather, they may become buried by virtue of their momentum when impacting the ground surface after being fired or dropped during training or testing activities. These munitions can remain buried and relatively undamaged for extended periods of time. When these munitions are discovered, Technical Escort personnel at DPG conduct range clearance operations (DPG, 1999d; DPG, 2000l). Section 2.1.8, Baseline Mission Support Activities, summarizes Technical Escort's role at DPG. Section 3.13.5.2, Range Recovered Munitions, describes the management of range recovered munitions at DPG, and Section 3.1.4.2, Soil Contamination Investigations, describes areas which may contain buried UXO.

3.1.4.2 Soil Contamination Investigations

Soil contamination has occurred in some areas of DPG from past testing, training, or waste management activities. Ongoing investigations are studying the nature and extent of potential soil contamination at identified areas within DPG. This section provides an overview of the ongoing soil contamination investigations at DPG by discussing the following elements:

- Solid and Hazardous Waste Management Units
- Past Testing and Training Areas
- Active Testing and Training Areas

Solid and Hazardous Waste Management Units – On March 15, 1994, the Executive Secretary of the Utah Solid and Hazardous Control Board issued a RCRA permit for storage of hazardous waste at DPG. (As a condition of this permit, DPG is required to perform a corrective action investigation for each solid waste management unit (SWMU) identified at DPG (PES, 1996). SWMUs are generally defined as areas used to manage hazardous waste prior to 1980 and are being investigated by COE under a RCRA Facility Investigation. One hundred and sixty SWMUs have been identified at DPG; these units are described in Appendix E, Solid and Hazardous Waste Management Units at DPG, and are identified on Figure E-1, Locations of SWMUs at DPG.

One hundred and sixty solid waste management units have been identified at DPG.

Forty-five hazardous waste management units (HWMUs) were identified in Stipulation and Consent Orders 8909884 (September 13, 1990, amended December 22, 1993) and 9309065 (September 30, 1994) from the Utah Division of Solid and Hazardous Waste (UDSHW). HWMUs are generally defined as areas used to manage hazardous waste after 1980 and are being investigated under a Consent Order investigation. The Consent Orders state that the identified HWMUs must be closed and until closure, they are subject to all applicable interim status requirements. DPG plans to close the identified HWMUs; units that have not been closed to date are listed in the Final Part A Permit Application Modification for DPG Interim Status Facilities (AGEISS, 1998b). The HWMUs are described in Appendix E, Solid and Hazardous Waste Management Units at DPG and are identified on Figure E-2, Locations of HWMUs at DPG.

Soil samples have been collected for chemical analysis at 88 SWMUs during the Phase I RCRA Facility Investigation and at 39 HWMUs as part of the Consent Order investigation as identified in Appendix E, Solid and Hazardous Waste Management Units at DPG. Background soil samples were also collected during these investigations from areas believed to represent natural background conditions (PES, 1996). Figure 3.1-5, Locations of Background Soil Samples, shows activity centers at DPG and the locations of background soil samples. Statistical analysis of the background soil samples was conducted to derive a background soil concentration believed to represent natural background conditions for DPG. The background soil concentrations used in the RCRA Facility Investigation are presented in Table 3.1-2, Background Soil Concentrations.

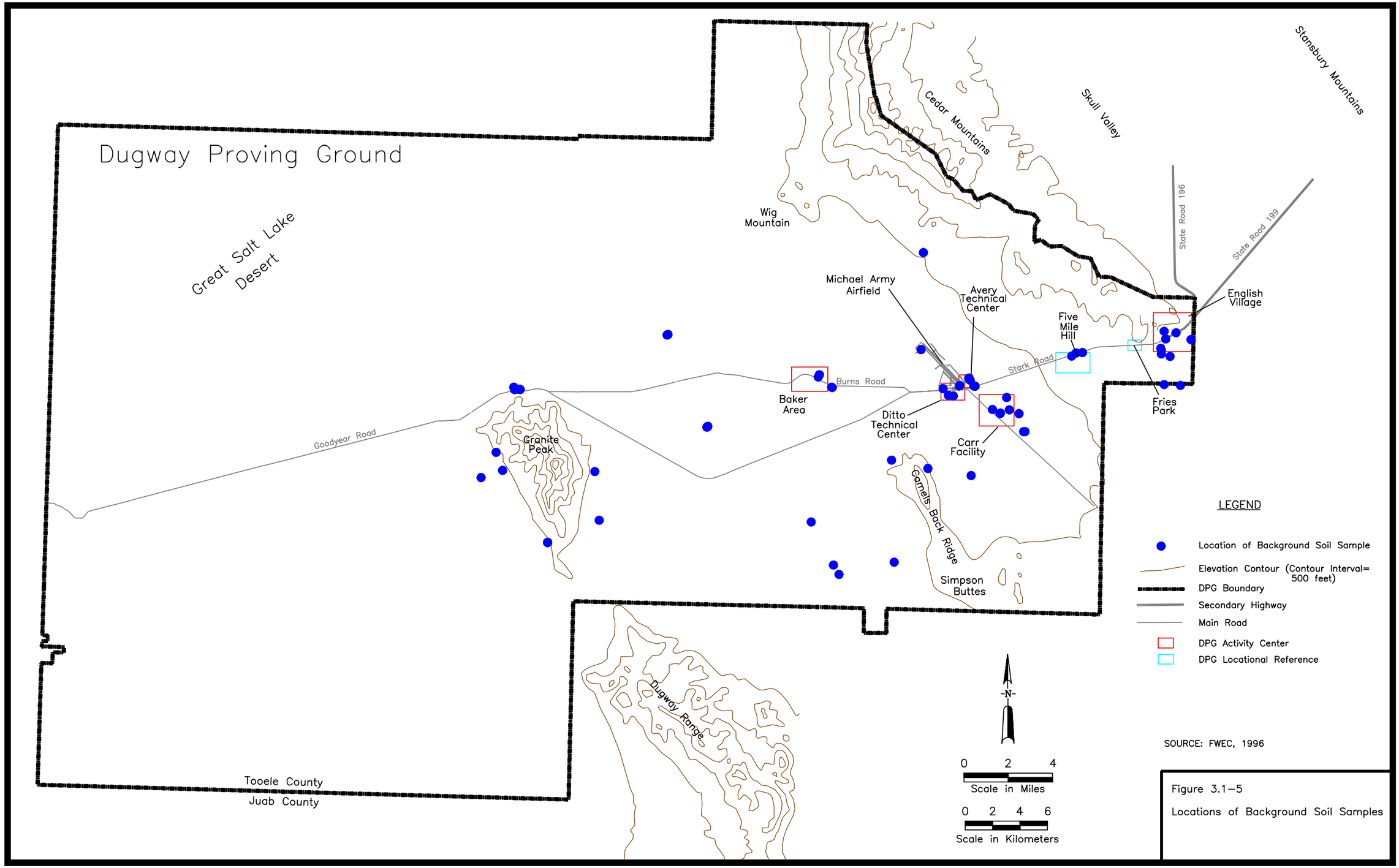

Figure 3.1–5
Locations of Background Soil Samples

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Table 3.1-2. Background Soil Concentrations.

Analyte	Background Concentration (95% Upper Tolerance Limit (mg/g))
Aluminum	19,000
Antimony	9.1 (maximum value)
Arsenic	13
Barium	400
Beryllium	1
Cadmium	0.46 (reporting limit)
Calcium	190,000
Chromium	17
Cobalt	7.9
Copper	25
Iron	19,000
Lead	14
Magnesium	29,000
Manganese	520
Mercury	0.05 (reporting limit)
Nickel	17
Potassium	7,400
Selenium	2.9 (maximum value)
Silver	0.94 (reporting limit)
Sodium	11,000
Thallium	35
Vanadium	29
Zinc	59

% percent
µg/g micrograms per gram

SOURCE: PES, 1996

Parsons Engineering Science identified several general trends regarding background soils during the Phase I RCRA Facility Investigation. The occurrence of common metals, such as aluminum, calcium, iron, magnesium, potassium, and sodium, above background concentrations usually indicated a different soil mineralogy compared to the background group. Differences in common metals composition between SWMU and background soil samples could also lead to differences in trace metal concentrations because trace metals tend to adsorb or bind onto clays and iron oxides more effectively than calcium carbonate type soils. Therefore, Parsons Engineering Science concluded that the occurrence of metal analyte concentrations just above background in SWMU soils could be related to natural differences in soil chemistry. This is important because even natural limits of the metals at DPG will exceed soil screening criteria and pose a human health risk when performing a regulatory clean closure assessment (PES, 1996).

Additionally, the soil samples collected for background determination were also analyzed for the full suite of chemical analytes, even those chemicals that would not be expected to be representative of natural conditions, such as explosives or volatile

organic compounds (VOCs). Results of these samples show evidence that contamination at DPG has not spread beyond the SWMUs and HWMUs to any significant extent. Figure 3.1-5, Locations of Background Soil Samples, shows the locations of background soil samples and their proximity to activity centers. Results of the background soil analysis did not detect any mission-related chemicals such as explosives or agent breakdown products.

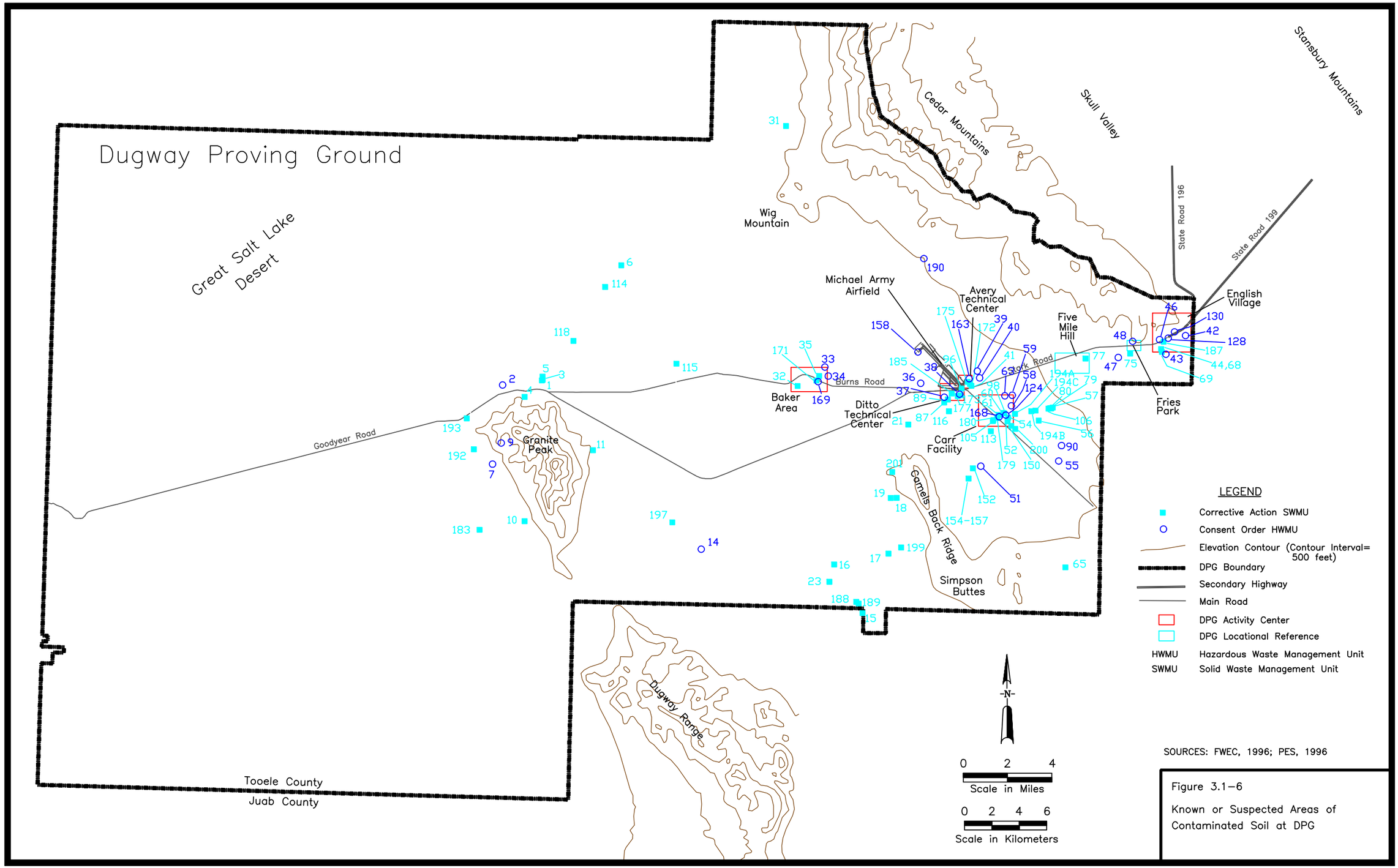
Analyte groups detected at the HWMUs and SWMUs, based on organic analytes detected above certified reporting limits and inorganic analytes detected above background are identified in Appendix E, Solid and Hazardous Waste Management Units at DPG. VOCs, semi-volatile organic compounds (SVOCs), pesticides, dioxins, explosives, agent breakdown products (ABPs), total organic carbon (TOC), total petroleum hydrocarbons (TPH), radiochemistry, total phosphorus, and/or metals were detected in the soil samples collected at one or more of the SWMUs. VOCs, SVOCs, pesticides, polychlorinated biphenyls (PCBs), dioxins/furans, explosives, ABPs, TPH, cyanide, and/or metals were detected in the soil samples collected at one or more of the HWMUs.

Locations of HWMUs and SWMUs that contain areas of known or suspected contaminated soil at DPG are shown in Figure 3.1-6, Known or Suspected Areas of Contaminated Soil at DPG. In this figure, known or suspected areas of contaminated soil are defined as follows:

- A SWMU at which further action has been recommended based on the results of the Phase I RCRA Facility Investigation
- A HWMU at which assessment of the analytical results identified possible HWMU-related contaminants in the soil

This figure only includes HWMUs and SWMUs that have been identified within the installation boundaries that are being managed as part of DPG's IRP. The IRP program is summarized in Section 3.13.5, DPG Restoration Wastes. Three SWMUs, SWMUs 67, 126, and 127, have been identified to the northeast or south of DPG and are not included on the figure. These SWMUs are being investigated by the COE as FUDS. The FUDS program is summarized in Section 5.1.13, Formerly Used Defense Sites.

The status of ongoing soil contamination investigations at the HWMUs and SWMUs is summarized in Appendix E, Solid and Hazardous Waste Management Units at DPG. Because the intent of this EIS is to provide an overview of the existing environmental conditions at DPG, detailed discussions of the investigation activities



SOURCES: FWEC, 1996; PES, 1996

Figure 3.1–6

Known or Suspected Areas of Contaminated Soil at DPG

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at the HWMUs and SWMUs are not included in this section. However, a comprehensive discussion of the operational history, nature and extent investigation (including sample locations, collection methods, and detected analyte concentrations), and further investigation or closure plans for the SWMUs and HWMUs can be found in the following documents:

- Final Phase I RCRA Facility Investigation Report (PES, 1996)
- Final Dugway Proving Ground Closure Plan Module 1 - SWMUs 30, 160, and 161 (Ebasco, 1995b)
- Final Dugway Proving Ground Closure Plan Module 2, SWMUs 20, 164, 166, and 170 (FWEC, 1997b)
- SWMU Closures at Dugway Proving Ground Final Interim Report (Ebasco, 1995a)
- Draft Dugway Proving Ground Closure Plan Module 3 (FWEC, 1996)

Past Testing and Training Areas – Many of the impact areas, ranges, target areas, and test grids at DPG were used prior to 1969 for open-air testing of biological agents, chemical agents, and radiological materials (AGEISS, 1996a). The following figures show areas where historic biological, chemical, radiological, or smokes and obscurants testing was conducted at DPG:

- Figure 3.1-7, Historic Areas Where Biological Testing was Conducted at DPG
- Figure 3.1-8, Historic Areas Where Chemical Testing was Conducted at DPG
- Figure 3.1-9, Historic Areas Where Radiological Testing was Conducted at DPG
- Figure 3.1-10, Historic Areas Where Smokes and Obscurants Testing was Conducted at DPG

Active and former impact areas, ranges, target areas, and test grids at DPG may potentially contain UXO. These include areas west of Ditto and impact areas located in the eastern portion of DPG. A large portion of the range was cleared of surface UXO between the late 1970s and early 1990s; however, an unknown number of subsurface UXO may be present in many areas. Frost heaving or soil erosion can cause UXO to surface in areas that were previously surface cleared. UXO is known to be present in the White Sage and Wig Mountain Impact Areas. Access to these areas is restricted and requires an Army escort. UXO is also known to be present

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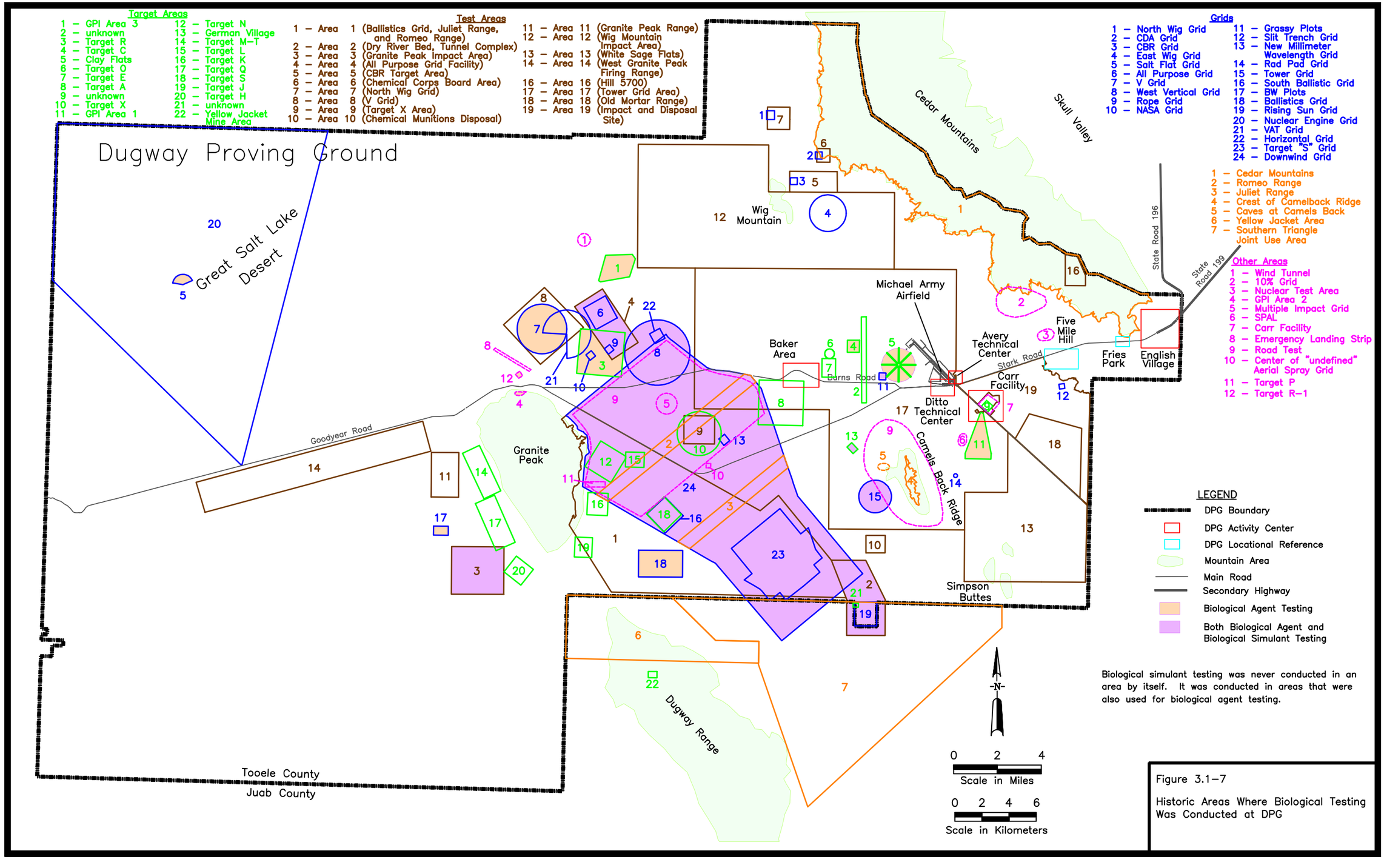

Figure 3.1–7

Historic Areas Where Biological Testing Was Conducted at DPG

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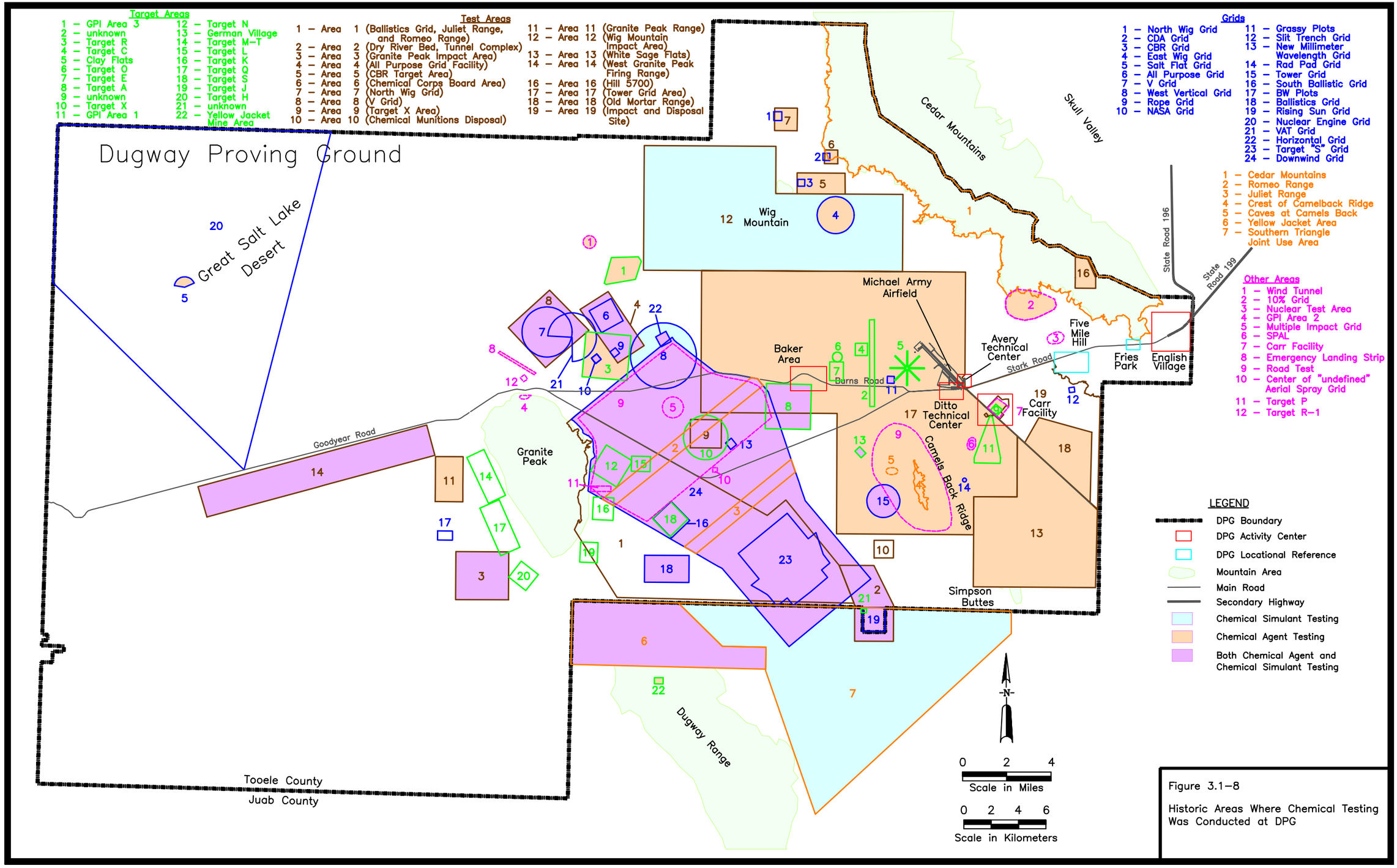

Figure 3.1–8

Historic Areas Where Chemical Testing Was Conducted at DPG

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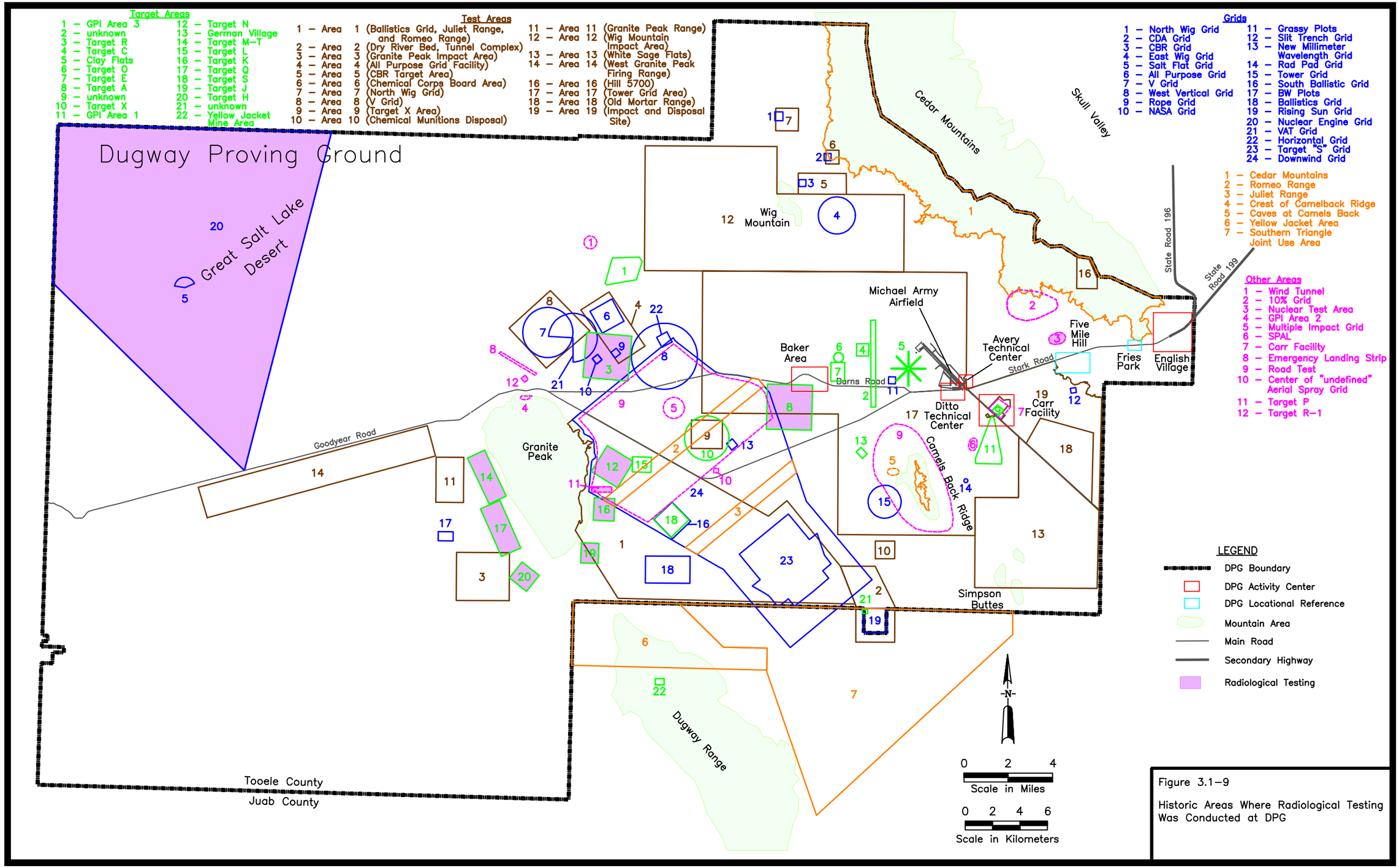

Figure 3.1–9

Historic Areas Where Radiological Testing Was Conducted at DPG

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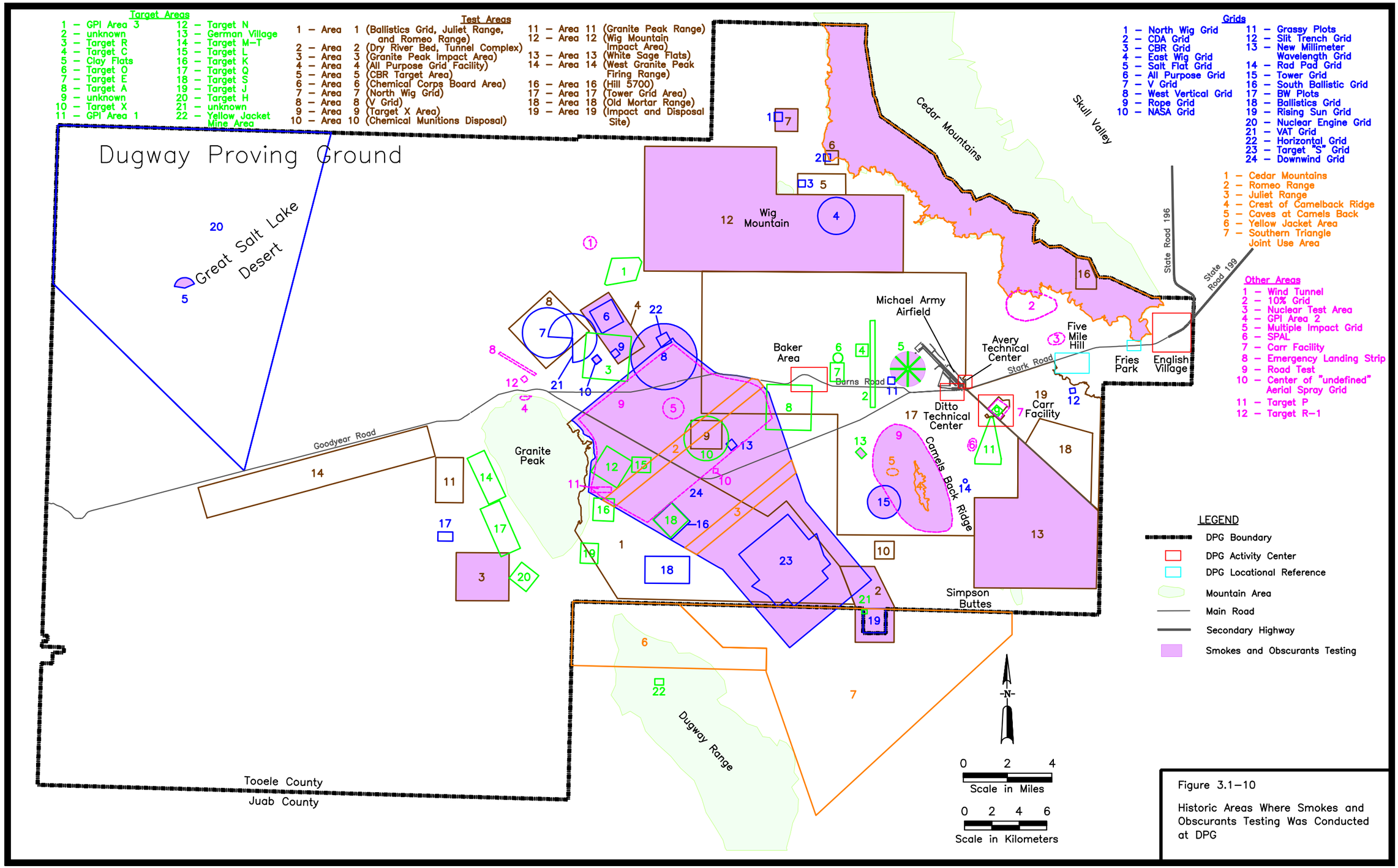

Figure 3.1–10

Historic Areas Where Smokes and Obscurants Testing Was Conducted at DPG

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within Downwind Grid in an area west of Centerline Road and south of Juliet Road. This area has been fenced to restrict access.

The majority of historic testing areas are located within DPG's boundaries. However, as shown on Figures 3.1-7 through 3.1-10, testing was also conducted to the south of DPG. These testing areas are located on BLM, state, and/or privately owned lands. The Yellow Jacket Area and the Southern Triangle Joint Use Area are being investigated by the COE under the FUDS program. These two areas are identified as SWMUs 126 and 127, respectively, in Table E-1, Solid and Hazardous Waste Management Units at DPG, and are further discussed in Section 5.1.13, Formerly Used Defense Sites.

As shown on Figures 3.1-7 through 3.1-10, past testing activities were not conducted to the northeast of DPG in the Cedar Mountains. However, as identified in Table E-1, Solid and Hazardous Waste Management Units at DPG, SWMU 67 was used for the disposal of sheep carcasses determined in a report by the U.S. Congress Committee on Government Operations to have been exposed to nerve gas. SWMU 67, Landfill at North Cedar Mountain, is located northeast of DPG and is being investigated under the FUDS program. Section 1.4.2, Korean War to the Late 1960s Era, describes the events surrounding the sheep deaths in 1968.

As described in this section, ongoing soil contamination investigations have collected soil samples from many of the identified HWMUs and SWMUs at DPG. However, very little soil sampling has been conducted outside of these waste management areas. Limited soil sampling may have been conducted in specific test areas or as part of past testing programs. In 1988, 206 soil samples were collected under the Land Condition Trend Analysis (LCTA) program from the testing and training ranges. LCTA is described in Section 3.1.4.3, Integrated Training Area Management Program. The samples were analyzed for arsenic, cadmium, copper, lead, magnesium, mercury, and zinc. The samples were collected in support of DPG's natural resource programs and thus do not have the low detection limit requirements that samples collected under the RCRA program have. However, they do provide the only information regarding concentrations of chemicals on the testing and training ranges.

The background values for arsenic, cadmium, copper, lead, magnesium, mercury, and zinc determined under the RCRA IRP were compared with the maximum detected values of these metals in the soil samples collected from the testing and training ranges under the LCTA program. This comparison is shown in Table 3.1-3, Comparison of RCRA IRP Soil Background Values to the Maximum Detection in LCTA Soil Samples.

Table 3.1-3. Comparison of RCRA IRP Soil Background Values to the Maximum Detection in LCTA Soil Samples.

Metal	Background Concentration (mg/g)	Maximum Detection in LCTA Samples (mg/g)	Number of LCTA Samples[1] with Detections
Arsenic	13	Not Detected Detection Limit = 40 µg/g*	0
Cadmium	0.46	Not Detected Detection Limit = 1 µg/g*	0
Copper	25	45.3	1
Lead	14	67.9	10
Magnesium	29,000	47,200	12
Mercury	0.05	Not Detected Detection Limit = 0.1 µg/g*	0
Zinc	59	120	14

1 A total of 206 samples were analyzed.
* Indicates detection limit was above background value.

SOURCE: PES, 1996; Arjo, 1999

The detection limits for arsenic, cadmium, and mercury were above background values. Thus, a comparison cannot be done for these metals. However, it is important to note that the detection limits for these metals ranged from two to three times background. With these detection limits, still within the protective range for human health, no detections were noted.

Copper, magnesium, and zinc were detected at approximately two times their background levels and lead was detected at approximately four times its background value. These values do not indicate a concern for human health based on EPA's risk-based standard for these metals. Considering that these samples were collected from a "worst-case" location, the testing and training range, these samples do not indicate gross contamination of the soil from DPG's past mission.

Active Testing and Training Areas – The RCRA Facility Assessment (USHWBC, 1992) identified 21 areas of concern (AOCs) at DPG that include many of the target areas, test areas, and grids shown on Figures 3.1-7 through 3.1-10. An AOC is defined as an area with a potential release that does not fit within the definition of a SWMU. These active sites have not been investigated. DPG's RCRA permit directs that if any AOC becomes inactive, it will undergo investigation. The AOCs are summarized in Appendix F, Areas of Concern at DPG, and are identified on Figure F-1, Areas of Concern at DPG.

3.1.4.3 Integrated Training Area Management Program

The Army's ITAM Program has been in place for over 10 years at DPG to monitor and mitigate damage to natural resources, including soil erosion and compaction, caused by military activity.

Monitoring is essential to identify trends in rangeland conditions and determine progress in rehabilitation activities. Mitigation addresses sustainable use of military lands by repairing damage to rangelands and improving site conditions for training or testing activities. The ITAM Program utilizes academic institutions to execute program components and provide technical expertise. In 1998, execution of the ITAM Program was granted to Brigham Young University (BYU) through a memorandum of understanding signed by DPG and BYU.

ITAM was first implemented at DPG in 1989 by the U.S. Army Construction Engineering Research Laboratories and Colorado State University (CSU). LCTA was the only one of four ITAM components originally implemented. LCTA is the monitoring aspect of the ITAM Program; it employs a standardized method of data collection, analysis, and reporting. LCTA methods were designed in part to collect information necessary to calculate soil erosion potential based on the Universal Soils Loss Equation. The Universal Soils Loss Equation is considered the most feasible and economical estimate of soil erosion potential on extensive areas.

Between 1990 and 1997, LCTA, including development of a Geographic Information System for natural resource data compilation and analysis, was executed by CSU in coordination with the DEP at DPG. In 1998, funding was procured to include the Land Rehabilitation and Management (LRAM) component of ITAM and program execution of LRAM was transferred to BYU. During the years of 1998 and 1999 BYU has implemented a cadre of projects to restore degraded rangelands and investigate approaches to maximize success in meeting rehabilitation objectives.

LRAM practices are those maintenance investments that are funded through the LRAM component of the ITAM Program. They include operations or structures that slow runoff water velocity, thus reducing the amount of sediment that is carried by runoff waters. There are two basic types of LRAM practices: repair and sustain. Repair practices are those that directly affect erosion and whose benefit can be quantified to "shift" the land condition curve. Seeding is an example of a repair practice. Sustain practices are nonerosion related practices, i.e., they do not directly affect erosion. Firebreaks are an example of a sustain practice.

While the majority of DPG's ITAM projects relate more closely to biological resources, ITAM does cover soil issues as well. For example, an ITAM project

involves sampling vegetation and soil disturbance at firing points within the training areas to assess range conditions.

3.1.5 Seismicity

Seismicity is defined as the likelihood of an area being subject to earthquakes. Earthquakes are the manifestations of excess shearing stresses in the earth's crust that cause a rock mass to break or slip along a fault (Arabasz et al., 1979).

Utah occupies a significant segment of the Intermountain Seismic Belt, a zone of pronounced earthquake activity that extends from southern Nevada to northwestern Montana. This seismic belt corresponds to a zone of active stretching and fracturing of the earth's crust in response to deformation and uplift within the North American plate (Arabasz et al., 1979).

The Basin and Range Physiographic Province has been undergoing active tectonic uplift since the middle Miocene age (approximately 10 million years before present). The term tectonic relates to the movement and deformation of the earth's crust on a large scale, including faulting. Nearly all northern Basin and Range mountain ranges are fault-block mountains. Therefore, faults are generally located at the base of the mountain ranges. These faults are considered to be active in a geologic sense. The return frequency for earthquakes along these faults is between 450 and 5,000 years (NRCS, 1992).

Since 1850, various types of information have been available for locating earthquakes in Utah and for estimating their size, ranging from personal accounts in local newspapers to data recorded by a high-gain, centrally recorded telemetered network. Reliable seismic monitoring of the Utah region became possible in mid-1962 with the installation of a skeletal state-wide network. The Worldwide Standardized Seismograph Network station located at DPG has been operational since 1962 and has provided a continuous record of all earthquakes greater than about magnitude 2.5 in Utah (Arabasz et al., 1979).

Between 1962 and 1977, four earthquake epicenters were identified within DPG. Figure 3.1-11, Mapped Faults at DPG and Approximate Locations of Earthquake Epicenters, shows the locations of these epicenters. The magnitude of the associated earthquakes ranged from 1.3 to 2.3 (UUSS, 1999). Historic seismicity in this general area is shown in Figure 3.1-12, Historic Seismicity in the Utah Region (1850 through 1977). Prior to 1962, four earthquakes with magnitudes greater than 3.0 occurred in

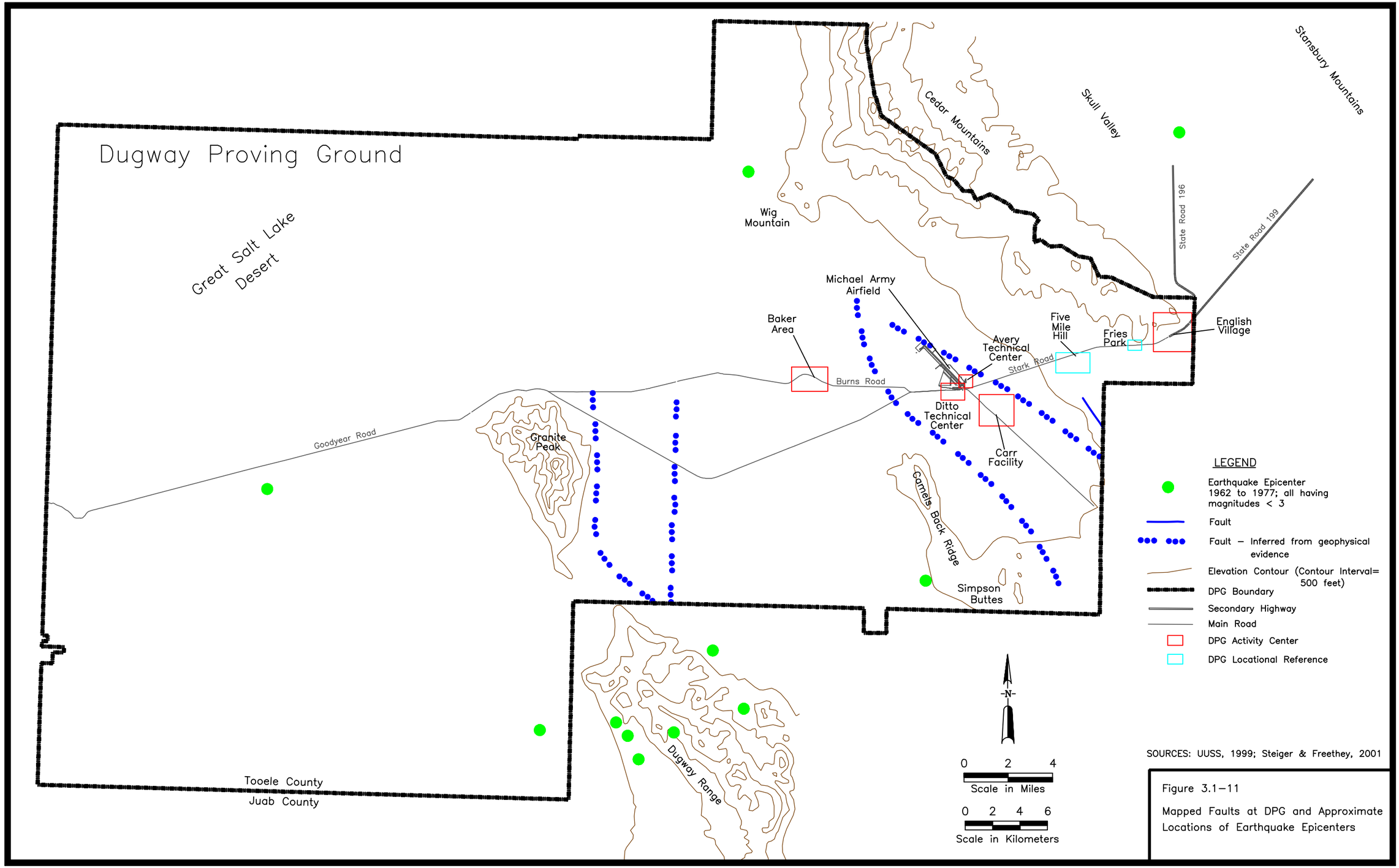

Figure 3.1–11

Mapped Faults at DPG and Approximate Locations of Earthquake Epicenters

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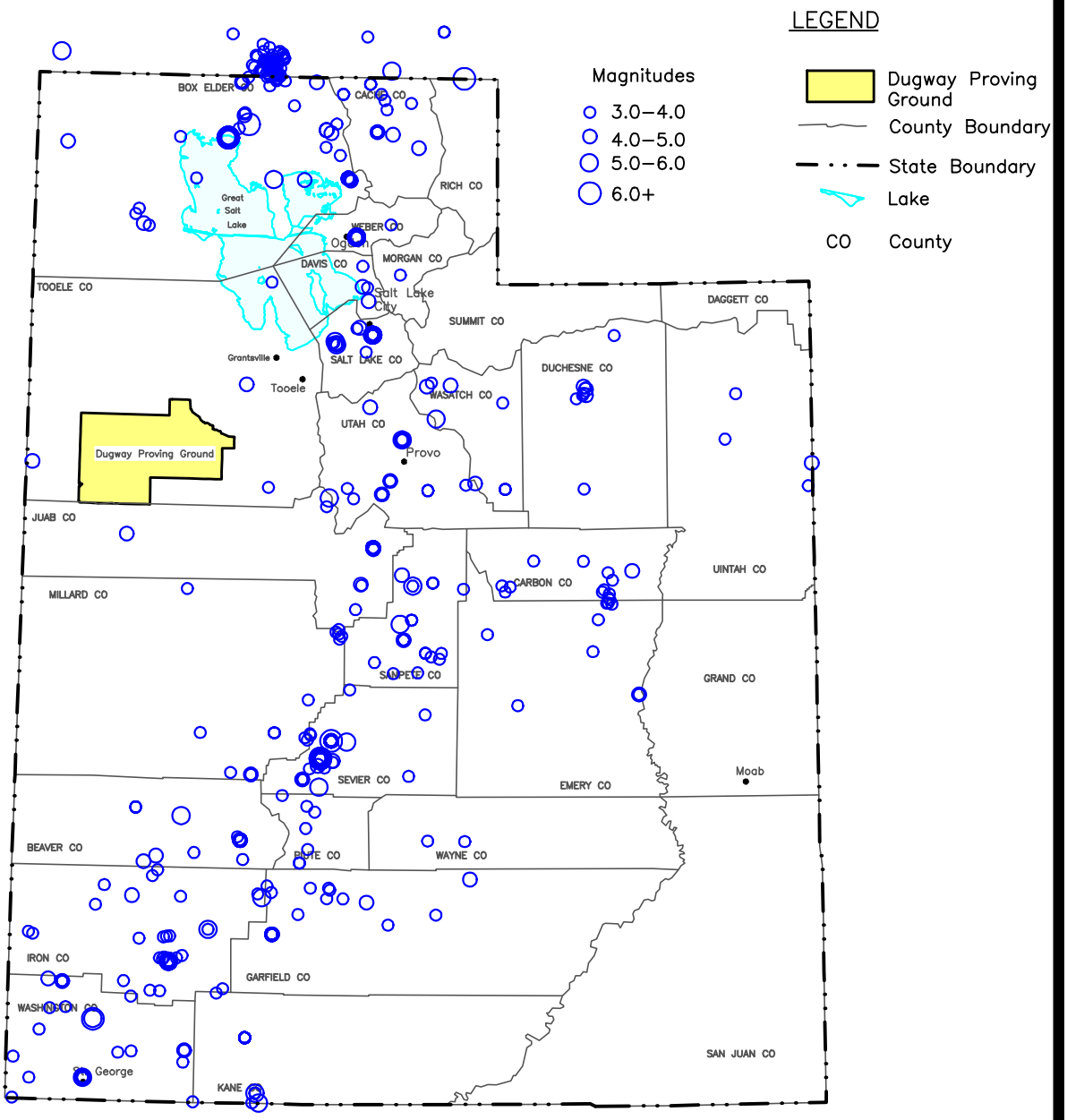

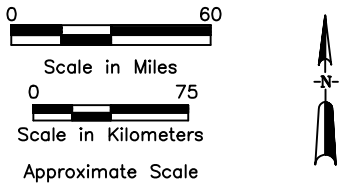

Figure 3.1–12

Historic Seismicity in the Utah Region (1850 through 1977)

SOURCE: UUSS, 1999

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the vicinity of DPG (UUSS, 1999). The associated epicenters were located within approximately 32 km (20 mi) of DPG, to the northeast, southeast, south, and west.

The Uniform Building Code seismic zone map for the State of Utah is shown in Figure 3.1-13, Seismic Zones of Utah. The Uniform Building Code applies to all new building construction and specifies requirements for earthquake-resistant design and construction to minimize structural damage and loss of life from earthquakes (Solomon and Black, 1995). DPG is located in Uniform Building Code Seismic Zones 2B and 3. Zone 3 is the highest rating in Utah and indicates a tectonically active area. DPG is located approximately 96 km (60 mi) west of the Wasatch Mountains and the associated Wasatch fault zone. The Wasatch fault zone and the eastern portion of DPG are located within Zone 3. The western portion of DPG is located within Zone 2B, including the Great Salt Lake Desert area. DPG is located within a less seismically or tectonically active area than the Wasatch fault zone. Figures 3.1-11, Mapped Faults at DPG and Approximate Locations of Earthquake Epicenters, and 3.1-12, Historic Seismicity in the Utah Region (1850 through 1977), show earthquake and seismicity information for Utah locations including DPG.

A seismic risk analysis was conducted as part of the EIS for the LSTF. The most significant finding of this analysis was that the facility would be located within seismic Zone 3 and therefore should be designed to meet Zone 3 essential facility requirements (Dynamac, 1992).

3.1.6 Geologic Resources

Several small ore deposits, sand/gravel pits, and two unique geologic features have been identified at DPG. These are described in the following subsections:

- Metallic Mineral Resources
- Nonmetallic Mineral Resources
- Unique Geologic Features

Figure 3.1-14, Known Geologic Resources at DPG, shows the locations of identified geologic resources at DPG. Paleontologic resources found at DPG are described in Section 3.8.3, Paleontologic Resources.

3.1.6.1 Metallic Mineral Resources

Mining at Granite Peak started before 1898. Early mining and exploration focussed on silver, gold, lead, and copper found in veins associated with Tertiary dikes that

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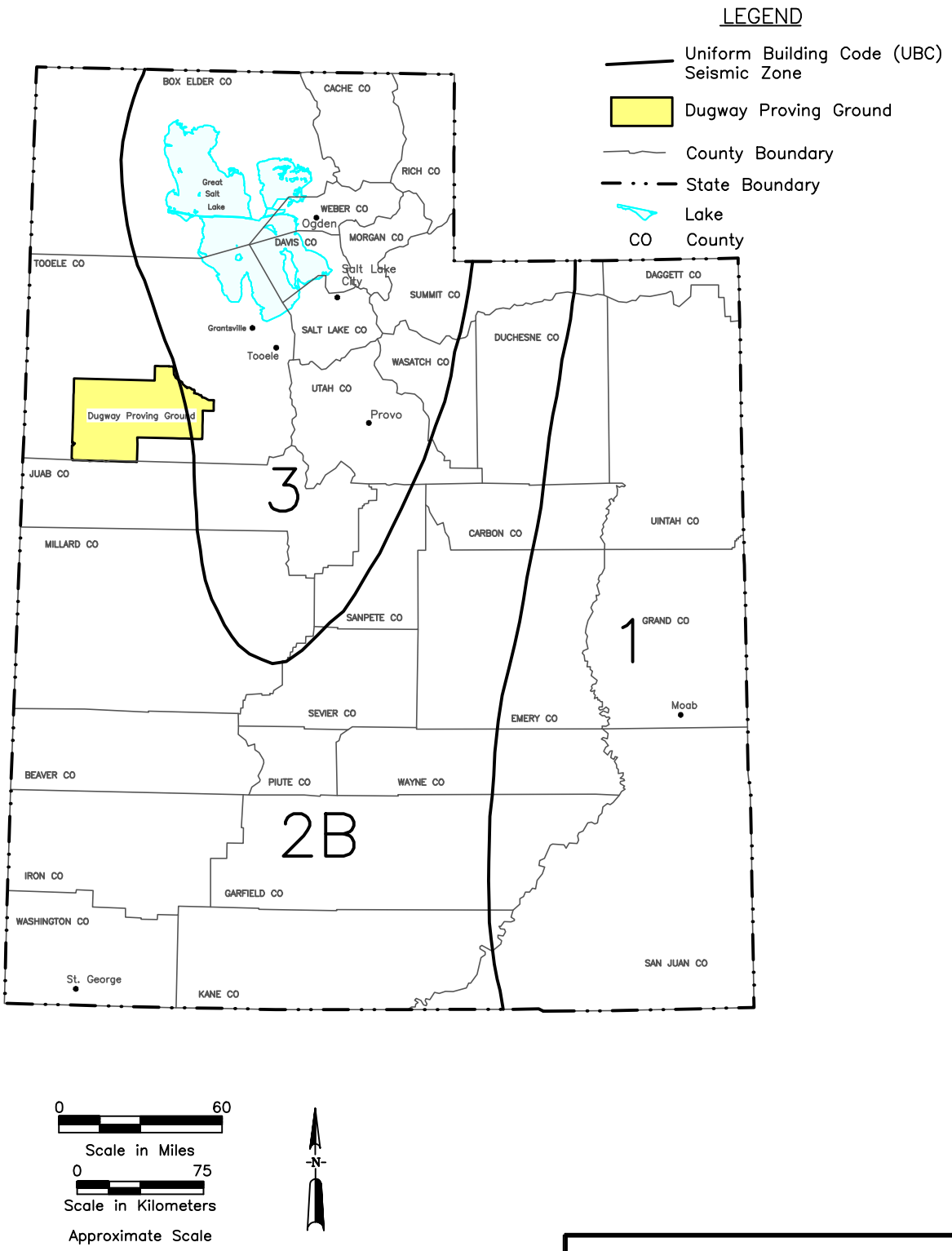

Figure 3.1–13

Seismic Zones of Utah

SOURCE: International Conference of Building Officials, 1994

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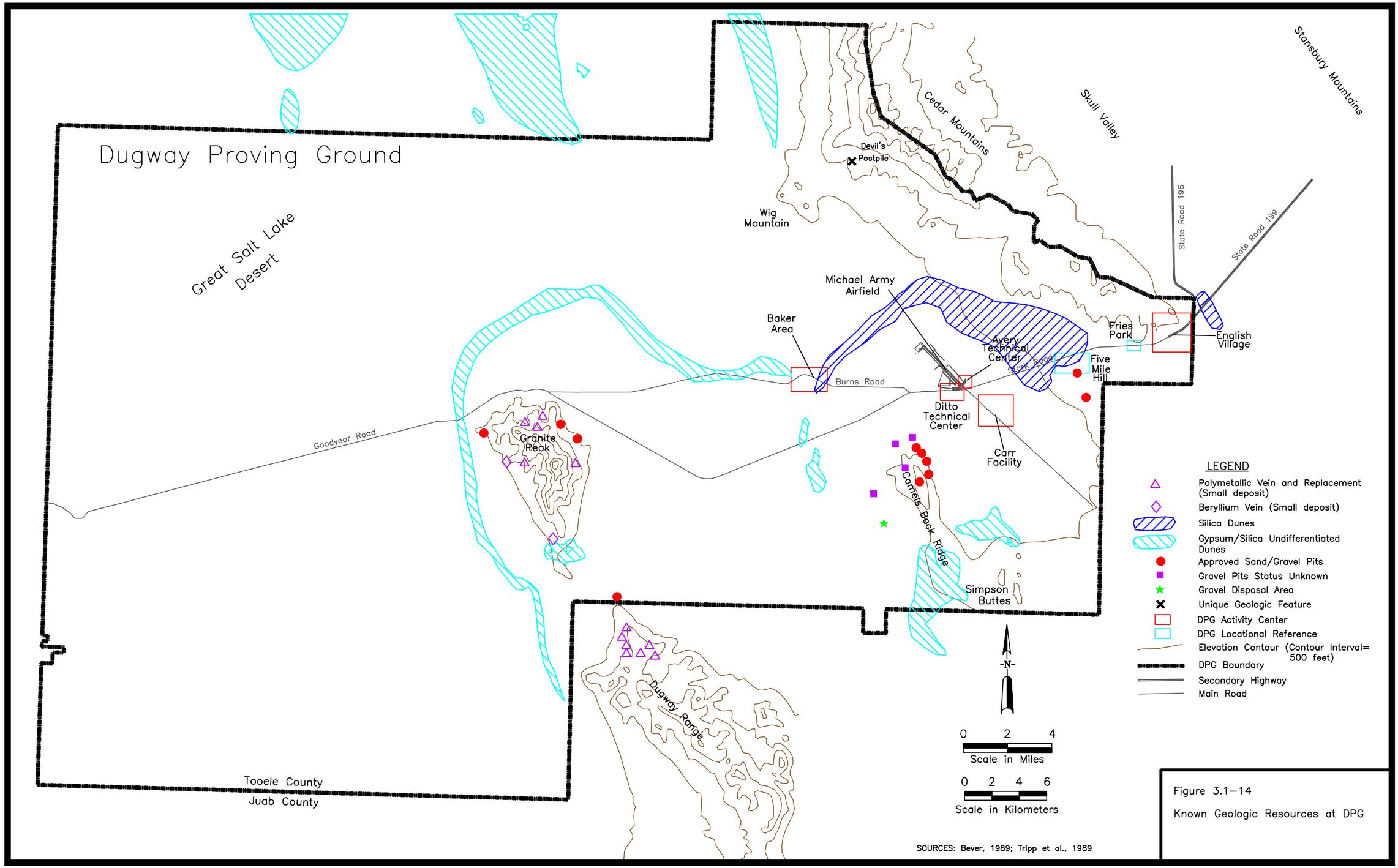

Figure 3.1–14

Known Geologic Resources at DPG

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cut the Precambrian granites in this mountain. Later mining concentrated on mica associated with granite gneiss, and beryl and fluorite associated with pegmatite dikes. Seven small prospects have been identified on Granite Peak. A prospect is an untested mineral occurrence that may or may not contain a concentration of some mineral. Five of the prospects are polymetallic vein and replacement deposits in which copper, fluorite, lead, and/or silver have been identified as commodities. Two of the prospects are beryllium vein deposits in which beryllium, copper, fluorite, lead, and/or mica have been identified as commodities (Tripp et al., 1989). Amethyst, beryl, tourmaline, quartz, hematite, and pyrite are also found at Granite Peak (Higginbotham, 1990).

Two mining districts with similar ore deposits are located in close proximity to DPG. The Dugway mining district is located to the south of DPG in the northern portion of the Dugway Range. The Wildcat Mountain mining district is located to the north of DPG in the AF controlled portion of the Utah Test and Training Range-South (UTTR-South AF). Since its discovery in 1869, the Dugway mining district has sporadically produced lead-zinc-silver ores. Seven mines or prospects are located in the Dugway mining district with copper, fluorite, lead, zinc, and/or silver identified as commodities. The northern end of Wildcat Mountain contains deposits of fluorite, silver-copper ore, and traces of gold. One mine was located at Wildcat Mountain with barium, copper, fluorite, and silver identified as commodities (Tripp et al., 1989).

3.1.6.2 Nonmetallic Mineral Resources

Salines, silica and undifferentiated gypsum/silica dune deposits, and sand/gravel deposits are among the nonmetallic mineral resources identified at DPG. Smith (1987) has indicated that salines (such as brines, salt, potash, and others) may be found within the Great Salt Lake Desert portion of DPG. Salines are the most valuable nonmetallic resource extracted in Utah (Smith, 1987). However, there is no evidence that exploration or production of salines has occurred in the past at DPG.

Silica dune deposits have been identified at DPG, to the north, northeast, and northwest of Ditto. Silica dune deposits are also located to the east of DPG in Skull Valley and north of DPG in the UTTR-South AF. The silica sand has been eroded from parent rock material in nearby mountains, including quartzite, sandstone, and other siliceous rocks. Undifferentiated gypsum/silica dune deposits have also been identified at DPG, to the north and west of Granite Peak and west, south, and southeast of Camels Back Ridge. Similar dune deposits are located north of DPG in the UTTR-South AF. Gypsum dunes formed as wind piled up gypsum crystals released from sulfate-rich Lake Bonneville sediments (Tripp et al., 1989). Eolian

action apparently has segregated silica dunes from gypsum dunes in many areas. No production is known to have occurred from these dune deposits (Tripp et al., 1989).

Several non-metallic mineral resources occur near Camels Back Ridge at DPG.

A very large sand and gravel resource occurs to the east and northeast of DPG. Although alluvial sand and gravel deposits are significant, lacustrine deposits are the chief resource (Tripp et al., 1989). Eleven approved sand/gravel pits are located at DPG (Bever, 1989). These pits are generally located along the northeast and northwest flanks of Granite Peak and northeast of Camels Back Ridge. Four gravel pits with unknown status are also located at DPG (Bever, 1989). These pits are located north and west of Camels Back Ridge. Used gravel is disposed at one designated location at DPG, west of Camels Back Ridge (Bever, 1989).

3.1.6.3 Unique Geologic Features

Two unique geologic features have been identified at DPG, Granite Peak and the Devil's Postpile. Both of these features were identified by the Nature Conservancy in their 1993 inventory of natural areas and special features on DPG land. As discussed in Section 3.7.3.4, Potential Land Use Constraints, Granite Peak was ranked as the highest priority area and characterized as geologically unique and deserving of consideration as a National Natural Landmark. The Devil's Postpile was ranked fifth out of 17 identified special features/natural areas at DPG.

Granite Peak is composed of Precambrian granites in the northern portion and metamorphic biotite granite-gneiss and phyllites in the southern portion. Pegmatites, occurring principally as tabular dikes, cut these units (DPG, 2001). According to Fowles (1964 cited in DPG, 2001), the pegmatites of Granite Peak are by far the most spectacular pegmatites found in the state of Utah. They constitute a very large percentage (10 to 15 percent) of the total rock volume of Granite Peak and are unique.

The Devil's Postpile is composed of andesite and exhibits a text book example of vertical columnar jointing. This Tertiary igneous extrusive may be the remnants of a volcanic neck, and one of the vents that supplied part of the lava exposed in the southern Cedar Mountains (DPG, 2001).

Devil's Postpile is located in the Cedar Mountains, north of Baker at DPG.

3.2 Water Resources

This section describes DPG's water resources, including surface water and groundwater.

Surface water at DPG is comprised mostly of ephemeral or intermittent flow in natural surface water drainages, natural springs, and manmade impoundments. There are no human uses of surface water, but surface water on DPG is important to wildlife. While there are three groundwater zones below DPG, only the shallow and mid-level aquifers are relevant in this discussion. Groundwater is used as a source of drinking, process, and irrigation water at DPG.

This section describes water resources at DPG according to the following elements:

- Regulatory Overview
- Surface Water
- Groundwater

3.2.1 Regulatory Overview

Laws and regulations that are applicable to water resources at DPG are as follows:

- CWA
- EO 11990 of May 24, 1977 as amended by EO 12608 of September 9, 1987, Protection of Wetlands

- Safe Drinking Water Act (SDWA)
- Utah Water Quality Act of 1981
- RCRA

The objectives of the Federal Water Pollution Control Act, referred to since its 1977 amendments as the CWA, are to restore and maintain the chemical, physical, and biological integrity of the Nation's water. The CWA enables EPA to delegate regulatory authority to the states; however, EPA retains the right to initiate an enforcement action. The CWA requires Federal facilities to comply with state requirements.

The COE has responsibility for delineating jurisdictional wetlands as defined in Section 404 of the CWA. EO 11990 of May 24, 1977 as amended by EO 12608 of September 9, 1987 requires governmental agencies to avoid, to the extent practicable, any short- and long-term adverse impacts on wetlands wherever there is a practicable alternative. Jurisdictional wetlands have not been delineated at DPG. Several surface water bodies have been identified as wetlands through nonjurisdictional wetland studies using the COE wetland delineation criteria.

The primary objective of the SDWA of 1974 is to protect the quality of public drinking water supplies. To meet this objective, the SDWA requires the EPA to set and enforce national standards for levels of contaminants in public drinking water systems. The EPA must also regulate underground injection wells and sole source aquifers. The SDWA also requires states to adopt a wellhead protection area for the wells in their jurisdiction. Finally, the 1996 SDWA amendments establish additional requirements for right-to-know notification, source water protection, and revised special contaminant requirements. Primary drinking water standards are enforceable by Federal regulation. Secondary drinking water standards are recommended by the EPA, but each state may choose how to enforce the standards. In the State of Utah, the Utah Division of Drinking Water (UDDW) regulates drinking water. To protect DPG and regional water resources, DPG performs groundwater monitoring of their potable water supply wells as part of regulatory drinking water requirements. DPG has also submitted Drinking Water Source Protection (DWSP) Plans for its potable water supply wells to UDDW.

The Utah Water Quality Act of 1981 regulates the prevention, control, and abatement of new or existing pollution of the Utah state waters and implements the Federal Water Pollution Control Act. Utah Division of Water Quality's (UDWQ's) authority to regulate discharges at DPG arises from the Utah Water Quality Act, which permits discharges to surface and groundwater only if authorized by a permit. Based on this

authority, UDWQ regulates point source discharges to surface water using the Utah Pollution Discharge Elimination System (UPDES) program contained in Section R317-8 of its Administrative Rules which also includes regulation of stormwater. The UDWQ regulates discharges to groundwater in Section R317-6.

UDWQ requires a UPDES permit whenever there is a discharge of pollutants from a point source into "waters of the State." UDWQ defines "waters of the State" under R317-8 as follows. Waters of the State means all streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface and underground, natural and artificial, public or private. While "waters of the State" are located on DPG, discharge from DPG facilities are not believed to enter any surface water body that is defined as such. Therefore, UDWQ has not required or issued a UPDES permit to DPG. However, if any facility or future construction activity at DPG could potentially cause a discharge into a surface water of the State, a UPDES permit would be required. Additionally, DPG has prepared a Spill Prevention, Control, and Countermeasures Plan/Installation Spill Contingency Plan (SPCCP/ISCP) to comply with the CWA and Army regulations related to spill prevention and spill response. This plan addresses the potential for spills of oil, hazardous substances, or hazardous wastes into "waters of the U.S." at DPG. While there are no "navigable waters of the U.S." as defined by 40 CFR 112 at DPG, 40 CFR 110 applies more broadly to "waters of the U.S." and includes intermittent streams, wetlands, and playa lakes which are located at DPG.

The UDWQ issues groundwater discharge permits independently of the UPDES system. For discharges to groundwater, UDWQ requires a permit for any new (construction initiated after February 9, 1990) or modified (after August 18, 1989) wastewater lagoon that discharges or probably discharges pollutants directly or indirectly into groundwater, unless the lagoon meets one of 25 listed exceptions. UDWQ refers to an excepted facility as one "permitted by rule." At DPG, Baker, Carr, and Ditto wastewater treatment lagoons are excepted facilities, "permitted by rule." Baker is authorized to operate as a zero-discharge system; Carr is authorized to operate as a limited discharge containment system. The exception applied to operation of Baker, Carr, and Ditto wastewater treatment lagoons is probably that for a municipal wastewater treatment lagoon which receives no wastewater from a significant industrial discharger. In general, a significant industrial discharger is one subject to a categorical pretreatment standard or one that discharges more than 94,600 L/day (25,000 gpd) to the wastewater facility. The English Village Wastewater Treatment Facility does have a groundwater discharge permit issued by

UDWQ, and semi-annual groundwater monitoring is conducted to maintain compliance with the permit.

RCRA includes requirements for groundwater protection during solid and hazardous waste operations. As a requirement of DPG's RCRA Subtitle D permit for the solid waste landfill in English Village, DPG conducts semi-annual groundwater monitoring. The results of this monitoring are provided to the UDSHW. DPG also conducts contaminant investigations of water resources and ongoing groundwater monitoring as part of the RCRA Part B permit. Results from ongoing RCRA groundwater monitoring programs and investigations are submitted to UDSHW. Ongoing groundwater monitoring at DPG follows regulations established in the Utah Hazardous Waste Management Rules for assessment monitoring programs at interim status treatment, storage, or disposal facilities (TSDFs).

3.2.2 Surface Water

Because DPG is located in an arid environment, flow is typically ephemeral or intermittent in surface water drainages at DPG. For example, flow briefly occurs in an ephemeral drainage when surface water runoff from a rainstorm or snowmelt enters the drainage from surrounding areas. An intermittent drainage flows only at certain times during the year such as when it receives water from springs or from a surface source. An intermittent drainage may not flow continuously because of evaporation or seepage losses. Surface water features that have perennial flow at DPG include springs that are fed by groundwater discharge and ponds that receive wastewater effluent. Perennial flow is continuous throughout the year. However, the quantity of flow may fluctuate during the year due to seasonal changes in groundwater discharge, precipitation, or wastewater influent.

Springs at DPG are an important water source for feral horses.

The following subsections describe quantity, quality, and use of surface water at DPG:

- Surface Water Features at DPG
- Surface Water Quantity
- Surface Water Quality
- Surface Water Uses

3.2.2.1 Surface Water Features at DPG

DPG is located within portions of four surface water drainage areas as shown in Figure 3.2-1, Surface Water Features at DPG. These drainage areas include Skull Valley, Dugway Valley-Government Creek area, Fish Springs Flat area, and the Great Salt Lake Desert.

The Skull Valley drainage basin covers approximately 2,267 sq km (560,000 acres) from Lookout Pass northward to the southwestern shore of the Great Salt Lake (Hood and Waddell, 1968). Approximately 39 sq km (9,600 acres) of the drainage area lies within DPG. Surface water runoff within this portion of the drainage area predominately flows to the northeast towards the center of Skull Valley as shown in Figure 3.2-1, Surface Water Features at DPG.

The Dugway Valley-Government Creek drainage area covers approximately 2,308 sq km (570,000 acres). Dugway Valley is separated from the Government Creek area by a topographic divide that extends from Simpson Mountains northwest to Simpson Buttes and Camels Back Ridge. Northwest from Camels Back Ridge, the two valleys merge into the Great Salt Lake Desert. Approximately 1,174 sq km (290,000 acres) of this drainage area lies within DPG. The general direction of surface water runoff in the DPG portion of this drainage area is to the northwest toward the Great Salt Lake Desert as shown on Figure 3.2-1, Surface Water Features at DPG. There are local deviations from this general flow direction caused by local variations in topography. The Old River Bed, located along DPG's southern boundary, is a prominent trench crossing the divide between the Sevier Desert drainage and the Great Salt Lake Desert drainage. The river that formed the trench was a connecting link between two major parts of Lake Bonneville during the Pleistocene (Stephens and Sumsion, 1978).

The Fish Springs Flat drainage area covers approximately 1,538 sq km (380,000 acres) from a topographic high area connecting Swasey Mountain and the Little Drum Mountains northwest to the Great Salt Lake Desert (Bolke and Sumsion, 1978). The general direction of surface water runoff in the DPG portion of this

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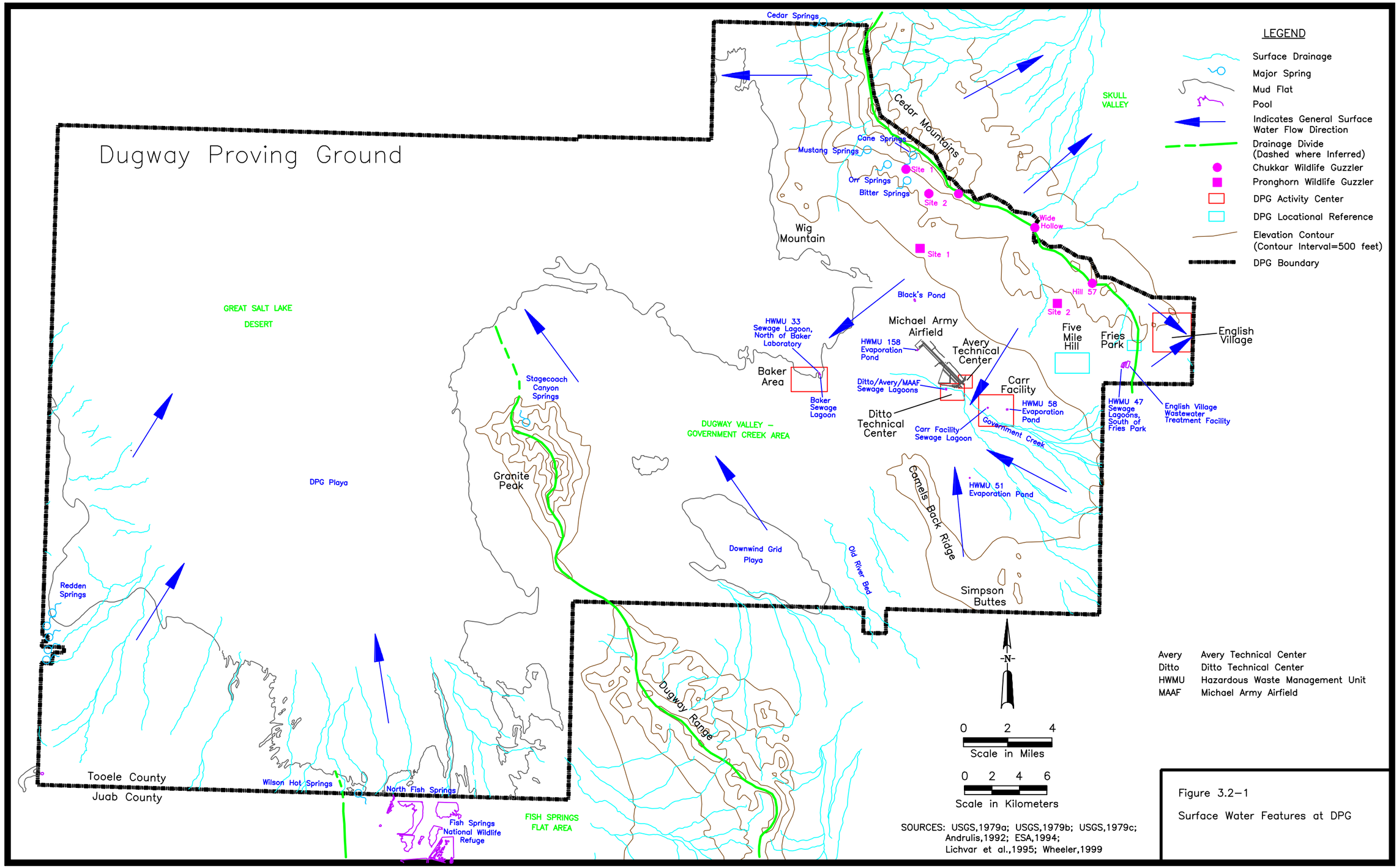

Figure 3.2–1

Surface Water Features at DPG

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drainage area is to the northwest toward the Great Salt Lake Desert as shown in Figure 3.2-1, Surface Water Features at DPG.

Approximately 36,000 acres of the Fish Springs drainage lies within DPG.

The western and northwestern portions of DPG lie within the Great Salt Lake Desert as shown in Figure 3.2-1, Surface Water Features at DPG and cover approximately 1,903 sq km (470,000 acres). Surface water drainage is internal within the Great Salt Lake Desert (Gates and Kruer, 1981).

The natural and constructed surface water features located at DPG are described in Table 3.2-1, Surface Water Features at DPG. Natural surface water features include surface water drainages, springs, ponds, playas, and wetlands. Constructed surface water features include wastewater lagoons, evaporation ponds, an excavated pond, a bermed pond, and roadside ditches. Both natural and constructed features are shown in Figure 3.2-1, Surface Water Features at DPG.

Table 3.2-1. Surface Water Features at DPG.

Name	Ephemeral	Intermittent	Perennial	Constructed	Natural	Dimensions	Surface Area	General Location	Description
Baker Sewage Lagoon			✓	✓		150 ft wide 310 ft long 7 ft deep	1.1 acres	In the central portion of DPG, in Baker	• Receives domestic wastewater from Baker • Completed in 1996 • Enclosed by a fence
Black's Pond			✓	✓		175 ft wide 500 ft long 10 to 15 ft deep	2.0 acres	In the eastern portion of DPG, northwest of Ditto	• An excavated rectangular depression that intercepts groundwater • Identified as "waters of the U.S." and in part a wetland

Table 3.2-1. Surface Water Features at DPG.

Name	Ephemeral	Intermittent	Perennial	Constructed	Natural	Dimensions	Surface Area	General Location	Description
Bitter Springs		✓			✓	Northern Seep 150 ft wide 170 ft long Southern Seep 75 ft wide 100 ft long	Northern Seep 0.59 acres Southern Seep 0.17 acres	In the northeastern portion of DPG, in Cedar Mountains	• The northern seep area does not meet all of the requirements to be considered a wetland. • A second seep area was identified in October 1996, located to the southeast of the northern seep area.
Cane Springs			✓		✓	Spring 25 ft wide 50 ft long Wetland 5 to 25 ft wide 433 ft long	Spring 0.029 acres Wetland 0.25 acres	In the northeastern portion of DPG, in Cedar Mountains	The wetland area includes one spring, two seeps, and a drainage that is perennially saturated with water.
Carr Facility Sewage Lagoon			✓	✓		7 ft deep	1.5 acres	In the eastern portion of DPG, in Carr	• Single-cell lagoon • Receives domestic wastewater from Carr • Constructed in 1990 • Enclosed by a fence
Cedar Springs			✓		✓	Not Available	Not Available	Along the northern boundary of DPG, in Cedar Mountains	Not Available
Ditto/Avery/ MAAF Sewage Lagoons			✓	✓		Each Cell 120 ft wide 240 ft long 7 ft deep	Each Cell 0.66 acres	In the eastern portion of DPG, west of Ditto	• Three-cell lagoon • Receives domestic wastewater from Ditto, Avery, and MAAF • Completed in 1992 • Enclosed by a fence
DPG Playa		✓			✓	Not Available	485,000 acres	In the western and northwestern portions of DPG, west of Granite Peak and northwest of Baker	• Portions of the playa have been identified as wetlands and "waters of the U.S." • Covered yearly with a shallow layer of storm water runoff and snowmelt from surrounding areas • Regarded as a "special aquatic site" because it is a mudflat and has special ecological characteristics that can be easily disrupted • Migrating shore birds may feed on brine flies and brine shrimp that are found at the playa
Downwind Grid Playa		✓			✓	Not Available	Not Available	In the southern portion of DPG, in Downwind Grid	Not Available

Table 3.2-1. Surface Water Features at DPG.

Name	Ephemeral	Intermittent	Perennial	Constructed	Natural	Dimensions	Surface Area	General Location	Description
English Village Wastewater Treatment Facility			✓	✓		Each Cell 359 ft wide 382 ft long 7 ft deep Discharge Area 1 to 4 ft deep	Each Cell 3.15 acres Discharge Area 0.9 acres	In the eastern portion of DPG, south of Fries Park	• Three-cell lagoon • Receives domestic wastewater from English Village and Fries Park • Completed in 1996 • Enclosed by a fence • Effluent from the lagoon is conveyed into an open ditch which outfalls into a pond and runoff area, located west of the lagoon
Government Creek	✓				✓	Varies	Varies	In the eastern portion of DPG, in the vicinity of Ditto and Carr	Ephemeral within DPG and perennial in and near the mountains where the creek originates
HWMU 33 Sewage Lagoon, North of Baker Test Facility	✓			✓		130 ft wide 210 ft long	0.63 acres	In the central portion of DPG, in Baker	• Used for the disposal of sanitary and laboratory waste from various facilities in Baker • Active until January 1997 • Surrounded by a chain-link fence
HWMU 47 Sewage Lagoons, South of Fries Park	✓			✓		Eastern Lagoon 300 ft wide 1,700 ft long Western Lagoon 300 ft wide 1,300 ft long	Eastern Lagoon 12 acres Western Lagoon 9.0 acres	In the eastern portion of DPG, south of Fries Park	• Received sanitary waste from the English Village sanitary sewer system including Fries Park • Eastern lagoon active until 1994 • Western lagoon active until approximately 1989 • Surrounded by a single cable-wire fence
HWMU 51 Evaporation Pond	✓			✓		180 ft wide 180 ft long 10 ft deep	0.74 acres	In the eastern portion of DPG, southwest of Carr	• Originally used to dispose of liquids from the Defensive Test Chamber and decontamination system • Retrofitted with a double liner and leachate detection system between 1987 and 1988 • Not used after retrofitting • Surface impoundment surrounded by a chain-link fence
HWMU 58 Evaporation Pond	✓			✓		80 ft wide 80 ft long 10 ft deep	0.15 acres	In the eastern portion of DPG, southeast of Carr	• Originally used to dispose of decontaminated waste solutions generated at various DPG facilities • Retrofitted with a double liner, leachate detection system, and berms between 1986 and 1988 • Inactive • Surrounded by a chain-link fence
HWMU 158 Evaporation Pond	✓			✓		232 ft wide 232 ft long 5 ft deep	1.2 acres	In the eastern portion of DPG, north of Ditto	• Designed to receive and evaporate liquid waste from HWMU 162, the Northwest Decontamination Pad • Surrounded by a chain-link fence

Table 3.2-1. Surface Water Features at DPG.

Name	Ephemeral	Intermittent	Perennial	Constructed	Natural	Dimensions	Surface Area	General Location	Description
Mustang Springs			✓		✓	10 to 36 ft wide 183 ft long	0.15 acres	In the northeastern portion of DPG, in Cedar Mountains	This area includes a small pond behind an earth dam with an adjacent wetland area.
North Fish Springs			✓		✓	Not Available	Not Available	In the southern portion of DPG, north of the Fish Springs National Wildlife Refuge	The North Fish Springs wetland area is dependent on surplus water from the Fish Springs National Wildlife Refuge and does not have extensive marshes.
Old River Bed	✓				✓	Varies	Varies	In the southern portion of DPG, southwest of Camels Back Ridge	The Old River Bed is a remnant of an ancient drainage that once connected two parts of Lake Bonneville during the Pleistocene.
Orr Springs			✓	✓	✓	Spring 39 ft wide 50 ft long Pond 40 ft in diameter	Spring 0.04 acres Pond 0.03 acres	In the northeastern portion of DPG, in Cedar Mountains	• This wetland area includes one spring and a lower pond. • A well is located downgradient of the spring that taps shallow groundwater. • The water is carried in a plastic pipe further downgradient to a watering trough and a circular pond. • The pond has wetland characteristics but is not considered a wetland because it has been constructed in upland soils.
Redden Springs			✓		✓	Not Available	Not Available	Located along the western boundary of DPG	Not Available
Roadside Ditches	✓			✓		Varies	Varies	Located throughout DPG, along constructed roadways	The ditches vary in dimension and are predominately located within the developed portions of DPG.
Stagecoach Canyon Springs			✓		✓	Not Available	Not Available	In the central portion of DPG, at the northern end of Granite Peak	In October 1996, a trickle of water was observed flowing out of several pools in a small drainage in this area.

Table 3.2-1. Surface Water Features at DPG.

Name	Ephemeral	Intermittent	Perennial	Constructed	Natural	Dimensions	Surface Area	General Location	Description
Unnamed Drainages	✓				✓	Varies	Varies	Located throughout DPG	Well-defined drainages vary in dimension and are predominately located along the mountains and in the Dugway Valley-Government Creek drainage area.
Wilson Hot Springs			✓		✓	Not Available	Not Available	Along the southern boundary of DPG	• Contains thermal springs • Discharges to the surface through six dome-shaped vents

Avery Avery Technical Center
Baker Baker Area
Carr Carr Facility
Ditto Ditto Technical Center
DPG U.S. Army Dugway Proving Ground
ft foot or feet
HWMU Hazardous Waste Management Unit
MAAF Michael Army Airfield

SOURCES: FWEC, 1996; Reed, 1998; ESA, 1994; Lichvar et al., 1995; Montgomery, 1990; Prather, 1999b; Price, 1981; Schaubs, 1996; Stephens and Sumsion, 1978

In the undeveloped portions of DPG, surface water runoff occurs as overland flow or is conveyed in natural drainages. Surface water that flows overland in an arid region spreads as a thin, continuous layer over a large area rather than being concentrated into well-defined drainage channels. Government Creek is one of the most well-defined natural drainages at DPG. The drainage enters DPG along the southeast boundary and trends northwestward passing to the west of Carr and through Ditto as shown in Figure 3.2-1, Surface Water Features at DPG. The drainage loses definition west of Ditto. In the developed portions of DPG, surface water runoff is generally conveyed in roadside ditches. In general, these ditches are not interconnected. Storm water sewers are located in portions of Avery, Baker, and Ditto. The storm sewers outfall into nearby drainage ditches or into Government Creek.

Several wetland areas have been identified at DPG as supported by two wetland delineation studies that were conducted at the installation. Environmental Science Associates (ESA, 1994) conducted a nonjurisdictional wetlands study that investigated Cane Springs, Bitter Springs, Mustang Springs, North Fish Springs, Orr Springs, Black's Pond, the sewage lagoons at the English Village Wastewater Treatment Facility, and the DPG Playa. The field study followed wetland delineation criteria developed by the COE. This study identified Cane Springs, North Fish Springs, Orr Springs, and a portion of Black's Pond and Mustang Springs as wetlands. The study identified DPG Playa and a portion of Black's Pond as "waters of the U.S." Lichvar et al. (1995) studied the DPG Playa. The COE wetlands

delineation criteria were used to delineate wetlands. Ordinary high water marks defined in 33 CFR 328.3 were used to delineate "waters of the U.S." This study identified both wetlands and "waters of the U.S." on the DPG Playa. To be identified as a wetland, an area must have hydric soils, hydrophytic vegetation, and wetland hydrology. "Waters of the U.S." are defined at 33 CFR 328.3 as:

1. All waters that are currently used, or were used in the past, for interstate or foreign commerce, including all waters that are subject to the ebb or flow of the tide
2. All interstate waters including interstate wetlands
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mud flats, sandbars, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds
4. All impoundments of waters otherwise defined as waters of the U.S.
5. Tributaries of waters identified in 1 through 4
6. The territorial seas
7. Wetlands adjacent to waters listed in 1 though 6

Several thermal springs are located in the vicinity of DPG's southern boundary. Fish Springs National Wildlife Refuge is located south of DPG's southern boundary as shown in Figure 3.2-1, Surface Water Features at DPG. The refuge covers approximately 73 sq km (18,000 acres) and includes five major springs, several lesser springs, and seep flow from a faultline at the base of the eastern front of the Fish Springs Mountain Range (FSNWR, 1994). The groundwater that discharges at the refuge is saline, with temperatures ranging from 22 to 27 °C (71 to 81 °F) (Banta, 1996). Wilson Hot Springs is located along DPG's southern boundary (Figure 3.2-1, Surface Water Features at DPG). This area contains six dome-shaped vents trending northeast to southwest that discharge very saline groundwater. In July 1967, the temperature of the hottest measured spring in the group was 60 °C (141 °F) at the edge of the pool and 76 °C (168 °F) in the center of the pool. The estimated rate of groundwater discharge was 378 L/min (100 gpm). Big Springs is located approximately 1.6 km (1 mi) southeast of Wilson Hot Springs, south of DPG's southern boundary. Both springs appear to be associated with the fault zone that has been identified at the refuge. Groundwater that discharges at Big Springs is similar in temperature to that found at the refuge (Mundorff, 1970).

Fish Springs National Wildlife Refuge is south of DPG's border and includes five major springs.

3.2.2.2 Surface Water Quantity

The mean annual precipitation at DPG is approximately 20 cm (8 inches) (Section 3.3.1, Climate). Most of this precipitation occurs in the spring. Local weather patterns are influenced by the terrain at DPG, with the mountains receiving more precipitation than the surrounding low-lying basin areas. Average annual precipitation ranges from approximately 15 cm (6 inches) in the basin areas to approximately 41 cm (16 inches) on the mountain tops at DPG (Andrulis, 1992).

Most streams in the Dugway Valley-Government Creek area are ephemeral except for a few in their upper reaches; all are ephemeral below an elevation of approximately 1,829 m (6,000 ft) (Stephens and Sumsion, 1978). No perennial streams originate in the Great Salt Lake Desert and runoff reaches the desert floor only during or after intense summer thunderstorms or during periods of rapid snowmelt. Annual runoff in the Great Salt Lake Desert is approximately 1 percent of the available precipitation (Gates and Kruer, 1981). Most of the surface water runoff that reaches the low-lying areas at DPG evaporates; a small amount of the runoff infiltrates into the soil and is transpired by plants or recharges groundwater (FWEC, 1996). Gates and Kruer (1981) estimated that about 4 percent of the available precipitation in the west-central portion of Utah recharges groundwater with the remainder returned to the atmosphere by evaporation or transpiration mechanisms.

The nature of flow in the surface water features at DPG is identified in Table 3.2-1, Surface Water Features at DPG. This table also lists the dimensions and surface area of the surface water features. Flow within natural drainages and roadside-ditches at DPG is ephemeral. Intermittent and perennial flow at DPG is limited to spring or seep areas where groundwater discharges at ground surface and areas that receive wastewater effluent. Surface water quantities associated with wastewater effluent are discussed in Section 3.2.2.3, Surface Water Quality, in conjunction with the

description of wastewater collection and treatment. Quantities of naturally-occurring surface water are discussed in this section.

While Government Creek is ephemeral within DPG, this creek is perennial to the southeast of DPG due to spring flow and surface water runoff in the mountains (Andrulis, 1992; Price, 1981). A peak discharge of 10.5 cubic m (370 cubic ft) per second was measured on August 12, 1961 at a surface water gauging station (Station Number 10172890) in Government Creek, located approximately 16 km (10 mi) southeast of DPG (Price, 1981). The period of record for this gauging station was 1961 to 1971.

Heavy snowpack overlying frozen soil and rapid melting associated with warming temperatures and moderate to heavy rainfall are the conditions that most commonly lead to flooding. During summer months, flash floods can develop in the ravines and drainages as a result of intense summer thunderstorms. Flash floods are of short duration and occur within a restricted area, but can cause severe damage (Andrulis, 1992).

A 100-year flood plain map is not available for DPG according to the COE and the Utah State Emergency Management Office. However, DPG is classified as a D-Zone which is defined as having an undetermined but potential flood hazard (Stoddard, 1997; Watanabe, 1997). Three incidents of flooding involving DPG facilities have been recorded since 1942. These incidents reportedly occurred during the winter months in 1943-1944, 1952, and 1953 (USACE, 1970). The first two floods (i.e., 1943-1944 and 1952) originated in the Government Creek drainage southeast of DPG. The first flood is poorly documented, but reports indicate that sandbagging was necessary to prevent flooding in a portion of Ditto. The flood of January 25, 1952 resulted from rapidly melting snow that caused the overflow of Government Creek in Ditto. A number of buildings and roads in the northeastern portion of Ditto were damaged (Dynamac, 1992; USACE, 1970). In the 1953 flood, much of the test area was under 2 to 2.54 cm (0.8 to 1 inch) of water for approximately 1 month, with little or no damage reported (USACE, 1970).

Drainage from the southern end of the Cedar Mountains has also been the source of past flooding in English Village. This flooding problem has reportedly been corrected by the construction of an intercept ditch that is located around the north and east boundary of the housing area (Ebasco, 1995a).

3.2.2.3 Surface Water Quality

This section discusses the existing surface water environment at DPG by describing the natural quality of surface water and the quality of surface water in wastewater

lagoons, and providing an overview of the ongoing surface water contamination investigations.

Natural Quality of Surface Water – All natural water contains dissolved mineral matter; water that falls as precipitation contains minute amounts. Because water is a solvent, it dissolves additional mineral matter from rocks and soil as it moves over or through the ground. Groundwater is usually in contact with the rocks and soil longer and usually contains more dissolved minerals than surface water. The amount and chemical character of the minerals dissolved in the water depend principally upon the nature of materials it contacts, and to a lesser extent upon the duration of contact. The total concentration of dissolved minerals and the concentration of individual ions determine the usefulness of the water for various purposes (Stephens and Sumsion, 1978).

The quality of surface water runoff in the western portion of DPG, west of Granite Peak and north of Baker, is characterized as slightly saline to briny. In these areas it is estimated that dissolved-solids concentrations are probably less than 1,000 milligrams per liter (mg/L) in direct storm water runoff and increase rapidly to more than 35,000 mg/L where water collects in natural depressions and drains. In the remaining portions of DPG, the quality of surface water runoff is characterized as fresh. In these areas it is estimated that dissolved-solids concentrations of runoff generally range from 250 to 1,000 mg/L. Dissolved solids concentrations may exceed 1,000 mg/L in natural or constructed catchments due to concentration by evaporation (Price, 1981).

Surface water samples have been collected for chemical analysis from two of the springs located at DPG. The U.S. Geological Survey (USGS) collected samples from the Cane Springs in August 1998 and the Stagecoach Canyon Spring in April 1998 as part of a groundwater hydrologic investigation in the DPG area (Steiger & Freethey, 2001). The two samples were analyzed for water quality parameters, major ions, selected trace metals, and dissolved solids concentrations. The Stagecoach Canyon Spring sample was also analyzed for VOCs, SVOCs, and explosives.

The dissolved solids residue concentration in the sample collected at the Cane Springs was 924 mg/L (Steiger & Freethey, 2001). All analyzed parameters that are regulated under the National Primary Drinking Water Standards were either not detected or detected below maximum contaminant levels (MCLs) (Steiger & Freethey, 2001). Based on these analytical results, the groundwater discharging at Cane Springs does not appear to have been impacted by DPG mission activities. This spring is located upgradient from known or suspected areas of soil and groundwater contamination at DPG. Analytical samples have not been collected from the other

springs located in the Cedar Mountains, Wilson Hot Springs, and Redden Springs. Like Cane Springs, these springs are also located upgradient from known or suspected areas of soil and groundwater contamination at DPG. Therefore, it is likely that the groundwater sources that discharge at these springs similarly would not contain contaminants. Surface water at North Fish Springs issues from an upgradient groundwater source located to the south of DPG. Therefore, it is also likely that this surface water body and groundwater source would not be impacted by known or suspected soil or groundwater contamination at DPG.

The dissolved solids residue concentration at the Stagecoach Canyon Spring was 607 mg/L (Steiger & Freethey, 2001). All analyzed parameters that are regulated under the National Primary Drinking Water Standards were either not detected or detected below MCLs (Steiger & Freethey, 2001). Based on these analytical results, the groundwater discharging at Stagecoach Canyon Spring does not appear to have been impacted by DPG mission activities. This spring is located within or near ranges used for chemical defense, biological defense, conventional munitions and smoke, obscurant, and illuminant testing.

Quality of Surface Water in Wastewater Lagoons – There are four independent wastewater treatment systems located at DPG, the English Village Wastewater Treatment Facility, the Ditto Wastewater Lagoon, the Carr Lagoon, and the Baker Wastewater Treatment Lagoon. These systems consist of collection lines and treatment lagoons. They were originally installed in the early 1950s or before, but have all undergone major reconstruction. The Baker Wastewater Treatment Lagoon is undergoing modifications to increase its design capacity. A construction permit from UDWQ was issued to DPG September 14, 2000 to construct a new lagoon and modify the Old Baker Lagoon (HWMU 33); construction began on October 24, 2000. Descriptions of the DPG wastewater treatment systems are provided in the SDP.

Design capacities and daily wastewater influent rates for the wastewater treatment system lagoons are identified in Table 3.2-2, Lagoon Design Capacities and Influent Rates for DPG Wastewater Treatment Systems. The design capacity is the total retention capacity of the lagoon, while the daily design capacity is the amount of influent the lagoon is designed to treat on a daily basis according to its construction permit. Daily influent data at the water metering stations from August 1999 through December 1999 were averaged to determine the daily average influent rate for the English Village Wastewater Treatment Facility. Daily influent data at the water metering stations for the Baker and Carr lagoons were found to be questionable during a 1999 study. Thus, daily average influent rates for the Baker and Carr lagoons were taken from field calculations and observations conducted during the

1999 study and do not represent a daily average over an extended period of time. Daily influent data for the Ditto Lagoon are not available.

Table 3.2-2. Lagoon Design Capacities and Influent Rates for DPG Wastewater Treatment Systems.

Lagoon	Design Capacity (million gallons)	Daily Design Capacity per Construction Permit (gallons per day)	Baseline Daily Average Influent Rate (gallons per day)	Baseline Daily Maximum Influent Rate (gallons per day)
Baker	2	5,000	24,000	Not available
Carr	2.8	5,600	1,330	Not available
Ditto	3	60,000	Not available	Not available
English Village	15	225,000	123,002	182,243

SOURCES: AGEISS, 1999e, Griffin-Albers, 1999a

No hazardous wastes, including chemical agents and simulants, are discharged into the wastewater collection lines that discharge into the wastewater treatment lagoons.

The English Village Wastewater Treatment Facility is regulated through a groundwater discharge permit issued by UDWQ. The other wastewater treatment systems at DPG are considered "permitted by rule," which means that they are excepted from UDWQ's requirement of a groundwater discharge permit unless their discharges are adversely affecting groundwater quality.

There are an enormous number of constituents in water, and a correspondingly large number of water quality measures. This discussion introduces the following indicators commonly employed in considering how human actions affect water quality.

- Biological Oxygen Demand (BOD) – The quantity of dissolved oxygen in a given volume of water used by bacteria to oxidize decomposable organic matter to carbon dioxide, water, nitrate-nitrogen, and other stable end products
- Coliform Bacteria – Imperfect indicator of fecal bacteria used to test for the presence of a number of disease-causing organisms
- pH – A measure of the acidity or alkalinity of a solution, numerically equal to 7 for neutral solutions, increasing with increasing alkalinity and decreasing with increasing acidity
- Specific conductance – A measure of conductivity of liquids; in water, this is a measure of the ions in solution

- Total dissolved solids (TDS) – An aggregate measure of various inorganic ions such as carbonate, bicarbonate, sulfate, nitrate, phosphate, chloride, calcium, magnesium, sodium, and potassium
- Total suspended solids (TSS) – A measure of particles that are in suspension

In general, DPG is not required to collect and analyze surface water samples from its wastewater treatment lagoons. However, DPG does collect surface water samples from the Baker, Ditto, and English Village wastewater treatment lagoons on a monthly basis for BOD analysis. BOD is widely used as a measure of potential depletions in a wastewater's dissolved oxygen. High concentrations of BOD may cause decreases in dissolved oxygen and thereby harm aquatic organisms.

BOD for the three wastewater treatment lagoons for a 12-month period is provided in Table 3.2-3, Biochemical Oxygen Demand for Wastewater Samples. BOD in this table is presented in milligrams per liter. Generally, the BOD is below the UDWQ's secondary treatment standard of 25 mg/L as defined in Utah Administrative Code (UAC) R317-1. This standard is for a permitted wastewater discharge to land and directly applies to the English Village Wastewater Treatment Facility since it is the only lagoon permitted by the UDWQ for discharge to land. However, treated wastewater from the Ditto Wastewater Lagoon at times flows to a ditch and also ultimately discharges to the ground.

Table 3.2-3. Biochemical Oxygen Demand for Wastewater Samples.

Wastewater Treatment Lagoon	Aug 1998	Sept 1998	Oct 1998	Nov 1998	Dec 1998	Jan 1999	Feb 1999	March 1999	Apr 1999	May 1999	June 1999	July 1999
English Village	3	12	3	12	7	11	6	15	26	20	25	26
Baker	3	< 3	< 3	< 3	< 3	3	< 3	3	3	< 3	< 3	< 3
Ditto	13	22	14	3	16	14	10	23	17	28	31	43

< less than

SOURCE: EWP Engineering, Inc., 1999b

Monitoring samples were collected from Baker Lagoon at DPG.

In preparation to conduct engineering work on the Baker Wastewater Treatment Lagoon, DPG has collected surface water samples from this lagoon. Samples were collected from the influent manhole and the lagoon itself. The results of the surface water quality samples from the Baker Wastewater Treatment Lagoon are provided in Table 3.2-4, Surface Water Samples from the Baker Wastewater Treatment Lagoon. A general assessment of the results from the Baker Lagoon indicates that BOD is low for domestic wastewater flows. The BOD results indicate the water is not depleted in dissolved oxygen and would contain sufficient oxygen to sustain aquatic organisms. The TSS level is low as well but the TDS and specific conductance are high. The low TSS level is good, indicating a small quantity of particles that are in suspension. The high TDS and specific conductance are a reflection of the natural quality of the high saline surface water in the area. The pH level at 9.7 is high. As a comparison, industrial flows are normally required to be between pH 7.2 and 8.0 for discharge under an National Pollutant Discharge Elimination System discharge permit, and the UDWQ requires a pH between 6 and 9 for land disposal of wastewater. Again, these standards are used for water quality comparison purposes only since the Baker Wastewater Treatment Lagoon is designed to be a nondischarging total containment system.

Table 3.2-4. Surface Water Samples from the Baker Wastewater Treatment Lagoon.

Parameters (units)	Baker Lagoon August 1999	Baker Lagoon Influent Manhole August 1999
Alkalinity, Total (mg/L)	231	231
Ammonia-Nitrogen (mg/L)	0.4	0.9
Biochemical Oxygen Demand (mg/L)	< 1	< 12
Chemical Oxygen Demand (mg/L)	28	73
Conductance, Specific (µmhos/cm)	3,020	1,810
Nitrate, Nitrogen (mg/L)	< 0.1	2.1
Nitrite, Nitrogen (mg/L)	0.008	0.033
Nitrogen, Total Kjeldahl (mg/L)	< 0.8	4.3

Table 3.2-4. Surface Water Samples from the Baker Wastewater Treatment Lagoon.

Parameters (units)	Baker Lagoon August 1999	Baker Lagoon Influent Manhole August 1999
pH (units)	9.7	8.4
Phosphorus, Ortho (mg/L)	0.25	0.73
Phosphorus, Total (mg/L)	0.35	13
Total Dissolved Solids (mg/L)	1,800	1,120
Total Suspended Solids (mg/L)	2	8
Total Organic Carbon (mg/L)	5	10

< less than
mg/L milligrams per liter
µmhos/cm micromhos per centimeter

SOURCE: EWP Engineering, 1999a

In addition, as part of preparation of DPG's Title V Air Permit, surface water samples were collected from all lagoons in March 1995 and analyzed for VOCs. Three samples from each lagoon were collected and analyzed. There were no significant detections of VOCs from the wastewater treatment lagoons.

Surface Water Contamination Investigations – Surface water contamination may have occurred in some areas of DPG from past testing, training, or waste management activities. Ongoing investigations are studying the nature and extent of potential surface water contamination at identified areas within DPG.

Surface water samples have been collected for chemical analysis at three SWMUs during the Phase I RCRA Facility Investigation and at one HWMU during Consent Order investigations. Metals were detected above background in surface water samples collected at SWMU 21, and explosives, TOC, and metals were detected above certified reporting limits or background in the surface water samples collected at SWMU 199. VOCs were detected above certified reporting limits in the surface water sample collected at HWMU 36. These SWMUs and HWMUs are shown on Figures E-1 and E-2, respectively of Appendix E, Solid and Hazardous Waste Management Units at DPG.

The status of ongoing surface water contamination investigations at the HWMUs and SWMUs is summarized in Appendix E, Solid and Hazardous Waste Management Units at DPG. Because the intent of this EIS is to provide an overview of the existing environmental conditions at DPG, detailed discussions of the investigation activities at the SWMUs and HWMUs are not included in this section. However, a comprehensive discussion of the operational history, nature and extent investigation (including sample locations, collection methods, and detected analyte

concentrations), and further investigation or closure plans for the SWMUs and HWMUs can be found in the following documents:

- Final Phase I RCRA Facility Investigation Report (PES, 1996)
- SWMU Closures at Dugway Proving Ground Final Interim Report (Ebasco, 1995a)
- Draft Dugway Proving Ground Closure Plan Module 3 (FWEC, 1996)

3.2.2.4 Surface Water Uses

There is no known use of surface water by humans at DPG. However, surface water at DPG is an important resource for wildlife and surrounding vegetation. There are several natural and constructed surface water features at DPG that provide water for wildlife use, including springs, ponds, wetlands, playa, and wastewater lagoons.

These features are described in Table 3.2-1, Surface Water Features at DPG, and their locations are shown in Figure 3.2-1, Surface Water Features at DPG. Additionally, several wildlife guzzlers have been constructed at DPG that collect precipitation and then store and dispense this water for wildlife use.

Two types of wildlife guzzlers are located at DPG, including five guzzlers that are designed for chukar use and two for pronghorn use. The locations of the guzzlers are shown in Figure 3.2-1, Surface Water Features at DPG.

Wildlife drink water stored in a guzzler at DPG through an opening in the storage tank.

The chukar guzzler design includes an above ground steel panel that collects precipitation and conveys this water to a 1,136-L (300-gallon) fiberglass storage tank

which is partially buried. Chukars can drink the stored water through a wire mesh opening in the top of the storage tank. The pronghorn guzzler design includes a rock covered polyethylene apron that collects precipitation and conveys this water to two 6,800-L (1,800-gallon) high-density crosslinked polyethylene storage tanks that are above ground.

3.2.3 Groundwater

Groundwater is used as a source of drinking, process, and irrigation water at DPG. The following subsections describe the regional groundwater flow systems in the vicinity of DPG and the specific groundwater resources at DPG:

- Regional Groundwater Overview
- Groundwater Flow Systems at DPG
- Groundwater Quantity
- Groundwater Quality
- Groundwater Uses

3.2.3.1 Regional Groundwater Overview

Groundwater flow in the Great Basin portion of the Basin and Range Physiographic Province of western Utah can be classified into the following three types of flow systems based on geographic extent, length of flow path, depth of flow, and areas of discharge (Gates and Bedinger, 1987):

- Local flow systems are primarily found in basin fill and are commonly limited to one topographic basin. Flow paths range from a few kilometers to about 40 km (25 mi) in length, with most of the flow within hundreds of feet of the ground surface. Groundwater discharges to stream channels or to terminal lakes or playas within the topographic basin.

- Intermediate flow systems are found in both basin fill and consolidated rock and generally underlie more than one topographic basin. Flow paths may be as long as tens of miles and cross the boundaries between the topographic basins. Deeper flow occurs along substantial parts of the flow paths. Groundwater discharges to stream channels flowing through the topographic basins or to a terminal lake or playa within one of the topographic basins.

- Regional flow systems are found in both basin fill and consolidated rock and underlie numerous topographic basins, including one or more intermediate flow systems. Flow paths can be as long as 160 km (100 mi) or more and may cross the boundaries of many topographic basins. Depth of flow may be up to several

thousand feet along substantial portions of the flow paths. Groundwater discharges to a large surface water body or to a large topographic depression.

DPG is located within a portion of the Great Salt Lake and the Great Salt Lake Desert regional groundwater flow systems, two of three regional flow systems located in western Utah. The regional flow systems are recharged by water from the mountains and plateaus at the eastern edge of the Basin and Range Physiographic Province and from mountains within the province. Movement of groundwater within the Great Salt Lake and Great Salt Lake Desert flow systems is along flow paths toward the Great Salt Lake and Great Salt Lake Desert, respectively (Gates and Bedinger, 1987).

In western Utah, groundwater has been developed mostly from aquifers in unconsolidated fill material that underlie the basin areas. However, substantial quantities of groundwater also locally occur in and move through the consolidated carbonate rocks that comprise parts or most of the mountain ranges in this area and underlie many of the basins (Gates and Bedinger, 1987).

Between the late 1960s and the early 1980s, the USGS conducted four hydrologic investigations in the vicinity of DPG. These investigations provide an assessment of the groundwater resources within the identified areas, including recharge, occurrence, movement, storage, discharge, and chemical quality. The results of these investigations were published in the following documents and are discussed in subsequent subsections:

- Hydrologic Reconnaissance of Skull Valley, Tooele County, Utah (Hood and Waddell, 1968)
- Hydrologic Reconnaissance of the Dugway Valley-Government Creek Area, West-Central, Utah (Stephens and Sumsion, 1978)
- Hydrologic Reconnaissance of the Southern Great Salt Lake Desert and Summary of the Hydrology of West-Central Utah (Gates and Kruer, 1981)
- Hydrologic Reconnaissance of the Fish Springs Flat Area, Tooele, Juab, and Millard Counties, Utah (Bolke and Sumsion, 1978)

In the late 1990s, the USGS (Steiger and Freethey, 2001) also conducted a groundwater hydrologic investigation of a portion of DPG and the adjoining area to the east and southeast. This investigation included the Dugway Valley-Government Creek area and the southern portion of Skull Valley. The report describes the groundwater hydrology of the study area including the principal recharge area,

discharge area, groundwater movement, water level fluctuation, and chemical quality of the groundwater.

3.2.3.2 Groundwater Flow Systems at DPG

Several groundwater flow systems underlie portions of DPG, including local, intermediate, and regional systems. Evidence of a regional groundwater flow system is found in the southwestern corner of DPG. This portion of DPG is underlain by a carbonate-rock aquifer. Much of the water moving in the carbonate rocks near the Utah-Nevada border is believed to discharge from two groups of large springs - Blue Lake Springs and Fish Springs (Gates and Bedinger, 1987). Blue Lake Springs is located to the northwest of DPG along the western boundary of the UTTR-South AF. Fish Springs is located to the south of DPG's southern boundary in the Fish Springs National Wildlife Refuge. Additionally, the carbonate-rock aquifer is likely the source of groundwater discharging from the Redden Springs located along DPG's western boundary. Both of these are shown in Figure 3.2-1, Surface Water Features at DPG.

Intermediate and local flow systems that underlie DPG include the basin fill aquifers that are found in Skull Valley, the Dugway Valley-Government Creek area, and the Great Salt Lake Desert area. The western and northwestern portions of DPG lie within the Great Salt Lake Desert. Three groundwater aquifers have been identified within portions of the southern Great Salt Lake Desert, including a shallow-brine, an alluvial-fan, and a basin-fill aquifer (Gates and Kruer, 1981). These three aquifers as defined are best known in the vicinity of Wendover, NV; however, they may be discontinuous throughout the Great Salt Lake Desert (AGEISS, 1999c; Dames & Moore and FWEC, 1997).

Groundwater production at DPG occurs in Skull Valley and the Dugway Valley-Government Creek area. The easternmost portion of DPG overlies the Skull Valley Aquifer, which is part of the Great Salt Lake regional flow system. The eastern and central portions of DPG overlie the Dugway Valley-Government Creek Aquifer, which is also part of the Great Salt Lake Desert regional flow system. Steiger & Freethey (2001) indicate that the basin-fill deposits underlying the eastern and central portions of DPG and to the south and east are bounded and partially divided by consolidated rock outcrops and mountain ranges. Dugway Valley, Old River Bed, Government Creek Valley, and the Fries Park area form subareas of the groundwater system south, southeast, and east from the main part of the Great Salt Lake Desert. A surface water divide and consolidated rock, overlain by a thin layer of alluvium, separates the English Village area from the Dugway Valley-Government Creek area. The English Village area is part of the much larger Skull Valley groundwater system

to the east and northeast. Bedrock that outcrops in a prospect pit located along a topographic high southwest of English Village consists of fractured quartzite with abundant iron staining. Weathered rhyolitic bedrock has also been encountered while drilling several groundwater monitoring wells in the vicinity of the topographic high (PES, 1996). It is likely that these igneous rocks which form a surface water drainage divide in this area also act as a groundwater divide at depth (FWEC, 1996).

As described by Hood and Waddell (1968), the main groundwater reservoir in Skull Valley lies in unconsolidated basin fill of late Tertiary and Quaternary age and covers approximately 931 sq km (230,000 acres). The source of groundwater in Skull Valley is precipitation that falls mainly on the Stansbury and Onaqui Mountains. The estimated average annual groundwater recharge and discharge ranges between 40 million to 60 million m^3 per year (30,000 to 50,000 acre-ft per year), with evapotranspiration accounting for 80 to 90 percent of the total groundwater discharge. Groundwater generally flows to the north towards the Great Salt Lake. Because of the small population and the primary dependence on surface water for stock and irrigation supplies, Skull Valley contains few large-diameter wells. Downgradient of DPG, wells are concentrated along the eastside of the valley between Timpie and the Skull Valley Reservation and in the vicinity of Orr's Ranch (Hood and Waddell, 1968).

The Skull Valley Aquifer is under unconfined conditions in the English Village area as indicated by a relatively small change in water levels encountered during drilling versus subsequent static water level measurements (AGEISS, 1998i). Drilling logs from water supply wells indicate that a sequence of clays, sands, gravels, and/or conglomerate units are found from ground surface to a depth of approximately 168 m (550 ft) bgs (USAEHA, 1987). Based on water level measurements taken at the Consent Order HWMUs, depth to groundwater is approximately 20 to 38 m (67 to 124 ft) bgs. Water levels in the English Village area are more than 100 ft higher than water levels in the Fries Park area and indicate a groundwater divide where consolidated rock is overlain by a thin layer of alluvium (Steiger & Freethey, 2001). The direction of groundwater flow in this area should generally be to the east towards the center of Skull Valley. However, as shown on Figure 3.2-2, Groundwater Flow Directions at DPG, groundwater flow is actually towards the center of a partially enclosed basin within the Skull Valley aquifer. Pumping of the water supply wells and differences in hydraulic properties of the consolidated rock and unconsolidated deposits influence groundwater flow in the immediate area (Steiger & Freethey,

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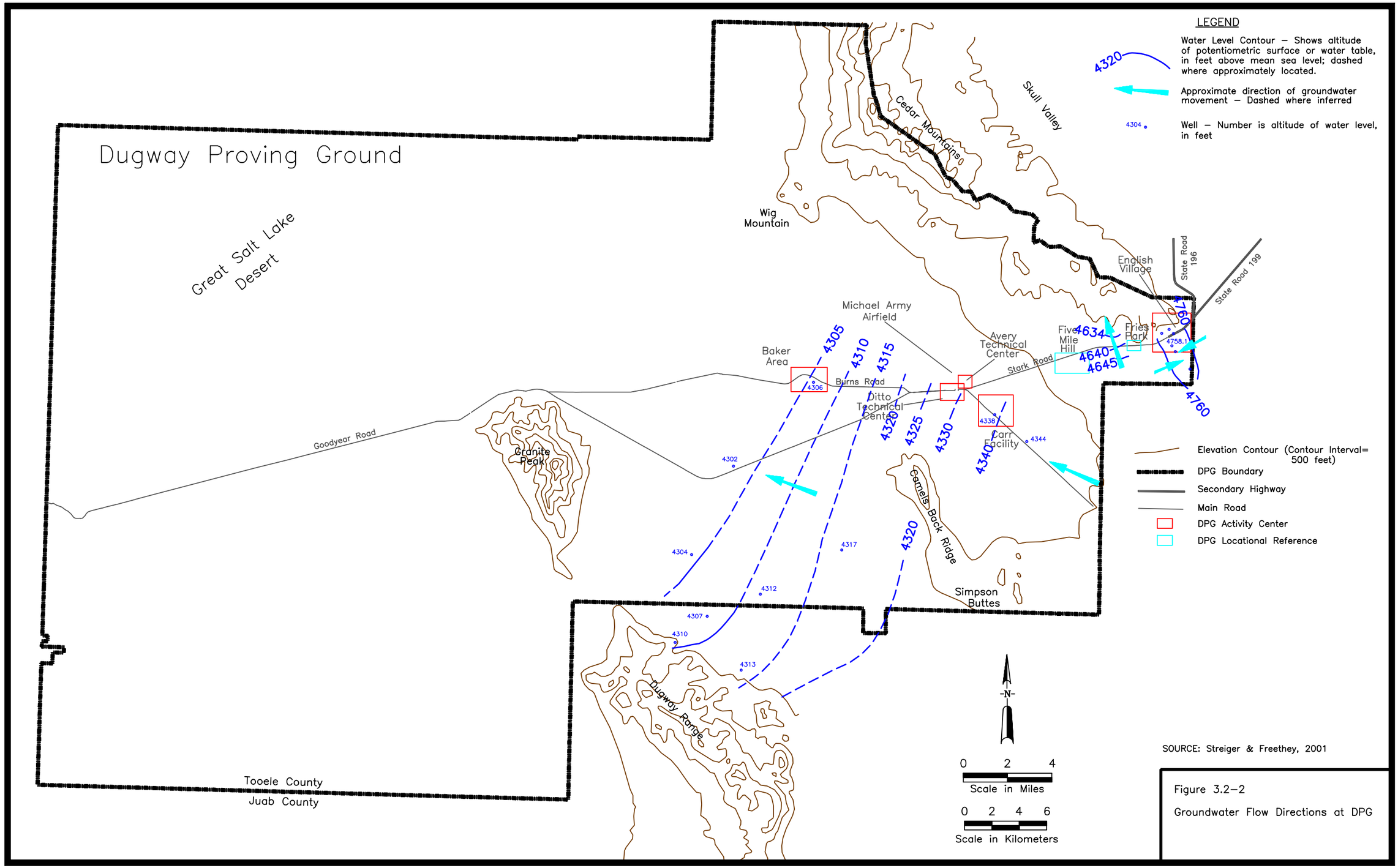

SOURCE: Streiger & Freethey, 2001

Figure 3.2–2

Groundwater Flow Directions at DPG

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2001). The locations of the water supply wells and quantity of groundwater withdrawn annually are discussed in Section 3.2.3.3, Groundwater Quantity.

As described by Stephens and Sumsion (1978), the major source of groundwater in the Dugway Valley-Government Creek area is saturated older alluvium of Tertiary and Quaternary age. This groundwater reservoir covers approximately 1,538 sq km (380,000 acres). The total estimated annual groundwater recharge in the Dugway Valley-Government Creek area is approximately 15 million m^3 (12,000 acre-ft). Recharge from precipitation is about 9 million m^3 (7,000 acre-ft) annually and occurs primarily in coarse alluvium of higher valleys and lower mountain slopes above 1,829 m (6,000 ft). About 6 million m^3 (5,000 acre-ft) of groundwater enters the area annually as subsurface inflow from the Sevier Desert drainage basin through the Old River Bed. Steiger & Freethey (2001) indicate that the areas with the greatest potential to contribute recharge to the deeper, confined parts of the Dugway Valley-Government Creek area groundwater system would be the Simpson Mountains, Sheeprock Mountains, alluvium and colluvium deposits around the flanks of the Simpson Mountains, and older alluvium between the Simpson and Sheeprock Mountains. The Cedar Mountains and Granite Peak, because of lower winter precipitation and lack of faults, have a low potential for contributing recharge to the groundwater system.

Groundwater in the Dugway Valley-Government Creek area discharges by four means (Steiger & Freethey, 2001): 1) evapotranspiration in areas with phreatophytes, 2) evaporation from mudflats and the Great Salt Lake Desert, 3) pumping of wells, or 4) spring discharge. Most of the groundwater discharge from the Dugway Valley-Government Creek aquifer is by subsurface flow northwestward into the Great Salt Lake Desert (Stephens & Sumsion, 1978). Steiger & Freethey (2001) delineated the Dugway Valley-Government Creek discharge area by identifying areas where groundwater discharges to the surface through natural means, mainly seeps and mudflats, where phreatophyte growth is well established, or where the depth to the water table is 6 m (20 ft) or less.

There are no groundwater wells located on the UTTR-South AF, which is located north of DPG or hydraulically downgradient in the southern Great Salt Lake Desert (AGEISS, 1999c). While large amounts of groundwater occur in the southern Great Salt Lake Desert, most of it is of poor quality and much of it is in fine-grained unconsolidated deposits that will not yield more than a few gpm of water to wells (Gates and Kruer, 1981).

Within DPG, two relevant zones of groundwater have been identified in the Dugway Valley-Government Creek Aquifer, a shallow aquifer and a mid-level aquifer. The

shallow aquifer is primarily unconfined. Based on water level measurements taken at the Consent Order HWMUs, depth to groundwater is approximately 0.6 to 15 m (2 to 50 ft) bgs. The mid-level aquifer is under confined conditions as indicated by higher static water levels in water supply wells compared to the depths of water encountered during drilling (AGEISS, 1998i). Based on water levels encountered during drilling of the water supply wells, depth to groundwater in the mid-level aquifer is approximately 76 to 98 m (248 to 320 ft) bgs. Drilling logs from the water supply wells located in Ditto and Carr indicate that a sequence of clays, sands, and/or gravels are found from ground surface to a depth of approximately 107 m (350 ft) bgs (USAEHA, 1987). Recent hydrogeologic studies in the Ditto and Carr area indicate that the basin fill in this area consists of silty sand units interbedded with clay layers. The upper interbedded sand and clay unit hosts shallow groundwater and is referred to as the shallow water-bearing zone (called the shallow aquifer in this EIS). A persistent clay layer exists at approximately 27 m (90 ft) and extends to 40 m (130 ft) bgs. Data indicate that this layer acts as a barrier to vertical groundwater movement and is referred to as the confining-clay layer. The lower sand is the regional aquifer in this area (called the mid-level aquifer in this EIS) and is the potable source of groundwater for the Ditto and Carr areas (PES, 1999). The general direction of groundwater flow in this area is to the northwest towards the Great Salt Lake Desert in both the shallow and mid-level aquifers. Figure 3.2-2, Groundwater Flow Directions at DPG, shows the general direction of groundwater flow for the mid-level aquifer in which the water supply wells are screened. The locations of the water supply wells and quantity of groundwater withdrawn annually are discussed in Section 3.2.3.3, Groundwater Quantity.

Groundwater in the Fries Park area is under unconfined conditions as indicated by a relatively small change in water levels encountered during drilling versus subsequent static water level measurements (AGEISS, 1998i). Based on water level measurements taken at Consent Order HWMU 47, the English Village Wastewater Treatment Facility, and the English Village Landfill, depth to groundwater is approximately 42 to 63 m (139 to 207 ft) bgs. The direction of groundwater flow in this area is to the northwest as shown in Figure 3.2-2, Groundwater Flow Directions at DPG.

Steiger & Freethey (2001) describe groundwater levels and movement in the Fries Park area. They indicate that the unconfined part of the groundwater system in this area is not well connected to the groundwater system in the adjoining areas. Consolidated rock separates groundwater in the Fries Park area from that under unconfined conditions in the English Village area. South and southwest of the Fries Park area are Little Granite Mountain and Davis Mountain. Water levels in the Fries

Park area are 90 m (300 ft) higher than water levels in the Ditto and Carr areas to the west. Depth to consolidated rock to the west is unknown, but water levels indicate that a zone of low transmissivity is present. However, there is not enough information available to determine groundwater movement to the west.

3.2.3.3 Groundwater Quantity

The total volume of groundwater in storage underlying DPG is unknown. However, the USGS has estimated the amount of recoverable groundwater in storage for Skull Valley and the Dugway Valley-Government Creek area. Recoverable groundwater in storage is defined as that part of the stored water that will drain by gravity from a groundwater reservoir as water levels are lowered (Stephens and Sumsion, 1978). It is the product of the specific yield of the reservoir rocks, the saturated thickness, and the area. Specific yield of a rock or soil is the ratio of the volume of water it will yield by gravity after being saturated, to the volume of the rock or soil.

In the Skull Valley Aquifer, the estimated recoverable water in storage in the upper 30 m (100 ft) of the saturated unconsolidated rocks is approximately 2.8 billion m^3 (2.3 million acre-ft) (Hood and Waddell, 1968). However, only about 1 billion m^3 (1 million acre-ft) of the groundwater is believed to be of a chemical quality suitable for irrigation and domestic use (Hood and Waddell, 1968). In the Dugway Valley-Government Creek area, the estimated amount of water recoverable from storage in the upper 30 m (100 ft) of saturated valley fill is about 4.7 billion m^3 (3.8 million acre-ft) (Stephens and Sumsion, 1978).

The 32 water supply wells that have been drilled at DPG and their production status are listed in Table 3.2-5, Status of Water Supply Wells at DPG. The locations of these wells are shown on Figure 3.2-3, Water Supply Wells at DPG. Table 3.2-5, Status of Water Supply Wells at DPG, also describes each well, including depth, flow rate (for active production wells only, if available), and general water quality. As of 2000, ten of the 32 water supply wells were active, two wells have been abandoned, and the remaining 20 wells were inactive but have not been abandoned. Federal reserved water rights provide for access to groundwater at DPG. Increases in demand can be met by those rights that already exist in inactive water supply wells.

Six of the ten active wells produce potable water (Wells 3, 5, 26, 27, 28, and 30), while the remaining four wells produce nonpotable water (Wells 10, 18, 19, and 32). Wells 18, 19, 26, 27, and 30 are located in the English Village area. These five wells withdraw groundwater from the Skull Valley Aquifer. Wells 3 and 28 are located in Ditto, Well 5 is located at Carr, and Wells 10 and 32 are located north and northwest of Granite Peak, respectively. These five wells withdraw groundwater from the mid-

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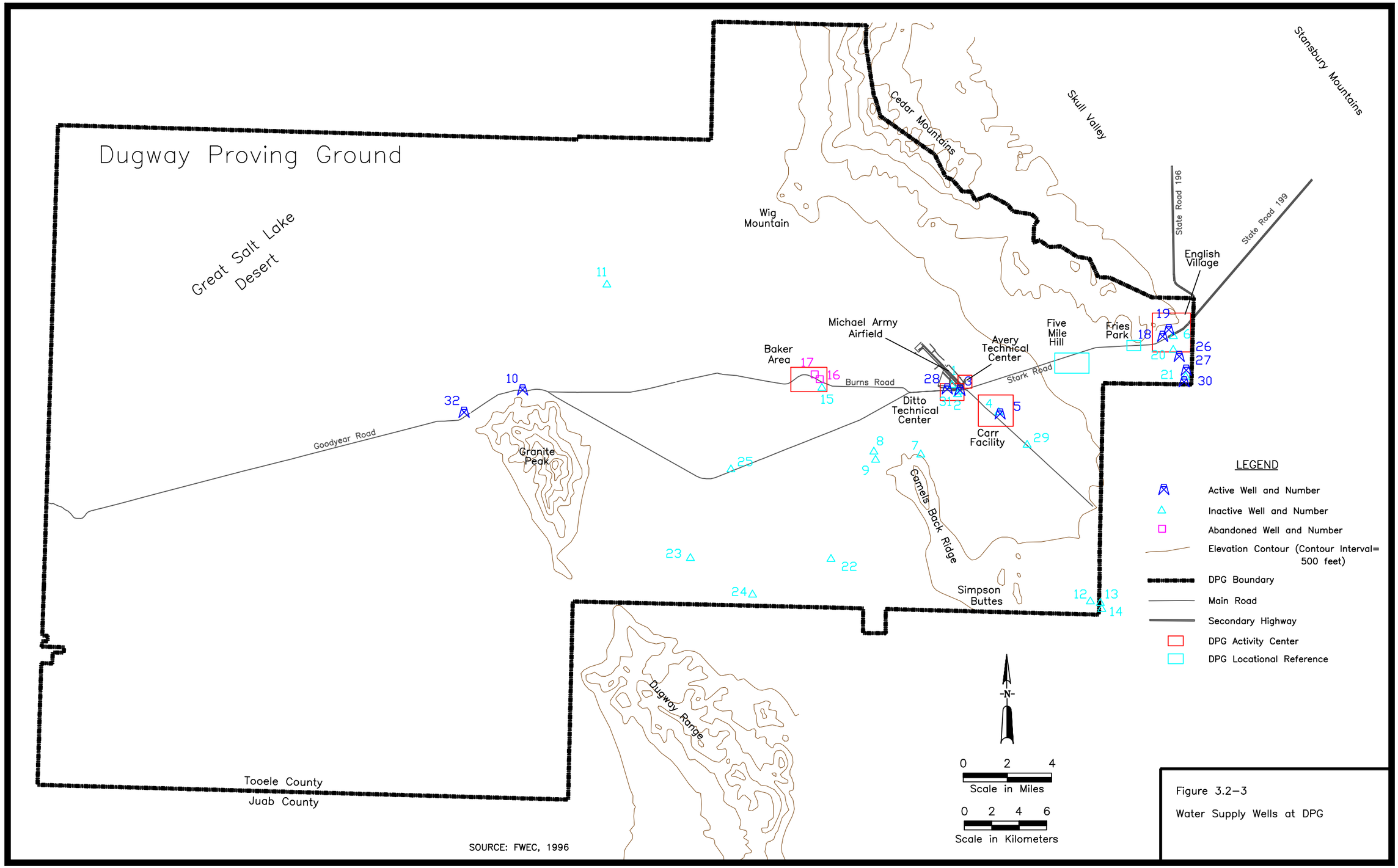

SOURCE: FWEC, 1996

Figure 3.2–3

Water Supply Wells at DPG

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level aquifer in the Dugway Valley-Government Creek area. Section 3.2.3.5, Groundwater Uses, describes the use of this groundwater at DPG.

Table 3.2-5. Status of Water Supply Wells at DPG.

Well Number	General Location	Depth (feet)	Flow Rate (gallons per minute)	Status	Description
1	Ditto	317	NA	Inactive	Test well, plugged
2	Ditto	328	NA	Inactive	Test well, plugged
3	Ditto	320	370	Active	Potable
4	Carr	170	NA	Inactive	Test well, potable
5	Carr	320	310	Active	Test well, potable
6	English Village	175	NA	Inactive	Test well, potable
7	Southwest of Ditto	120	NA	Inactive	Potable, plugged
8	North of Tower Grid	230	NA	Inactive	Nonpotable
9	North of Tower Grid	35	NA	Inactive	Nonpotable
10	North of Granite Peak	143	*	Active	Nonpotable, used for dust suppression
11	North of All Purpose Grid	315	NA	Inactive	Nonpotable
12	Simpson Springs	520	NA	Inactive	Test well, potable
13	Simpson Springs, southeast of DPG	75	NA	Inactive	Test well, potable
14	Simpson Springs, southeast of DPG	75	NA	Inactive	Test well, potable
15	Baker	444	NA	Inactive	Test well, nonpotable
16	Baker	284	NA	Abandoned	Nonpotable
17	Baker	304	NA	Abandoned	Nonpotable
18	English Village	340	*	Active	Nonpotable, irrigation only
19	English Village	400	*	Active	Nonpotable, irrigation only
20	English Village	497	NA	Inactive	Test well, potable
21	English Village	718	NA	Inactive	Test well, potable
22	Southwest of Tower Grid	204	NA	Inactive	Nonpotable
23	South of Downwind West Road	210	NA	Inactive	Test well, nonpotable
24	South of Downwind West Road	200	NA	Inactive	Test well, nonpotable
25	Northeast of Highway 101 & Stark Road	193	NA	Inactive	Test well, nonpotable
26	English Village	432	890	Active	Potable
27	English Village	545	810	Active	Potable
28	Ditto	336	350	Active	Potable
29	Southeast of Carr	450	NA	Inactive	Test well, potable
30	English Village	450	1,000	Active	Potable
31	Ditto	330	NA	Inactive	Potable
32	Northwest of Granite Peak	*	*	Active	Nonpotable, used for toilet functions and hand washing only

* Information is not available
Baker Baker Area
Carr Carr Facility
Ditto Ditto Technical Center
NA not applicable

SOURCES: AGEISS, 1998g; AGEISS, 1998h; AGEISS, 1998i; Prather, 1999a; Pendley, 1999; USAEHA, 1987, DPG, 2000m

Well water supplies are used by three primary and independent water systems at DPG:

- English Village (Community), State of Utah Water System ID 23054, serves English Village and Fries Park and includes Wells 26, 27, and 30
- Ditto (Non-Transient/Non-Community), State of Utah Water System ID 23021, serves Ditto, Avery, Baker, and MAAF and includes active Wells 3 and 28 and inactive Well 31
- Carr (Non-Transient/Non-Community), State of Utah Water System ID 23058, serves Carr and includes Well 5

Descriptions of the water supply and distribution systems at DPG are provided in the SDP (AGEISS and HBA, 2000).

The amount of groundwater that is annually pumped from the six active potable water supply wells at DPG for a select number of years are identified in Table 3.2-6, Annual Groundwater Withdrawal from Active Drinking Water Supply Wells at DPG. Between 1994 through 1998, production rates have varied for each well, with the largest fluctuations noted in Wells 3 and 5. The highest withdrawal rates for the English Village wells during this time period were reported in 1994 for Wells 27 and 30 and in 1996 for Well 26. The highest withdrawal rates for the Ditto wells occurred in 1997 and for the Carr well in 1995. Historically, the rate of groundwater withdrawal has decreased significantly over the last 30 years at DPG. This can be attributed to the decrease in mission activities over this time period. The highest overall groundwater withdrawal rates generally occurred in 1969 for those wells with reported data or 1976 for the remaining wells, with one exception. Well 28 in Ditto had an overall highest withdrawal rate in 1989.

Table 3.2-6. Annual Groundwater Withdrawal from Active Drinking Water Supply Wells at DPG.

Well Number	Annual Withdrawal Rate (million gallons per year)								
	1969	1976	1980	1989	1994	1995	1996	1997	1998
3	A	23	12	13.2	3.14	4.3	6.12	13	6.12
5	A	43	15	4.4	1.31	4.08	1.09	2.13	3.87
26	80.8	37.5	64.7	30.3	16.6	12.2	22.6	20.3	19.4
27	110	55.7	104	90	17	15.6	16.8	16.5	15.5
28	A	19	18	44.5	6.9	5.46	6.58	10.8	6.74
30	B	238	185	202	40.8	28.7	31.4	23	25.3

A Data are not available.
B Well 30 was first used in April 1976.

SOURCES: Pinkham et al., 1982; Prather, 1999a; Higginbotham, 1990

During 1998, 590,506 L and 3,032,024 L (156,000 gallons and 801,000 gallons) of nonpotable water were withdrawn from Wells 18 and 19 in English Village, respectively. This is the first year that withdrawal rates were metered in these two wells (Prather, 1999a). Production rates are not available for Wells 10 and 32.

During the next 5 years, DPG plans to place Well 31 into active use at Ditto (Prather, 1999a). Well 31 will be used as a backup well for the potable water supply system in this area (AGEISS, 1998h).

Significant aquifer dewatering has not been reported at DPG; however, water levels have decreased in the water supply wells compared to levels first noted during drilling.

Between 1942 and 1964 the water level in Well 6, an English Village area test well, reportedly dropped at an average of 0.46 m (1.5 ft) per year (COE, 1967). A reverse of this long-term water level decline was noted in 1969 when water levels began to rise in the English Village area. These changes were attributed to a decrease in the annual groundwater withdrawal rate and an increase in average precipitation. In Ditto and Carr, water levels in the mid-level aquifer have reportedly dropped at an average rate of 0.30 to 0.61 m (1 to 2 ft) per year prior to 1968. This rate of decline began to change between 1968 and the early 1970s, with water levels decreasing at a lower rate of 0.15 m (0.5 ft) per year (COE, 1973).

During the 1980s, English Village supported at least double the number of users compared to the baseline rate and no evidence of aquifer depletion was identified in the Skull Valley Aquifer (AGEISS, 1998i). Additionally, during this time period, Ditto and Carr also supported a greater number of users and no evidence of aquifer depletion was identified in the mid-level aquifer (AGEISS, 1998g; AGEISS 1998h). Between 1994 and 1998, a trend toward decreased groundwater withdrawal has been shown.

The USGS (Steiger & Freethey, 2001) also analyzed water level fluctuations in several DPG wells and compared them to average annual precipitation for this area. English Village inactive test Wells 6, 20, and 21 all showed similar patterns of water-level change between 1950 and 2000. Water level declines started in the 1950s and continued through the 1960s, and then water levels rose in the late 1960s, leveling off about 1988. The USGS attributes the rise in water levels in the late 1960s to a decline in pumpage of DPG Wells 18 and 19 and a more normal period of precipitation. In the late 1970s, during a period of decreased precipitation, the USGS attributes the continued rise in water levels of Well 6 and 20 to the use of a new

water supply well. Well 30, drilled and put into use in 1974, is located approximately 2 miles southeast of English Village.

3.2.3.4 Groundwater Quality

This section discusses the existing groundwater quality at DPG by describing the natural quality of groundwater, the quality of potable and nonpotable water used at DPG, and groundwater protection standards for DPG permits. This section also provides an overview of the ongoing groundwater contamination investigations at DPG.

Natural Quality of Groundwater – The natural quality of groundwater at DPG is shown on Figure 3.2-4, Natural Groundwater Quality at DPG, by plotting the dissolved solid residue concentrations from groundwater samples collected at select locations in the Skull Valley Aquifer and the mid-level aquifer in the Dugway Valley-Government Creek area.

In the eastern portion of DPG, within the Skull Valley Aquifer, the dissolved solid residue concentrations range from 627 to 1,040 mg/L in DPG water supply or test wells (Steiger & Freethey, 2001). Based on these analytical results, groundwater is classified as Class II using the State of Utah's groundwater classification system. Class II groundwater is considered to be drinking water quality and includes groundwater with TDS concentrations between 500 and 3,000 mg/L. Groundwater samples collected from monitoring wells at English Village area SWMUs/HWMUs have TDS concentrations that range from 501 to 4,700 mg/L and are classified as Class II to Class III groundwater. Class III groundwater is considered to be of limited use and includes groundwater with TDS concentrations between 3,000 and 10,000 mg/L.

In the eastern and central portions of DPG, within the mid-level aquifer of the Dugway Valley-Government Creek area, the dissolved solid residue concentrations range from 562 to 2,590 mg/L in DPG water supply or test wells (Steiger & Freethey, 2001). Based on these analytical results, groundwater is classified as Class II. Groundwater samples collected from monitoring wells at Dugway Valley-Government Creek area SWMUs/HWMUs, screened within the shallow aquifer, have TDS concentrations that range from 686 to 73,285 mg/L. The groundwater quality in the shallow aquifer generally decreases to the west, with the highest concentrations identified to the west and southwest of Ditto. Classes II, III, and IV groundwater have been identified in the shallow aquifer. Class IV groundwater is considered to be saline and includes groundwater with TDS concentrations that exceed 10,000 mg/L.

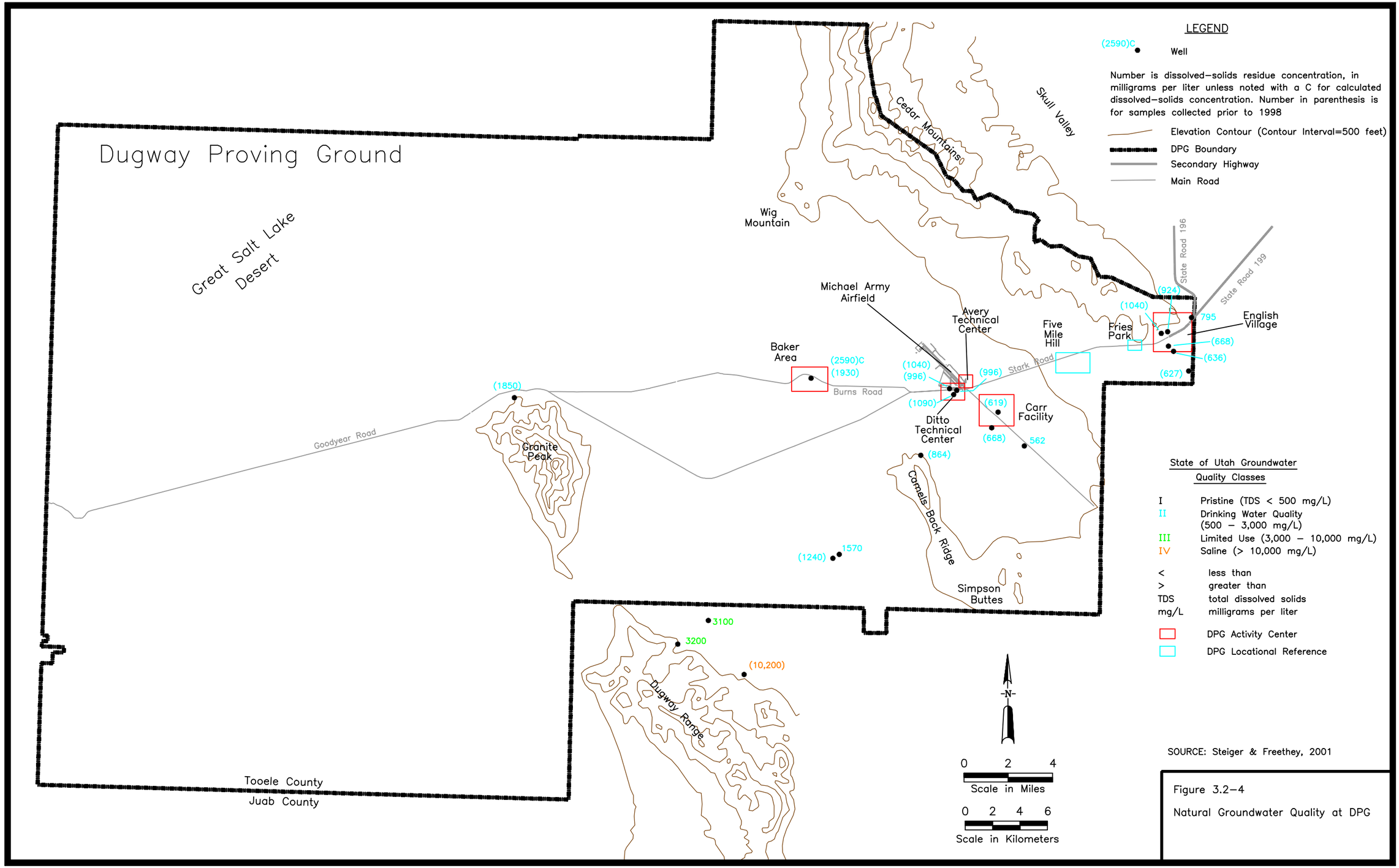

Figure 3.2–4

Natural Groundwater Quality at DPG

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As part of a groundwater hydrologic investigation in the DPG area, the USGS (Steiger & Freethey, 2001) installed an observation well and collected groundwater samples for chemical analysis from the observation well and an inactive test well located at DPG. The observation well is located in the southern portion of DPG, southwest of Camels Back Ridge, and monitors subsurface flow in the vicinity of the Old River Bed. The inactive test well, Well 29, is located southeast of Carr. The samples were analyzed for water quality parameters, major ions, selected trace metals, dissolved solids concentrations, VOCs, SVOCs, and explosives.

The dissolved solids residue concentrations in the samples collected at the Old River Bed Observation Well and Well 29 were 1,570 and 562 mg/L, respectively (Steiger & Freethey, 2001). Toluene was also detected in the Well 29 sample at a concentration of 1.2 µg/L (Steiger & Freethey, 2001), which is below the MCL of 1,000 µg/L for this VOC. The USGS reported that the groundwater sample was most likely contaminated during handling in the field (Steiger & Freethey, 2001). All other analyzed parameters that are regulated under the National Primary Drinking Water Standards were either not detected or detected below MCLs in the two samples (Steiger & Freethey, 2001). Based on these analytical results, the groundwater samples do not appear to have been impacted by DPG mission activities. These wells are located close to or within portions of grids, ranges, and impact areas used for ground training and for testing conventional munitions and smokes, obscurants, and illuminants.

Potable Water – Potable water at DPG is withdrawn from the Skull Valley Aquifer in the English Village area and from the mid-level aquifer in the Dugway Valley-Government Creek area. DPG submitted DWSP Plans to UDDW for the following potable water supply systems at DPG:

- English Village (Community), State of Utah Water System ID 23054, includes Wells 26, 27, and 30 (AGEISS, 1998i)
- Ditto (Non-Transient/Non-Community), State of Utah Water System ID 23021, includes active Wells 3 and 28 and inactive Well 31 (AGEISS, 1998h)
- Carr (Non-Transient/Non-Community), State of Utah Water System ID 23058, includes Well 5 (AGEISS, 1998g)

The DWSP Plans have been prepared in compliance with UAC R309-113. These plans delineate the four source protection zones for each water supply well and identify Potential Contamination Source (PCSs) found within each zone. A PCS is any facility or site that employs an activity or procedure which may potentially

contaminate groundwater. Each identified PCS was assessed to determine whether it is adequately controlled by either a regulatory, best management/pollution prevention, physical, or negligible quantity control. Regulatory or nonregulatory land management strategies were identified for those PCSs that were classified as not adequately controlled. Examples of regulatory land management strategies include standards or actions relating to a legally enforceable mechanism such as a Consent Order, closure of SWMUs that are under investigation under RCRA Section 3004(u), and any PCSs that are subject to a state or Federal permit program. Examples of nonregulatory land management strategies include voluntary groundwater monitoring, pollution prevention plan implementation, and waste minimization strategies.

One of three identified PCSs in the English Village area was assessed as not adequately controlled (AGEISS, 1998i). Eleven of the 51 identified PCSs in the vicinity of Ditto were assessed as not adequately controlled (AGEISS, 1998h). Twenty-four of the 38 identified PCSs in the Carr area were assessed as not adequately controlled (AGEISS, 1998g). Regulatory or nonregulatory land management strategies have been developed for each of the PCSs that have been assessed as not adequately controlled.

UDDW specifies sampling frequency and required analytical parameters for samples collected from the water supply distribution systems and potable water supply wells at DPG. Samples for bacteriologic monitoring must be collected on a monthly or quarterly basis from the distribution systems. Samples for lead and copper monitoring must be collected, depending upon the distribution system, on a semiannual basis or once every 3 years. Inorganics and metals must be collected from the water supply wells once every 3 years, while nitrate is required yearly. Depending upon the water supply well, VOCs must be collected on a yearly basis or once every 6 years. Pesticides, unregulated organics, and radionuclides are only required in specific wells at frequencies that vary from quarterly to once every 4 years (UDDW, 1999).

Appendix G, Drinking Water Supply Wells at DPG, identifies the 1999 analytical results for groundwater samples collected from the potable water supply wells at DPG. The results show that the identified analytes were either not detected or detected below MCLs in groundwater samples collected from Wells 3, 5, 27, 28, and 30. An MCL is the maximum permissible level of a contaminant in water that is delivered to any user of a public water system. The MCL is a national primary water regulation or primary standard that is set by EPA. The analytical results identified for Well 27 in Appendix G, Drinking Water Supply Wells at DPG, are also representative of the water quality in Well 26.

EPA requires that a consumer confidence report (CCR) be prepared by public water systems which have at least 15 service connections serving year round residents (EPA, 1999). The report must be distributed to the water users annually to inform them of water quality sampling results and compliance with drinking water standards. The CCR for DPG's English Village water system was published in the September and October 1999 issues of the Dugway Dispatch. This report summarized analytical data for 1998 and showed that the water quality from the English Village potable water supply wells met Federal and state requirements in all areas that were tested (Unknown, 1999d; 1999e). The CCR for 1999 was published in the June 2000 issue of the DPG Housing Newsletter. This report summarized analytical data for 1999 and showed that water quality from the English Village potable water supply system again met all Federal and state requirements.

In April 1994, as part of the Phase I RCRA Facility Investigation, the potable water supply wells at DPG were sampled and analyzed for mission-related analytes (ESI, 1994). Analytical parameters included VOCs, SVOCs, explosives, ABPs, metals, gross alpha/beta, TOC, total phosphorus, TDS, and pH. Analytes were not detected above method reporting limits in samples analyzed for VOCs, SVOCs, explosives, ABPs, and TOC. For the remaining parameters, analytes were detected below primary drinking water standards.

Based on the 1994, 1997, and 1999 analytical results, it appears that potential soil or groundwater contamination identified at nearby SWMUs or HWMUs have not negatively impacted groundwater withdrawn from the potable water supply wells at DPG.

Nonpotable Water – Four wells are actively used for nonpotable water at DPG, Wells 10, 18, 19, and 32. Wells 18 and 19 are located in English Village and are only used for irrigation. The wells were taken out of service for culinary purposes in 1972 and 1967, respectively, because of high nitrate levels. The nitrate contamination may be due to one or more of the following (USAEHA, 1982):

- A naturally occurring deposit
- Leaching of nitrates from fertilizer applied to lawns in English Village coupled with over-irrigation
- Failure of the former sewage treatment lagoon east of English Village in 1964
- Infiltration of wastewater by effluent from the former English Village Sewage Lagoons located to the southwest of English Village

Well 10 is located north of Granite Peak. Water from this well is used for dust suppression by DPG road crews. Well 32 is located northwest of Granite Peak. Water from this well is used for toilet functions and handwashing at the Strategic Training Range Complex (Pendley, 1999; Wheeler and Wheeler, 1994).

Groundwater Protection Standards for Permit Requirements – DPG monitors groundwater in the vicinity of the English Village Landfill and English Village Wastewater Treatment Facility to meet regulatory permit requirements. For both the landfill and the wastewater treatment facility, the background groundwater quality or natural groundwater chemistry has been determined. Background groundwater quality is determined by sampling upgradient wells and/or downgradient wells before a facility goes on-line usually for 8 consecutive months and determining the mean, variance, and standard deviation for the parameters that are monitored. Once the background groundwater quality is determined, the Executive Secretary sets groundwater quality protection standards, which then become part of the permit for that facility.

For the English Village Landfill, interwell statistical analysis is conducted to determine whether a significant change has occurred as compared to background. DPG monitors three downgradient wells and two upgradient wells in accordance with the permit issued for the English Village Landfill. Tolerance limits are calculated for those analytes that are detected during a sampling event. The tolerance limits are updated each time groundwater is sampled; so the limits can change during the life of the monitoring program. Groundwater is monitored semi-annually at the English Village Landfill. The first semi-annual monitoring event was conducted in July 2000. The results are reported to the UDWQ.

DPG is required to monitor two upgradient wells and one downgradient well in accordance with its groundwater discharge permit issued for the English Village Wastewater Treatment Facility. The permit includes groundwater protection standards for:

- pH at 6.5 to 8.5
- Maximum nitrate at 3.86 mg/L
- Maximum TDS at 640 mg/L

These parameters are to be monitored semi-annually. In addition, volatile organic compounds in groundwater must be monitored every other year. The results are reported to the UDSHW. The first semi-annual monitoring event for the English Village Wastewater Treatment Facility occurred in July 2000.

Groundwater Contamination Investigations – Groundwater contamination has occurred in some areas of DPG from past waste management practices. Ongoing investigations are studying the nature and extent of potential groundwater contamination at identified areas within DPG.

DPG began monitoring groundwater in 1992 for activity-related analytes. Groundwater samples have been collected for chemical analysis at eight SWMUs during the Phase I RCRA Facility Investigation and at 20 HWMUs as part of the Consent Order investigation as shown in Appendix E, Solid and Hazardous Waste Management Units at DPG. Groundwater sampling is also conducted on a semiannual basis at 13 of the Consent Order HWMUs as part of the ongoing RCRA assessment monitoring program at DPG, including HWMUs 14, 33, 36, 37, 39, 42, 43, 47, 51, 55, 58, 90, and 158. In response to Consent Order 8909884, DPG has implemented this assessment monitoring program and submits annual reports to UDSHW which present and evaluate the groundwater monitoring results (AGEISS, 1996f).

Groundwater monitoring wells drilled in the vicinity of English Village HWMUs and SWMUs are completed in the Skull Valley Aquifer. In the Dugway Valley-Government Creek Area, groundwater monitoring wells that are drilled in the vicinity of the HWMUs and SWMUs are completed in the shallow aquifer.

Groundwater monitoring identifies analytes in the groundwater at DPG.

Appendix E, Solid and Hazardous Waste Management Units at DPG, identifies the analyte groups detected in groundwater at the HWMUs and SWMUs, based on organic analytes detected above certified reporting limits or recommended reporting limits and inorganic analytes detected above background or statistical background values. VOCs, SVOCs, pesticides, TPH, radiochemistry, and/or metals were detected in groundwater samples collected at one or more of the SWMUs. VOCs,

SVOCs, explosives, ABPs, TOC, total organic halogens, TPH, radiochemistry, cyanide, and/or metals were detected in groundwater samples collected at one or more of the HWMUs.

The locations of HWMUs/SWMUs that contain contaminated groundwater, defined as follows, are shown in Figure 3.2-5, Groundwater Contamination at DPG.

- A SWMU at which further action has been recommended based on groundwater results from the Phase I RCRA Facility Investigation
- A HWMU at which assessment of the analytical results identified possible HWMU-related contaminants in groundwater above certified reporting limits, recommended reporting limits, MCLs, background, and/or statistical background values

Typically, the analytes that have been detected in groundwater at DPG do not form laterally extensive or definable groundwater plumes. Analytes are often detected:

- Sporadically in the immediate area of investigation (i.e., less than three points of detection within an area of investigation)
- At low concentrations (i.e., below recommended reporting limits, statistical background values, MCLs, or regional background concentrations for inorganics or below recommended reporting limits for organics)
- Inconsistently (i.e., detected during one sampling event and not detected during previous or subsequent sampling events)

Isoconcentration maps that delineate the lateral extent of detected analyte concentrations (i.e., groundwater plumes) have been developed for several analytes as part of the Consent Order investigations. Isoconcentration maps have been developed for the following analytes at the specified HWMUs (AGEISS, 1998e):

- Selenium at HWMU 14
- Arsenic, selenium, and silver at HWMU 36
- Selenium and silver at HWMU 37
- Selenium at HWMU 39
- Trichloroethene, tetrachloroethene, and selenium at HWMU 55
- Chloroform, diisopropylmethyl phosphonate, isopropylmethylphosphonic acid, methylphosphonic acid, manganese, and selenium at HWMU 58
- Selenium at HWMU 158

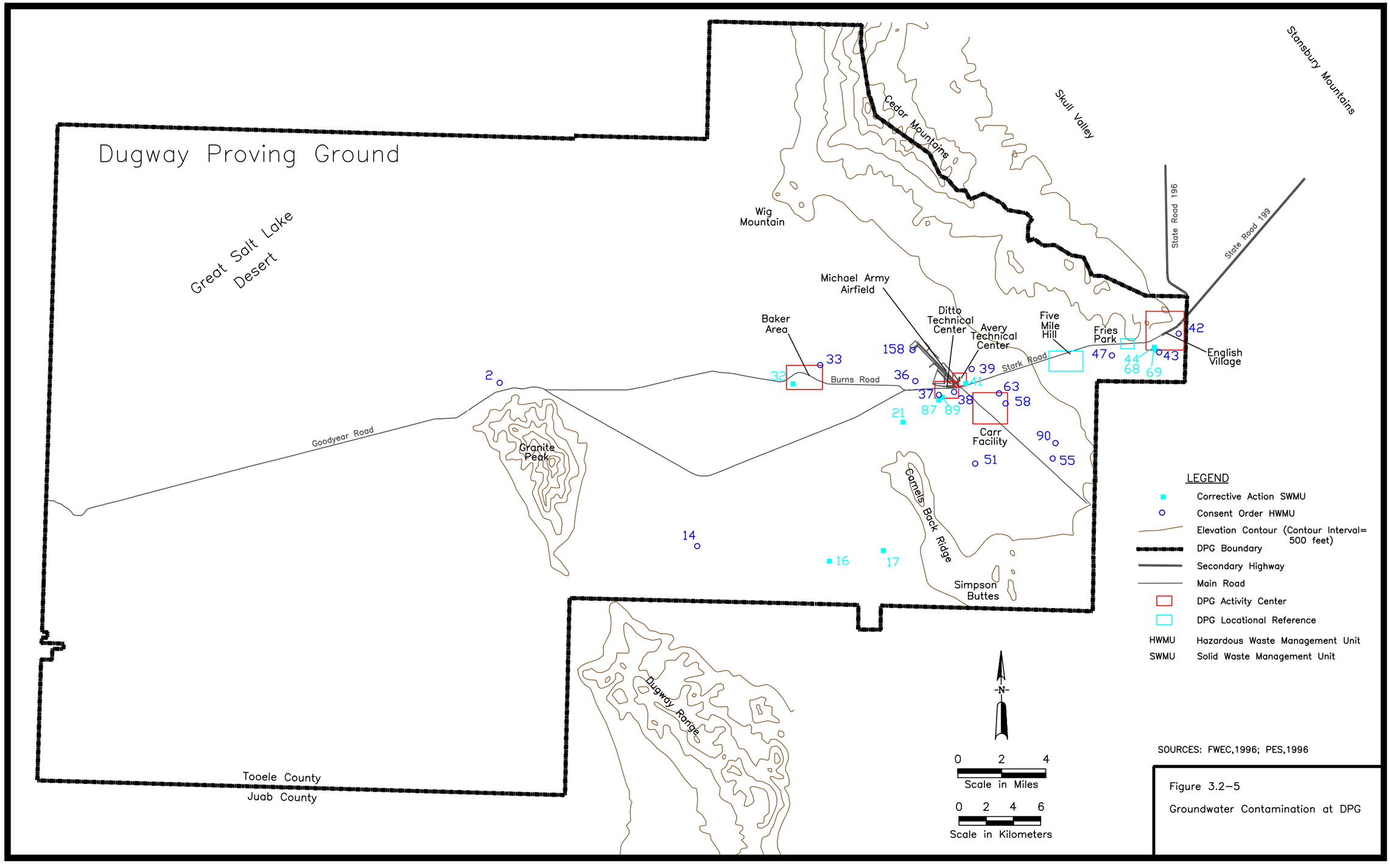

Figure 3.2–5

Groundwater Contamination at DPG

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Wells located at these HWMUs monitor groundwater in the shallow aquifer in the Dugway Valley-Government Creek area. Groundwater sampling results from the Consent Order investigations conducted in the English Village and Fries Park areas have not identified any definable groundwater plumes in the Skull Valley Aquifer.

The status of ongoing groundwater contamination investigations at the HWMUs and SWMUs is summarized in Appendix E, Solid and Hazardous Waste Management Units at DPG. Because the intent of this EIS is to provide an overview of the existing environmental conditions at DPG, detailed discussions of the investigation activities at the SWMUs and HWMUs are not included in this section. However, a comprehensive discussion of the operational history, nature and extent of investigation (including sample locations, collection methods, and detected analyte concentrations), and further investigation or closure plans for the SWMUs and HWMUs can be found in the following documents:

- Final Phase I RCRA Facility Investigation Report (PES, 1996)
- Final Dugway Proving Ground Closure Plan Module 1 - SWMUs 30, 160, and 161 (Ebasco, 1995b)
- Final Dugway Proving Ground Closure Plan Module 2, SWMUs 20, 164, 166, and 170 (FWEC, 1997b)
- SWMU Closures at Dugway Proving Ground Final Interim Report (Ebasco, 1995a)
- Draft Dugway Proving Ground Closure Plan Module 3 (FWEC, 1996)
- 1998 Annual Groundwater Monitoring Report for Execution of the Groundwater Monitoring Plan for the Consent Order Hazardous Waste Management Units (AGEISS, 1998e)

3.2.3.5 Groundwater Uses

Groundwater is used for drinking, process, and irrigation purposes at DPG. Six of the DPG water supply wells produce potable water (Wells 3, 5, 26, 27, 28, and 30) and four wells produce nonpotable water (Wells 10, 18, 19, and 32). The locations of these wells are shown on Figure 3.2-3, Water Supply Wells at DPG.

Groundwater withdrawn from the potable wells is used primarily for drinking and process purposes. Drinking water includes all domestic related needs (such as human consumption, sanitary sewage, etc.), while process water includes industrial usage and fire protection.

As discussed in Section 3.2.3.4, Groundwater Quality, DPG has submitted DWSP Plans for the potable wells to UDDW.

Groundwater withdrawn from the two nonpotable wells at English Village is used for irrigation during the months of March to October. Well 18 supplies irrigation water for sprinkling the grounds located in the central portion of English Village, north of Stark Road. Well 19 supplies irrigation water for sprinkling the grounds at the English Village golf course, located south of Stark Road (Prather, 1999b). Groundwater withdrawn from the two nonpotable wells located in the vicinity of Granite Peak is used for dust suppression or sanitary purposes only (Pendley, 1999).

3.3 Air Resources

This section describes the following elements of air resources at DPG:

- Climate
- Air Quality

Ambient air quality at a given location is governed by both the quantities of air pollutants that are emitted to the atmosphere and the climate, or weather. Local and regional weather conditions control the manner in which air pollutants are dispersed.

3.3.1 Climate

This section describes the climate of the DPG area using available quantitative information, under the following topics:

- Overview of DPG Area Climate
- Temperature
- Precipitation
- Winds
- Unusual or Severe Weather Conditions
- Atmospheric Dispersion

Meteorological data presented in this section were recorded at several DPG on-installation weather stations. The locations of weather stations used to provide data for DPG are shown in Figure 3.3-1, Surface Atmospheric Measurement System Locations at DPG.

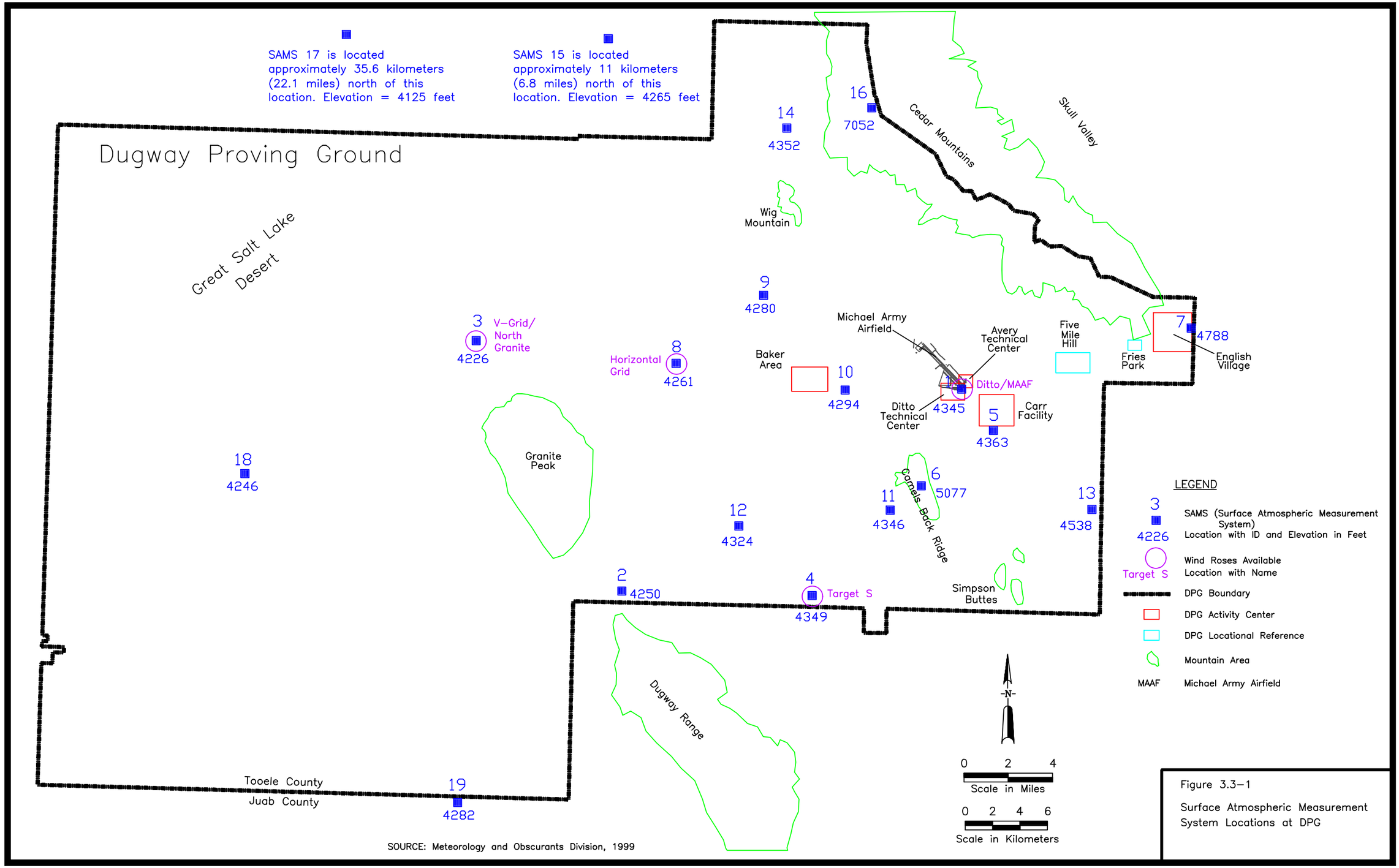

Figure 3.3–1

Surface Atmospheric Measurement System Locations at DPG

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3.3.1.1 Overview of DPG Area Climate

DPG is located in a semi-arid, continental, steppe region, or high desert known as the Great Basin Desert. This region is often referred to as a cold desert due to its mid-latitude location. Typically winters are cold, summers are hot and dry with a high evaporation rate, and most precipitation falls in the spring.

Other weather characteristics typical of the DPG area include frequent electrical storms and occasional dust storms in summer, and temperature inversion conditions in winter. Temperature inversion conditions occur when cold Arctic air spills into the area, wind speed is low, and contrary to the normal pattern, air temperature increases with height above the ground surface. Surface airflow is reduced and any tendency toward reduced air quality is aggravated under these conditions.

Weather patterns at DPG are influenced by the terrain. Most of DPG is relatively flat because it consists of a former lakebed (the former Lake Bonneville of which the Great Salt Lake is a small remnant). Interspersed in the flat terrain are abrupt often pinnacle-like mountains. These mountains are cooler and receive more precipitation than the surrounding flatlands. In addition, they influence local weather patterns by channeling winds and promoting up and down-slope conditions in the mornings and evenings, respectively.

3.3.1.2 Temperature

Temperature data for DPG are presented in Table 3.3-1, Temperature Data for DPG at Ditto from 1950 to 1998. Data include the monthly average of the daily maximum, minimum, and mean; monthly extremes; and extremes of monthly averages. Records are for the period September 21, 1950 to April 30, 1998. Temperature units are °F

Table 3.3-1. Temperature Data for DPG at Ditto from 1950 to 1998.

Month/ Season	Monthly/Seasonal Averages			Monthly/Seasonal Extremes				Monthly/Seasonal Extremes				Max Temp		Min Temp	
	Daily Max °F	Daily Min °F	Daily Mean °F	High °F	Date	Low °F	Date	Highest Mean °F	Year	Lowest Mean °F	Year	3 90 °F # Days	£ 32 °F # Days	£ 32 °F # Days	£ 0 °F # Days
January	38.0	16.1	27.0	66	01/10/53	-25	01/18/84	39.9	1953	15.1	1984	0.0	9.4	28.6	3.4
February	45.3	22.8	34.0	71	02/28/72	-29	02/07/89	41.5	1958	18.3	1984	0.0	3.2	24.2	0.9
March	53.6	28.6	41.1	80	03/24/56	-6	03/03/52	47.6	1978	33.7	1952	0.0	0.4	21.9	0.0
April	62.9	35.5	49.2	88	04/23/77	11	04/06/97	56.4	1992	41.4	1975	0.0	0.0	10.9	0.0
May	73.5	44.4	58.9	99	05/31/97	21	05/01/72	64.9	1969	53.0	1953	1.2	0.0	1.8	0.0
June	84.9	53.3	69.1	107	06/23/54	31	06/02/54	75.1	1961	63.5	1975	11.3	0.0	0.1	0.0
July	94.4	61.4	77.9	109	07/19/89	37	07/01/68	81.0	1989	70.8	1993	25.4	0.0	0.0	0.0
August	91.9	59.6	75.7	108	08/11/72	33	08/26/92	79.5	1970	69.9	1968	21.7	0.0	0.0	0.0
September	81.1	48.4	64.7	102	09/12/90	22	09/26/70	69.5	1979	58.0	1970	6.3	0.0	1.2	0.0
October	66.9	36.1	51.5	91	10/09/96	9	10/30/71	58.6	1963	46.2	1984	0.0	0.1	10.6	0.0

Table 3.3-1. Temperature Data for DPG at Ditto from 1950 to 1998.

Month/ Season	Monthly/Seasonal Averages			Monthly/Seasonal Extremes				Monthly/Seasonal Extremes				Max Temp		Min Temp	
	Daily Max °F	Daily Min °F	Daily Mean °F	High °F	Date	Low °F	Date	Highest Mean °F	Year	Lowest Mean °F	Year	³ 90 °F # Days	£ 32 °F # Days	£ 32 °F # Days	£ 0 °F # Days
November	50.5	26.0	38.2	78	11/12/73	-8	11/27/52	46.2	1965	31.1	1993	0.0	1.0	23.8	0.2
December	39.2	18.1	28.6	69	12/01/95	-27	12/23/90	35.5	1973	17.2	1990	0.0	7.4	28.6	1.7
Annual	65.2	37.5	51.3	109	07/19/89	-29	02/07/89	53.6	1981	47.9	1993	66.0	21.5	151.6	6.3
Winter	40.8	19.0	29.9	71	02/28/72	-29	02/07/89	36.3	1978	20.7	1984	0.0	20.0	81.4	6.1
Spring	63.4	36.1	49.8	99	05/31/97	-6	03/03/52	55.3	1992	44.0	1975	1.2	0.4	34.6	0.0
Summer	90.4	58.1	74.2	109	07/19/89	31	06/02/54	77.7	1961	68.9	1993	58.4	0.0	0.1	0.0
Fall	66.1	36.8	51.5	102	09/12/90	-8	11/27/52	55.7	1963	47.5	1971	6.3	1.1	35.6	0.2

≥ greater than or equal to # number Max maximum Temp temperature
≤ less than or equal to °F degrees Fahrenheit Min minimum

SOURCE: WRCC, 1998

The data show that monthly average temperatures range from 25.5 °C (77.9 °F) in July, which is the hottest month, to –2.8 °C (27 °F) in January, which is the coolest. Daily extremes for each month show a substantial range. For example, for July the daily extreme high is 42.8 °C (109 °F) and the extreme low is 2.8 °C (37 °F), a range of 40.0 °C (72 °F). Similarly, the daily extreme range for January is 50.6 °C (91 °F). The large temperature fluctuations recorded between day and night and seasonally are typical of the area's arid continental climate.

3.3.1.3 Precipitation

Precipitation data for DPG are presented in Table 3.3-2, Precipitation Data for DPG at Ditto from 1950 to 1998. Data include the monthly mean, high, and low precipitation averages; numbers of days during which greater than 0.025, 0.25, 1.27, and 2.54 cm (0.01, 0.1, 0.5, and 1 inch) of rain fell; and mean and high snowfall. Records are for the period September 21, 1950 to April 30, 1998. Units are in inches.

Table 3.3-2. Precipitation Data for DPG at Ditto from 1950 to 1998.

Month/ Season	Precipitation in inches											Snowfall in inches		
	Mean	High	Year	Low	Year	1 Day Maximum		# Days ³ 0.01	# Days ³ 0.10	# Days ³ 0.50	# Days ³ 1.00	Mean	High	Year
January	0.53	1.54	1980	0.00	1961	0.79	01/25/52	5	2	0	0	4.0	13.9	1993
February	0.62	1.63	1998	0.00	1967	0.84	02/25/58	5	2	0	0	2.9	11.8	1955
March	0.80	2.44	1986	0.00	1956	1.34	03/08/86	6	3	0	0	2.6	21.2	1952
April	0.78	2.14	1986	0.04	1992	0.95	04/15/69	6	2	0	0	0.9	7.8	1970
May	1.01	2.96	1982	0.00	1969	1.24	05/31/94	6	3	0	0	0.2	6.4	1965
June	0.57	2.64	1997	0.00	1958	0.95	06/15/97	3	2	0	0	0.0	0.1	1951
July	0.54	1.89	1983	0.00	1963	1.11	07/31/83	4	2	0	0	0.0	0.0	1951
August	0.57	1.89	1983	0.00	1956	1.46	08/06/88	4	2	0	0	0.0	0.0	1951
September	0.59	3.16	1982	0.00	1952	1.17	09/17/61	3	2	0	0	0.0	0.0	1951

Table 3.3-2. Precipitation Data for DPG at Ditto from 1950 to 1998.

Month/ Season	Precipitation in inches											Snowfall in inches		
	Mean	High	Year	Low	Year	1 Day Maximum		# Days [3] 0.01	# Days [3] 0.10	# Days [3] 0.50	# Days [3] 1.00	Mean	High	Year
October	0.71	2.00	1981	0.00	1952	1.02	10/09/61	4	2	0	0	0.1	1.7	1956
November	0.57	1.86	1973	0.00	1959	0.95	11/15/63	4	2	0	0	1.9	8.8	1985
December	0.58	2.33	1983	0.00	1976	1.01	12/31/59	5	2	0	0	3.8	15.6	1968
Annual	7.86	15.07	1982	3.35	1966	1.46	08/06/88	57	25	3	0	16.3	31.3	1952
Winter	1.74	3.97	1997	0.32	1975	1.01	12/31/59	16	6	0	0	10.6	26.3	1993
Spring	2.59	6.32	1986	0.73	1966	1.34	03/08/86	18	9	1	0	3.7	21.2	1952
Summer	1.67	4.71	1984	0.02	1966	1.46	08/06/88	11	5	1	0	0.0	0.1	1951
Fall	1.86	5.79	1982	0.27	1953	1.17	09/17/61	12	6	1	0	2.0	8.2	1963

number
≥ greater than or equal to

SOURCE: WRCC, 1998

The data show that mean annual precipitation is approximately 20 cm (8 inches) with a low of approximately 7.6 cm (3 inches) and a high of approximately 38 cm (15 inches). The wettest months are March, April, and May, followed by October. Snowfall occurs November through March; however, snow may persist at mountain elevations for much longer periods than on flatlands. Daily temperature and precipitation at DPG are shown graphically in Figure 3.3-2, Temperature and Precipitation Data for DPG, based on 30 years of data collected for the period 1961 through 1990.

3.3.1.4 Winds

DPG is surrounded by mountain ranges and peaks to the northeast, southeast, southwest, and west. This topography creates the distinct diurnal flow patterns that are modified by regional weather patterns, such as cold frontal systems or low-high pressure gradients. At night, radiative cooling of the mountain surfaces cools the air adjacent to those surfaces, causing the air to become denser at higher elevations. This denser air drains down the slopes and then is channeled down the axis of the valleys.

The mountain to valley circulation reverses on days with clear skies and light winds. As the mountain slopes are heated by solar radiation, the air above the slopes becomes warmer than the air at the same level over the valley resulting in upslope flow along the adjacent valley axis. Upslope flow is evident in the wind roses for the summer and fall afternoon periods. At most locations, the typical afternoon flow is

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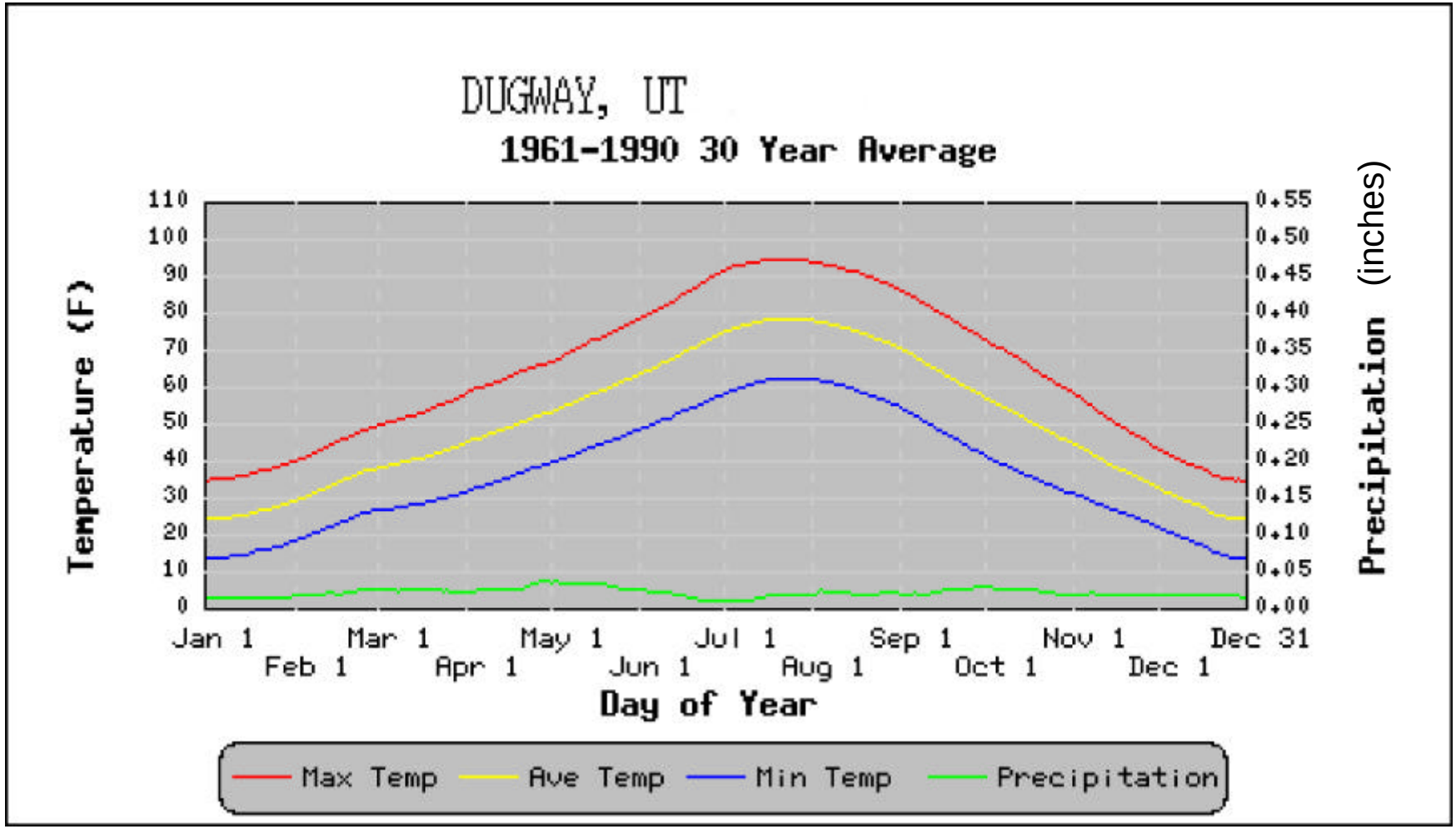

SOURCE: WRCC, 1998

Figure 3.3-2

Temperature and Precipitation Data for DPG

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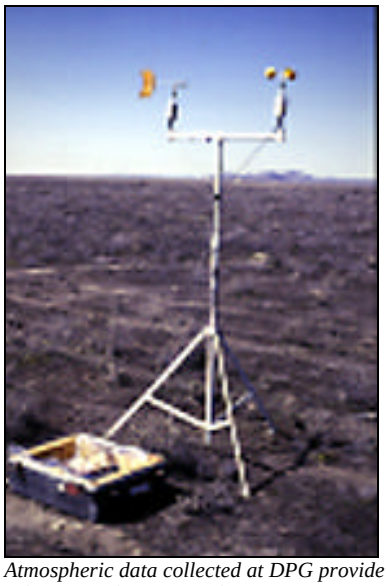
from the northwest to north. Unlike drainage winds, which are associated with stable thermal stratifications, upslope winds are associated with unstable thermal stratifications, which enhance the turbulent mixing of the slope winds with the winds aloft. Consequently, upslope flows are more variable than downslope winds.

In summary, local wind patterns are governed by differential heating and cooling of the higher elevations relative to the flatlands and by regional weather. These patterns usually include the onset of southeasterly or southerly downslope flow at night that persist into morning, which transitions into northwesterly through northerly flow with daytime heating. There are two periods of relative atmospheric stability in the early morning and early evening hours. These patterns are marked in summertime but weak or absent in winter, due to differences in the amount of heat in the form of solar radiation received seasonally, and the tendency of snow to reflect solar radiation away during winter.

Wind conditions at DPG are measured at DPG's SAMS which are shown in Figure 3.3-1, Surface Atmospheric Measurement System Locations at DPG. Wind roses summarizing the frequency and speed of afternoon winds at the Ditto SAMS during summer and winter are shown in Figures 3.3-3, Wind Speed and Frequency at Ditto During Summer, and 3.3-4, Wind Speed and Frequency at Ditto During Winter, respectively. Data collected from SAMS are used to model atmospheric dispersion patterns during testing. Atmospheric dispersion models may be required for air permits. Permit conditions defined as a result of atmospheric dispersion modeling are listed in Section 3.3.2.2, Air Quality Conditions at DPG.



Atmospheric data collected at DPG provide information for tests performed at DPG.

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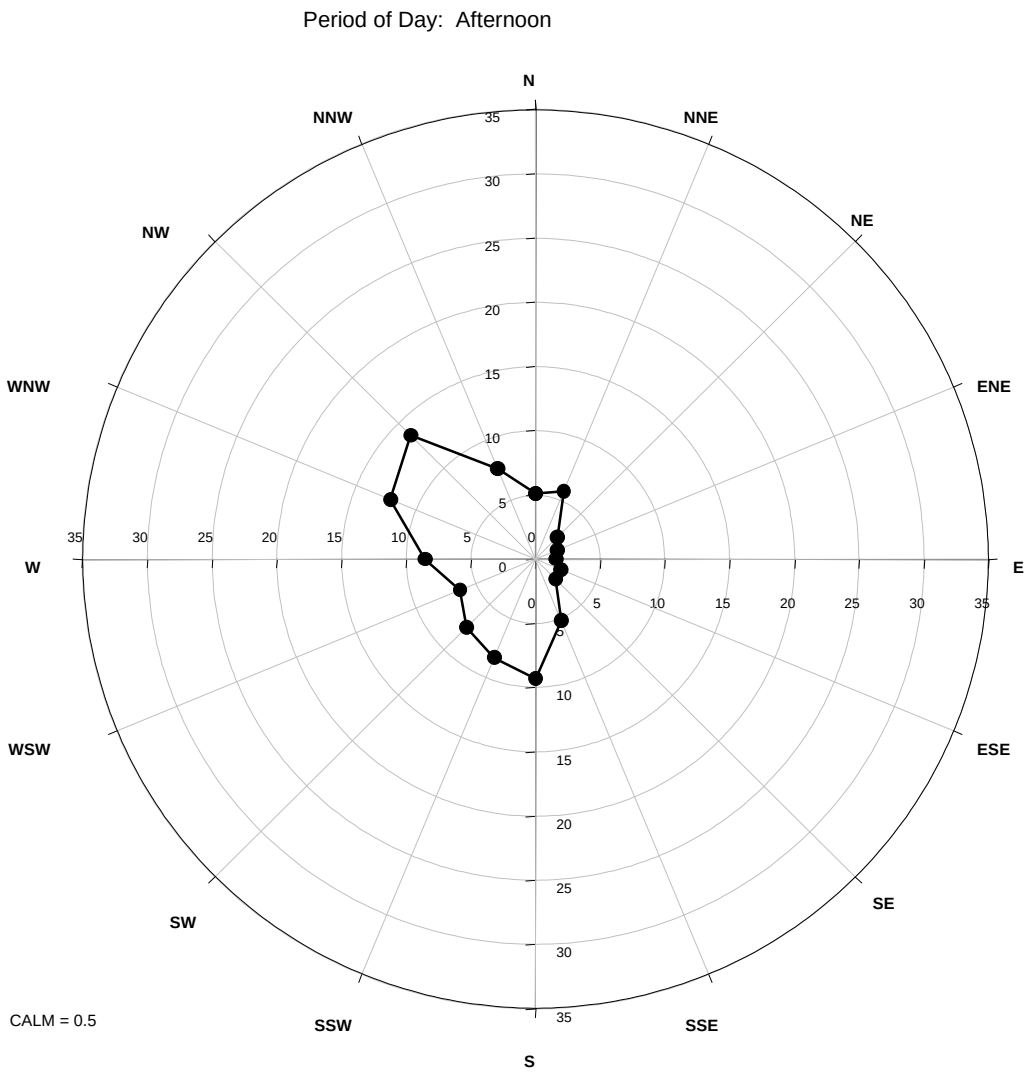
SAMS 1 Ditto
Summer 1987-1998
Percent Frequency of Occurrence
for All Wind Speeds



SOURCE: Meteorology and Obscurants Division, 1999

Figure 3.3-3
Wind Speed and Frequency at Ditto During Summer

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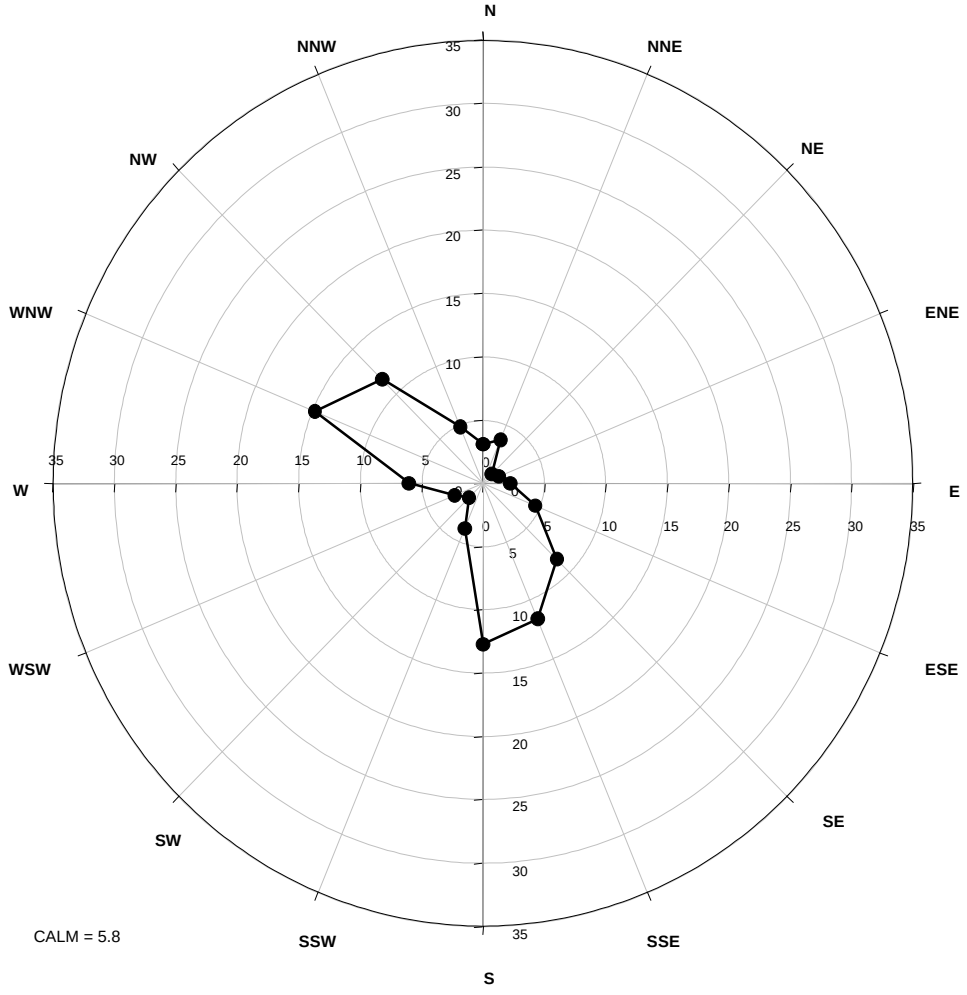
SAMS 1 Ditto
Winter 1987-1998
Percent Frequency of Occurrence
for All Wind Speeds

Period of Day: Afternoon



SOURCE: Meteorology and Obscurants Division, 1999

Figure 3.3-4
Wind Speed and Frequency at Ditto During Winter

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3.3.1.5 Unusual or Severe Weather Conditions

The occurrence of unusual or severe weather conditions at the DPG Ditto/MAAF weather station are listed in Table 3.3-3, Occurrence of Unusual Weather Conditions at DPG. Data are reported through 1998.

Table 3.3-3. Occurrence of Unusual Weather Conditions at DPG.

Meteorological Condition	Annual Frequency (mean number of days/hours or percent of time)	Months with Greatest Average Frequency (in descending order)	Number of Years Recorded	Comments
Fog (Visibility < 7 mi)	27 days per year or 7% of the time	December January February	33	Winter occurrence
Thunderstorms or Electrical Storms	19 days per year or 5% of the time	July August	33	Summer occurrence
Cloud Ceiling < 200 ft and/or Visibility < 0.5 mi	61 hours per year or 0.7% of the time	December January	20	Winter and morning occurrence
Cloud Ceiling < 1,000 ft and/or Visibility < 2 mi	166 hours per year or 1.9% of the time	December January	20	Winter and morning occurrence
Cloud Ceiling < 1,500 ft and/or Visibility < 3 mi	228 hours per year or 2.6% of the time	December January	20	Winter and morning occurrence
Cloud Ceiling < 3,000 ft and/or Visibility < 3 mi	359 hours per year or 4.1% of the time	December January	20	Winter and morning occurrence

< less than ft foot or feet
% percent mi mile(s)

SOURCE: NOAA, 1999

3.3.1.6 Atmospheric Dispersion

Dispersion of material released into the atmosphere occurs as a consequence of large scale and small scale atmospheric motions. Motions that are large with respect to the volume of the released material tend to move the material along the direction of the mean flow. Smaller (turbulent) motions tend to disperse this material. The large scale motions are characterized in terms of a time-averaged wind speed and direction. Turbulent motions are caused by the wind encountering flow obstacles (trees, buildings, hills, etc.) and by heating of air near the earth's surface. The effects of turbulent motion on dispersion are usually evaluated in terms of atmospheric stability. Turbulent motions and dispersion are suppressed in a stable atmosphere at night and are enhanced in an unstable atmosphere during the day.

The most commonly used measure of turbulence is a letter scale originally developed by Pasquill (1976). This scale uses commonly measured variables such as time of day, wind speed, and cloud cover to describe stability. A day with calm winds and bright sunshine would have greatly enhanced turbulent dispersion due to warm air bubbling off heated surfaces. This most unstable condition is designated as "Category A" stability. Letters "B" and "C" denote progressively weaker thermal enhancement of turbulent motions due to increased wind speed and/or cloud cover. "Category D" represents an atmosphere where turbulent dispersion receives no thermal enhancement. "Categories E, F," and "G" occur at night where radiative cooling suppresses turbulent motions. "Category G" represents the greatest degree of turbulence suppression that occurs with calm winds and clear skies. Dispersion is weakest under "Category G" stability.

"Categories D" and "E" are prevalent at DPG during winter months (December, January, and February). Nocturnal temperature inversions produce a shallow layer of cold, still air just above the earth's surface, causing "Category G" stability and poor dispersion. During summer months (June, July, and August), unstable categories "B" and "C" are common during the day. Stability categories "F" or "G" may occur during the evening and early morning hours when wind speeds approach zero.

3.3.2 Air Quality

The existing air quality conditions at DPG in relation to applicable state and Federal regulations governing air quality are presented in the following sections:

- Regulatory Overview
- Air Quality Conditions at DPG

3.3.2.1 Regulatory Overview

The Federal CAA, as amended, provides the primary statutory basis for regulating emissions to air that affect air quality. Most of the provisions of the CAA are codified by the State of Utah under the Air Conservation Act (Title 19 Chapter 2). The Utah Department of Environmental Quality, UDAQ administers the Air Conservation Act through the new source review and the operating permit programs. UDAQ's air quality regulations are codified in the Utah Air Conservation rules as Rule (R) 307-1 et seq.

The EPA retains the regulatory authority for Title VI of the CAA, which regulates production and use of ozone-depleting chemicals. Air emissions from sources subject to RCRA regulations may be controlled through RCRA-specific programs.

National ambient air quality standards (NAAQS), prevention of significant deterioration (PSD) increment standards, Air Quality Related Values (AQRVs), hazardous air pollutants (HAPs), and military-specific material, are regulated under state and/or Federal law and are discussed in this section. These categories are used by UDAQ to evaluate air quality.

National Ambient Air Quality Standards – EPA has established primary and secondary NAAQS for six criteria pollutants regulated under Title I of the 1990 CAA amendments. Primary NAAQS are established to protect human health. Secondary NAAQS are established as "welfare" standards. Welfare standards are established to protect soil, water, crops, vegetation, buildings, property, plant and animal life, visibility, and other values such as personal contentment and well-being. Federal primary and secondary NAAQS have been adopted by the State of Utah. These standards are shown in Table 3.3-4, National Ambient Air Quality Standards, which lists standards in micrograms of pollutant per cubic meter ($\mu g/m^3$) of ambient air.

Table 3.3-4. National Ambient Air Quality Standards.

Pollutant	Averaging Time	National Ambient Air Quality Standards (mg/m^3)	
		Primary	Secondary
PM_{10}	24-hour[1]	150	150
	Annual[1]	50	50
Sulfur dioxide	3-hour[2]	NA	1,300
	24-hour[2]	365	NA
	Annual[3]	80	NA
Nitrogen dioxide	Annual[3]	100	100
Carbon monoxide	1-hour[2]	40,000	NA
	8-hour[2]	10,000	NA
Ozone	1-hour	235	235
Lead	3-month[3]	1.5	NA

1 Statistical evaluation of mean is required over a 3-year period.
2 Not to be exceeded more than once per year
3 Never to be exceeded

NA not applicable
PM_{10} particulate matter less than 10 microns in diameter
$\mu g/m^3$ micrograms per cubic meter

SOURCE: CFR (Code of Federal Regulations). Title 40, Part 50

Prevention of Significant Deterioration Increment Standards – To determine whether air quality standards are being met, UDAQ monitors air quality and establishes Air Quality Control Regions (AQCRs). AQCRs are considered to be in attainment when concentrations of all criteria pollutants are below the NAAQS. When an AQCR is in attainment, UDAQ is required to prevent significant

deterioration of air quality in that region. This is accomplished by implementing the PSD increment standards. PSD increment standards are the maximum allowable increase above established baseline conditions in concentrations of particulate matter less than 10 microns (PM_{10}), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2). These standards allow some degradation of air quality as a result of industrial growth while preventing degradation of air quality to the level of the NAAQS. Three standards have been established: Class I, Class II, and Class III. Class I standards apply to major stationary sources or major modifications to stationary sources that may affect Mandatory Class I areas. Mandatory Class I areas are National Parks and wilderness areas that have been designated by Congress to be afforded the highest level of air quality protection according to the CAA Section 169 and Utah R307. In Utah, Arches National Park, Bryce Canyon National Park, Canyonlands National Park, Capitol Reef National Park, and Zion National Park are all designated as Class I. All other attainment areas are designated as Class II. There are no Class III areas in Utah.

AQCRs in Utah are established based on the exceedences of specific criteria pollutants. Nonattainment areas are defined for each pollutant exceeded. The nonattainment area for particulate matter as defined by PM_{10} is Salt Lake, Southern Davis, and Utah Counties, UT. The nonattainment area for SO_2 is Salt Lake, and Tooele County, UT above 1,700 m (5,600 ft). The concern for SO_2 is emissions from Kennecott copper mining and processing operations northeast of DPG. The nonattainment areas for CO are the cities Provo-Orem, Salt Lake City, and Ogden, UT. Salt Lake City and Ogden, UT have had no violations of the standard in many years and have requested redesignation as attaining the standard. The Wasatch Front Intrastate AQCR comprised of Davis and Salt Lake Counties, UT is designated as a nonattainment area for ozone. All areas in Utah in attainment for a specific criteria pollutant are considered the attainment AQCR.

Air Quality Related Values – AQRVs are attributes that may be adversely affected by deterioration of air quality. Examples of air quality related attributes are floral and faunal resources, water, visibility, cultural-archeological and paleontological resources, and odor. The Federal land manager of a Class I area that may be impacted establishes criteria for determining what constitutes an “adverse” impact.

For example, visibility protection requirements are intended to preserve pristine visibility conditions in mandatory Class I areas and to reduce regional haze. Major PSD sources may be required to implement emission controls to prevent impacting visibility in Class I areas.

Hazardous Air Pollutants – HAPs are pollutants, identified by Congress, which present or may present a threat of adverse effects to human health and/or the environment. HAPs are regulated under Section 112 of the CAA. As of January 1, 1999, 188 air pollutants were listed as HAPs (40 CFR 63, Subpart C and Utah R307). When a source emits more than 22,700 kg (25 tons) per year in aggregate of listed HAPs or more than 9,070 kg (10 tons) per year of any single HAP it is considered a major source under both Section 112 and the Federal operating permit program as required in 40 CFR Parts 70 and 71. Major sources may be subject to emission control requirements for HAPs, including maximum achievable control technology standards. All other sources are considered "area" sources. States may implement more stringent programs for control of "area" sources. UDAQ includes a requirement to evaluate emissions of HAPs for all new sources applying for or modifying an air permit. Sources may be required to conduct dispersion modeling and control emissions to ensure protection of the public.

Military-Specific Material – UDAQ controls releases of military-specific material to air through its new source review permitting program. Military-specific material includes but is not limited to fog oil, diesel fuel smoke, hexachloroethane smoke, graphite, white phosphorus smoke, and red phosphorus/butyl rubber smoke. Military-specific materials are released to air during testing and training activities.

3.3.2.2 Air Quality Conditions at DPG

DPG is located in an AQCR that is in attainment with all applicable ambient air quality standards.

DPG is designated as a Class II area. The nearest mandatory Class I areas to DPG are Capital Reef National Park in Utah and Craters of the Moon National Park in Idaho. DPG is approximately 240 km (150 mi) from Capital Reef National Park and 375 km (225 mi) from Craters of the Moon National Park. Permitting, air emissions, and air emission sources describe the air quality conditions at DPG.

Permitting – There are three types of permitting programs administered by UDAQ. The three programs are the new source review permit program for "minor" sources, the new source review permit program for "major" sources, and the operating permit program. The new source review permit program is also known as the PSD and nonattainment area permitting program and the construction permitting program. DPG is considered a "minor" source under the PSD permitting program because it does not have the potential to emit more than 227,000 kg (250 tons) per year of a criteria pollutant. DPG is considered a "major" source under the operating permit program because it has the potential to emit more than 90,700 kg (100 tons) per year

of a criteria pollutant. As a major source under the operating permit program, DPG complies with the documentation requirements of this program and identifies all regulations that are applicable to its operations. DPG submitted an Operating Permit Application to UDAQ under Utah R307-415 in 1995 (AGEISS, 1995b). DPG's Title V Operating Permit was issued in February, 2001 (UDAQ, 2001). All air emissions are documented in DPG's operating permit program.

UDAQ reviews and issues operating permit conditions for air emissions at DPG. During the review process, UDAQ ensures that:

- Emissions will not exceed or contribute to a violation of a NAAQS.
- Emissions will not consume more than 50 percent of a PSD increment without a public hearing and the permission of the Air Quality Board. This ensures that air quality in the attainment area in which DPG is located is not degraded and remains in attainment with NAAQS.
- Emissions of HAPs are evaluated and controls are implemented, if needed.

Under the new source review permit program, air dispersion modeling may be required to assess impacts from air pollutants at DPG's boundary. If dispersion modeling predicts a potential for public exposure to any regulated air pollutant at harmful concentrations at DPG's boundary or air quality may be degraded then UDAQ imposes restrictions on operations.

Under the new source review permit program, DPG has a consolidated approval order for the CCTF, LSTF, BMTF, Cryofracture Test Facility, smoke and obscurant testing, and OB/OD activities. Dispersion modeling has been required for smoke and obscurant testing and OB/OD activities.

As a result of dispersion modeling, the following permit conditions apply:

- For smoke and obscurant testing release of smokes and obscurants shall be no closer than 2 km (1.2 mi) from DPG's boundary.
- For open burning:
    - Net explosive weight shall be no greater than 454 kg (1,000 lb) per event
    - Net explosive weight shall be no greater than 1,360 kg (3,000 lb) per day
    - Net explosive weight shall be no greater than 13,600 kg (30,000 lb) per rolling 12 month period
    - Mixing height must be greater than or equal to 500 m (1,640 ft)

- Wind speed must be greater than or equal to 4.8 kph (3 mph)
- Wind speed must be less than or equal to 24 kph (15 mph)

♦ For open detonation:

- Net explosive weight shall be no greater than 680 kg (1,500 lb) per event
- Net explosive weight shall be no greater than 680 kg (1,500 lb) per day
- Net explosive weight shall be no greater than 68,000 kg (150,000 lb) per rolling 12 month period
- Mixing height must be greater than or equal to 500 m (1,640 ft)
- Wind speed must be greater than or equal to 4.8 kph (3 mph)
- Wind speed must be less than or equal to 24 kph (15 mph)

UDAQ may authorize exceptions to these conditions during emergencies.

Air Emissions – DPG's operating permit program requires DPG to estimate the potential to emit and to conduct an inventory of emissions annually in accordance with Utah Air Conservation R307-155. The inventory consists of identifying emission sources and estimating annual emissions for criteria pollutants and HAPs. DPG has conducted air emissions inventories each year since 1994. The 1996, 1997, and 1998 annual air emissions inventories are used as the baseline air emissions at DPG. These publicly available documents are located at the offices of the UDAQ.

Estimated criteria pollutants and total HAPs emissions for DPG based on the average of years 1996, 1997, and 1998 are shown in Table 3.3-5, Air Pollutant Emissions Subject to UDAQ Permit Limits. These averages are considered baseline air emissions for this EIS. Criteria pollutant emissions by DPG source categories and HAP emissions are provided in Appendix H, Air Emissions Data for DPG.

Table 3.3-5. Air Pollutant Emissions Subject to UDAQ Permit Limits.

	Air Pollutant (tons/year)						
Source Type	**PM_{10}**	**SO_x**	**NO_x**	**CO**	**VOCs**	**Lead**	**Total HAPs**
Baseline DPG Activities	26	26	29	18	59	0	3

CO carbon monoxide
HAP hazardous air pollutant
NO_x nitrogen oxides
PM_{10} particulate matter less than 10 microns
SO_x sulfur oxides
VOC volatile organic compound (regulated to protect the ozone national ambient air quality standard)
UDAQ Utah Division of Air Quality

SOURCES: AGEISS, 1997a; AGEISS, 1998a; AGEISS, 1999b

Air Emission Sources – The major source of PM_{10} at DPG is fugitive dust created by vehicles traveling on unpaved roads and off-road during testing, training, and

routine mission support. This traffic produces 404 tons of fugitive dust per year. Fugitive dust is not subject to UDAQ permitting limits.

The source which contributes the most to PM_{10} emissions subject to UDAQ permit limits is smoke and obscurant testing. Smoke and obscurant testing contributes 22 tons/year or 93 percent of the PM_{10} emissions subject to UDAQ permit limits. The most significant source of sulfur oxides (SO_x) is infrastructure and maintenance. Infrastructure and maintenance, the source of 99.7 percent of SO_x emissions, include boilers and generators, fuel management, and landfill emissions. DPG air permits require that all boilers and generators at DPG must combust fuel oil with a sulfur content of no greater than 0.5 percent sulfur by weight. Infrastructure and maintenance are responsible for 82 percent of emissions of nitrogen oxides (NO_x). Take-offs and landings at MAAF are responsible for 17 percent of the NO_x emissions. Take-offs and landings at MAAF are responsible for 67 percent of the carbon monoxide (CO) emissions with infrastructure and maintenance responsible for 32 percent. The most significant source of VOCs at DPG is smoke and obscurant testing. Seventy seven percent of the VOC emissions are from smoke and obscurant testing. Seventeen percent of the VOC emissions are from infrastructure and maintenance.

Table 3.3-5, Air Pollutant Emissions Subject to UDAQ Permit Limits, shows that DPG emits approximately 2,700 kg (3 tons) per year of total HAPs, which is well below the “major” source threshold of 22,700 kg (25 tons) per year. DPG is therefore an “area” source under EPA’s and UDAQ’s regulations for control of HAPs as specified in 40 CFR Part 63 and Utah R307-214. The sources contributing greater than 50 percent of the total weight of each individual HAP are boiler operations, fuel dispensing, and solid waste landfill operations.

Military-specific material emissions are related to testing and training at DPG that occur primarily during the summer months. Testing and training occur during both day and nighttime hours.

Tests that involve the controlled release of materials, such as smokes, obscurants and tracer gases, are conducted no closer than 2 km (1.2 mi) from DPG’s boundary to ensure there are no adverse emissions at DPG’s boundary.

Wildland fires are part of the natural background of the region and are also associated with mission activities including testing and training. Smoke from wildland fires is a significant source of PM_{10}, and other pollutants such as VOCs and CO. The types and relative quantities of pollutants emitted vary according to the type of vegetation consumed as fuel. The types of fuel available for fire at DPG include grasslands, scrub juniper, sagebrush, and greasewood. These vegetation types occur most

frequently on slightly elevated slopes. The dry lakebeds and salt flats do not have enough fuel to burn readily.

Wildland fires contribute to smoke and emissions in the air.

Figure 3.1-4, Fires Occurring at DPG from 1994 through 1998, demonstrates the acreage damaged by fire. By estimating the number of acres burned annually and using emission factors provided by EPA annual emissions from wildfires can be estimated for the baseline period of 1996, 1997, and 1998. Annual emissions of PM_{10}, CO, and VOCs from wildfires at DPG are estimated at 806,000, 5,900,000, and 102,000 kg (889, 6,515, and 112 tons) respectively. These estimated emissions from wildland fires are much greater than DPG's regulated emissions and fugitive dust emissions.

3.4 Biological Resources

DPG has a variety of vegetated communities comprised of a diverse group of plant species that support a variety of wildlife. These plant communities range from the low laying valley floors to the higher elevations of the Cedar Mountains and Granite Peak. DPG wildlife resources include:

- **49 species of mammals**
- **213 species of birds**
- **13 species of reptiles**
- **1 species of amphibians**
- **1,540+ species of invertebrates**

DPG does not have any species of fish present. To describe DPG's biological resources, this section is organized into the following subsections:

- Regulatory Overview

- Vegetation Classifications
- Vegetative Trends
- Wildlife Resources
- Special Status Species
- Important Habitats or Biological Resource Areas

Common names and scientific names in italics are used to describe vegetation and only common names are used for wildlife species. Once a scientific name has been introduced, only common names are used in subsequent discussion. Scientific names for wildlife species are listed in Table I-2, Wildlife Species Historically and Currently Present at DPG and Their Associated Habitats in Appendix I, Biological Resources at DPG.

3.4.1 Regulatory Overview

Biological resources are regulated under several Federal and state laws. The Sikes Act of 1960 and the Sikes Act Improvement Amendments, in conjunction with NEPA requirements and regulations, are the main supporting statutory laws established to implement a program for planning, developing, and coordinating wildlife conservation and rehabilitation on military reservations. The policy, procedures, and responsibility for the conservation, management and restoration of natural resources are established in AR 200-3, Natural Resources – Land, Forest and Wildlife Management.

Amendments to the Sikes Act require that all Army installations have an Integrated Natural Resource Management Plan (INRMP) in place by November 2001 to manage natural resources. A Natural Resource Management Plan was developed for DPG in 1991 (BIO/WEST, 1991); however, this plan does not meet the needs of the installation. DPG has, therefore, prepared an INRMP to comply with Federal regulations and to meet the changing needs of the installation and its mission.

According to AR 200-3, Memorandums of Understanding between DOD and the USDA establish guidelines for the protection of vegetative resources, soil and water, and a Memorandum of Understanding with the Department of the Interior, serves to conserve fish and wildlife species. In addition, AR 200-3 defines specific requirements and procedures for managing military lands.

Several other laws and regulations are applicable only to certain species or conditions. DPG's vegetation and habitat are regulated and monitored as defined in AR 200-3 and AR 350-4, ITAM. Weed species are regulated through the Agricultural Risk Protection Act which supercedes the Federal Noxious Weed Act in

regulating plants transported into the U.S. The Executive Order of Invasive Species, EO 13112, is specifically implemented to: 1) prevent the introduction of invasive species; 2) detect, monitor, and control invasive species; 3) research and develop preventive measures to control invasive species. In addition, the Utah Noxious Weed Act and the Utah Seed Law, further prevent the introduction and spread of exotics.

Environmental control for the sale, distribution, and application of pesticides is regulated under the Federal Insecticide, Fungicide, and Rodenticide Act of 1947. Pest species and their control are further defined and managed under AR 200-5, Integrated Pest Management Program. AR 200-5 promotes effective integrated pest management within the scope of the environmental program to:

- Comply with applicable laws, regulations, and policies
- Protect property from damage and destruction
- Support stewardship of natural and cultural resources
- Safeguard the environment and human health from injury, disease, and exposure risks from pesticides and other pest management materials

Under AR 200-3, DPG is responsible for managing its wildlife populations; however, this is done in conjunction with other Federal and state agencies through the Fish and Wildlife Coordination Act and the Fish and Wildlife Conservation Act. Memorandums of Understanding have been established with the UDWR and U.S. Fish and Wildlife Service for the management of game species, such as pronghorn, mule deer, and chukars. Feral horses are managed in cooperation with the BLM under the authority of the Wild-Free Roaming Horses and Burros Act. This Act allows for protection of the horse herds and the range to sustain the herds. It also allows the authority for the BLM to conduct round-ups of the horses to manage the populations and the habitat. Excess animals may either be adopted, sterilized and returned, humanely destroyed if necessary, or kept in permanent enclosures.

Migratory bird species are managed and protected under the Migratory Bird Treaty Act, with consultation with the state and local governments. This Act also protects land or water resources necessary for the conservation of migratory birds. Monitoring of migratory species is done in conjunction with the UDWR Partner's in Flight Program. In addition, the Bald Eagle and Golden Eagle Act, protects these raptor species.

When it comes to the management and conservation of threatened and endangered species, the ESA of 1973 supercedes all other regulations. The ESA protects both the species and their associated habitats, and is implemented by the U.S. Fish and Wildlife Service. The State of Utah also defines threatened and endangered species

and species of concern that the UDWR manages in conjunction with DPG if the species occur in the area.

3.4.2 Vegetation Classifications

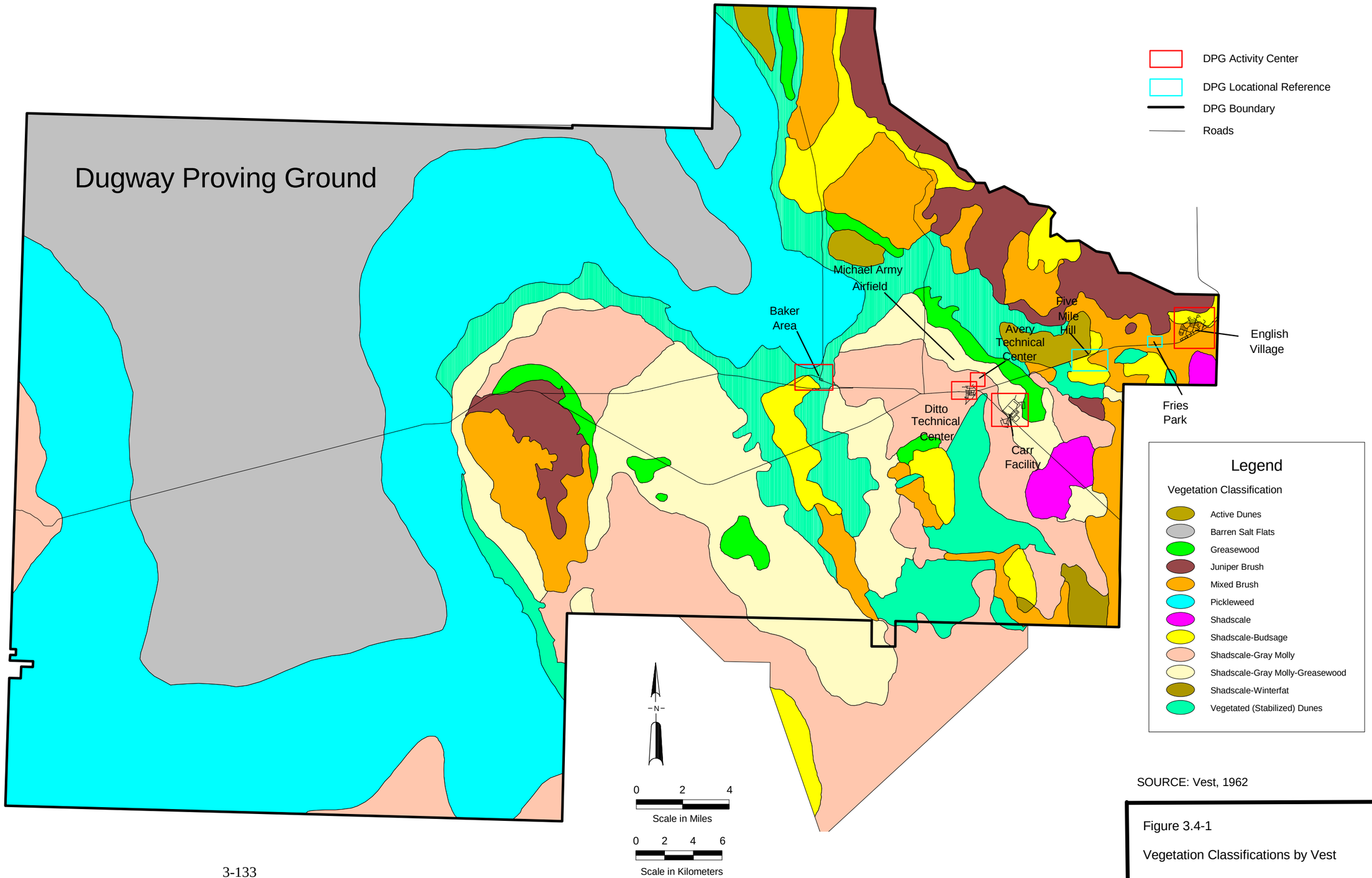
Vest (1962) originally described the vegetation communities at DPG. His original classifications included: barren salt flats, pickleweed, shadscale-gray molly, vegetative dunes, active dunes, shadscale-gray molly-greasewood, shadscale-budsage, greasewood, shadscale, shadscale-winterfat, mixed brush, and juniper brush, as shown in Figure 3.4-1, Vegetation Classifications by Vest. In 1996, Emrick and Hill (1998) classified DPG vegetation, due to changes in community classification and changes in the vegetation at DPG. These classifications were then used along with Land Remote-Sensing Satellite imagery to classify, describe, and map the vegetative communities at DPG (Johnson, 1999). The locations of vegetation classifications are shown on Figure 3.4-2, Locations of Vegetation Classifications. For the discussion in this EIS, the description of vegetation classifications has been grouped into the following seven broader categories based on vegetation height:

- Cryptobiotic Soil
- Pygmy Forest
- High Desert Scrub
- Low Desert Scrub
- Vegetated Dunes
- Annual Grasslands
- Barren

Although cryptobiotic soil is not considered a separate vegetation community because it is distributed throughout several vegetation communities, it is an important biological resource at DPG. Appendix I, Biological Resources at DPG, summarizes the common vegetation present at DPG. The appendix provides the common and scientific names, the type of vegetation, and whether the species is native or exotic.

3.4.2.1 Cryptobiotic Soil

The low desert scrub community contains soil dominated by cyanobacteria, with some addition of lichen, moss, microfungi, and green algae. This soil is referred to as cryptobiotic soil and is very fragile. Cryptobiotic soil is formed when the sticky sheath of the moving bacteria forms a web of fibers. This web of fibers fuses the soil together and allows for accumulation of moisture for vascular plants in an otherwise dry climate (Belnap, 1998). Cryptobiotic soil also contributes nutrients, principally nitrogen, to the soil for other plant species. Disturbance, such as soil compaction,



SOURCE: Vest, 1962

Figure 3.4-1

Vegetation Classifications by Vest

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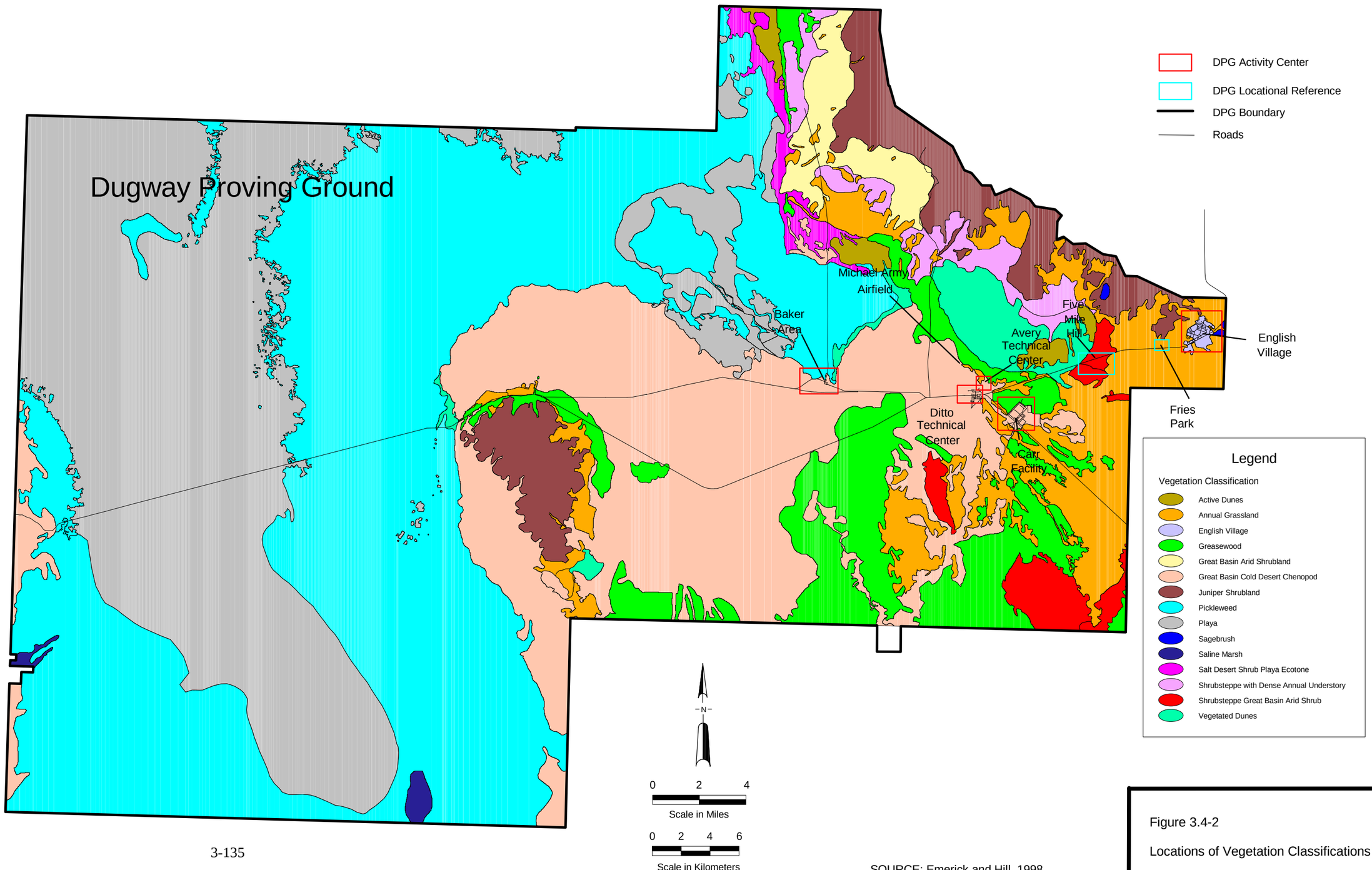

SOURCE: Emerick and Hill, 1998

Figure 3.4-2

Locations of Vegetation Classifications

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breaks up this soil and does not allow the cyanobacteria to be regenerated. The exact amount of cryptobiotic soil present at DPG has not been measured.

3.4.2.2 Pygmy Forest

The pygmy forest community is dominated by one tree species, the juniper (*Juniperus osteosperma*), and covers about 4 percent of DPG lands. Cursory investigations have indicated that the mean juniper tree age at DPG is 250 years. Juniper communities can be grouped into three specific associations with other plant species.

- At the higher elevations, juniper, bluebunch wheatgrass (*Elymus spicatus*), and black sagebrush (*Artemesia nova*) range over a broad elevation. This association is often found in transition between the juniper-mixed grass and the high desert scrub communities. Other bushes found in this association are Nevada ephedra (*Ephedra nevadensis*), greasewood (*Sarcobatus vermiculatus*), horsebrush (*Tetradymia glabrata*), hopsage (*Grayia spinosa*), and viscid rabbitbrush (*Chrysothamnus viscidiflorus*).

- On flat to steep slopes, the juniper-mixed grass association is found. The most common grass in this association with juniper is cheatgrass (*Bromus tectorum*), although Indian ricegrass (*Stipa hymenoides*), Sandberg's bluegrass (*Poa secunda*), and bluebunch wheatgrass are also found. Viscid rabbitbrush and broom snakeweed (*Gutierrezia sarothae*) are the associated bushes.

- At the lower elevations of the valley bottom, a narrow elevational band of juniper association is found. Cheatgrass is the most common associate; however, broom snakeweed and four-wing saltbush (*Atriplex canescens*) are also found in association. The soil characteristics of the sand dune community on the valley floor allow for juniper to occur below its normal elevational range.

Annual exotic (non-native) species such as peppercress (*Lepidium perfoliatum*) and Russian thistle (*Salsola iberica*) are also common in the pygmy forest (AGEISS, 1997b). Over 40 percent of the juniper association has been replaced by exotic vegetation.

3.4.2.3 High Desert Scrub

The high desert scrub association includes greasewood, sagebrush, shrubsteppe, and Great Basin Arid Shrubland communities. The high desert scrub association covers about 10 percent of DPG. These communities occur at the bases of Granite Peak and the Cedar Mountains, and up the slopes of the smaller mountains such as Camels

Back Ridge, Wig Mountain, and Simpson Buttes. Differences in soil, topography, and vegetation make the locations of this community highly variable. The high desert scrub community is dominated by sagebrush (*Artemisia sp.*). Only a small patch of pure sagebrush remains at DPG. Black sagebrush (*A. nova*) occurs in shallow soils at the higher elevations. The low moisture conditions of northwestern and western exposed ridges within DPG are the most common areas for this sagebrush. The common shrub associates of black sagebrush are viscid rabbitbrush and Nevada ephedra and the herbaceous (a non-woody flowering plant) associates of this community are cheatgrass and Sandberg's bluegrass.

As elevation decreases, change in the species of sagebrush occurs. The Wyoming sagebrush (*A. tridenta var. wyomingensis*) is found at DPG in the valley outwashes and foothills with poor, shallow soil. Other brush species in this association with Wyoming sagebrush include viscid rabbitbrush, Nuttall's horsebrush (*Tetradymia nutalli*), and shadscale (*Atriplex confertifolia*). Sandberg's bluegrass is the dominant herbaceous species followed by cheatgrass.

Big sagebrush (*A. tridenta)* is found in the deep alluvial soils in the fans of the foothills and piedmont areas (Beetle, 1979; USSCS, 1986). In these areas, the big sagebrush is associated with exotic annuals such as, cheatgrass, storksbill (*Erodium cicutarium*), Russian thistle, and halogeton (*Halogeton glomeratus*).

Stands of greasewood are located east and north of Granite Peak and Camels Back Ridge in the lower portion of the alluvial slopes. These areas provide adequate moisture to allow for greasewood growth. Other areas that accumulate large amounts of water necessary for greasewood growth are located between the dunes and the hills parallel to the dunes (Vest, 1962). Although greasewood is the dominant species in this community, cheatgrass has now become a co-dominant species. In 1998, 60 percent of the high desert scrub community was dominated by cheatgrass. Torrey seepweed (*Suaeda torreyanna*), peppercress, and Russian thistle are also found in this community. During 1998, several human-caused and natural fires occurred in the greasewood stands of the Wig Mountain and Granite Peak areas, destroying a large portion of these stands. Figure 3.1-4, Fires Occurring at DPG from 1994 through 1998, shows the locations of these fires.

3.4.2.4 Low Desert Scrub

The plant aspect of the low desert scrub association reflects the low shrubby appearance of the Cold Desert Chenopod and Salt Desert Shrub vegetation, but is interspersed with taller dark green greasewood shrubs. This association covers about 52 percent of DPG. The pickleweed (*Allenrolfea occidentalis*) community is the

predominant vegetation type within this association, covering about 34 percent of total DPG acreage.

The Cold Desert Chenopod and the Salt Desert Shrub community is somewhat unique in the Great Basin in that gray molly (*Kochia americana*) is unusually vigorous, perhaps because it is favored by stresses such as overgrazing in the Great Basin area (Fautin, 1946). This community occurs at DPG primarily in the flats northeast and southeast of Granite Peak, and to the north of Camels Back Ridge. One or more dominant grasses, such as Indian ricegrass and galleta (*Hilaria jamesii*), naturally occur in this community in the Great Basin, as do annual and perennial herbs (Trimble, 1989). The trend in the Great Basin within this community is the loss of native grasses.

Shadscale, gray molly, Gardner's saltbush (*Atriplex gardneri*), and Torrey seepweed are also found in this community at DPG. Greasewood occurs in association with shadscale and gray molly only in areas with more moisture. Exotic annuals such as cheatgrass, bur buttercup *(Ranunculus testiculatus)*, peppercress, and tumbling mustard (*Sisymbrium altissimum*) were common in 1996 and 1997 surveys (AGEISS, 1998f). In 1998, 35 percent of the low desert scrub community was dominated by cheatgrass.

The pickleweed community is found at the lowest elevations of the flat valley floors and in the most saline conditions. This community, bordering on the barren salt flats, is often associated with saltbush and greasewood. The presence of low mounds, where the majority of the salt has been leached away, allows for the germination and the growth of the pickleweed plants. As the plants increase in size, the mounds also increase in size. In comparison to other vegetative classes, this community is sparsely vegetated with no invasion of exotic annuals (AGEISS, 1997b).

3.4.2.5 Vegetated Dunes

The vegetated or stabilized dunes support the greatest diversity of plants on the valleys of the Great Basin, including the DPG area. The dunes hold underground water available to plants at reachable depths; and, relative to the alkali soil typical of the valley floor adjacent to the dunes, the dunes' soil is capable of supporting plants. The microclimates produced by shifting dune topographies promote unique combinations of both plant and animal species.

Sand dunes at DPG hold water and are capable of supporting plants.

This biotic community covers about 1.5 percent of DPG total acreage. The vegetated dunes are relatively stable and are considered a biotic oasis in the surrounding, austere ecology of the valley flats at DPG, largely due to the availability of water in relatively salt-free, permeable soils. Soil salt content is less than 0.2 percent, and sufficient water is generally available within 41 cm (16 inches) of the surface. In comparison to the valley floor communities, the greatest variety of plants and the largest populations and diversity of animals exist on the stabilized dunes. This community occurs at DPG as a fringe around the pickleweed community, to the east and south of Camels Back Ridge and into the foothill benches.

In contrast to the other, rather monotonous, shrub-dominated communities of the valleys, the stabilized dunes consist of a diverse assemblage of shrubs, grasses, and herbs in three distinct habitats:

- The inter-dune areas, between the dunes and the adjacent shrub community, contain a variety of grasses and small shrubs on sandy and sandy clay loam. Plants in these areas include: fourwing saltbush, greasewood, viscid rabbitbrush, hopsage, big sage, dune rabbitbrush (*C. nauseosus var. turbinatus*), and horsebrush. Cheatgrass and Indian ricegrass dominate the understory.

- At the base of the dunes are loamy soil mounds dominated by budsage (*Artemisia spinescens*), shadscale, and sharp slenderlobe (*Leptodactylon pungens*). Alkali saccaton grass (*Sporobolus airoides*) is a dominant herb.

- The interior of the dunes are dominated by forbs (non-woody flowering plants that are not grasses) such as dune scurfpea (*Psoralidium lanceolatum*), coin buckwheat (*Eriogonum nummulare*), pale evening primrose (*Oenothera pallida*), sand dropseed (*Sporobolus cryptandrus*), Indian ricegrass, and wormwood (*Artemisia dracunculus*). Viscid and dune rabbitbrush also dominate in this interior.

Exotics occurring in the dune communities include Russian thistle and halogeton (AGEISS, 1998f). As of 2000, the vegetated dunes community is decreasing at DPG.

3.4.2.6 Annual Grasslands

Disturbances from natural and human-caused fires and military maneuvers have allowed for displacement of natural vegetation by exotic annuals (weeds). The most widespread exotic annual is cheatgrass and annual grasslands can now be considered their own community.

Annual grasslands cover about 6 percent of DPG. In the intermountain west, cheatgrass often outcompetes the native vegetation and is now a dominant species in the rangelands. Tumbling mustard, peppercress, and Russian thistle are also common in the annual grassland community (AGEISS, 1997b). Three of the communities described by Vest (1962) have been heavily impacted by cheatgrass. The shadscale-budsage community has decreased 30 percent and the juniper brush community 40 percent due to cheatgrass invasion. A total of about 60 percent of the original acreage of the mixed brush community is now dominated by cheatgrass. Fire frequency in areas dominated by cheatgrass increases due to the increase in fuel load. In areas that are not naturally susceptible to fires, such as greasewood communities, cheatgrass has been the fuel factor allowing these areas to burn in recent years. In 1994, 49 sq km (12,000 acres) in the White Sage Impact Area burned from white phosphorus munitions. This fire left the southern boundary and burned surrounding BLM land as well. In addition, in 1998, 15,000 acres of greasewood and mixed brush, as well as annual grasslands, were burned from Global Patriot activities. Figure 3.1-4, Fires Occurring at DPG from 1994 through 1998, shows the burned areas of DPG. As of 1999, the ITAM program is developing a noxious weed management plan. This plan will identify and prioritize exotic plant management.

3.4.2.7 Barren

The barren community consists of two areas void of vegetation: the playa and active dunes. This community consists of barren flats underlain by clay/salt intermixtures with a relatively high salt content and the active dunes. The water table in the flats is within 1.5 m (5 ft) of the surface, and typically is at the surface in winter and early spring months, thereby forming extensive playa lakes. The playa flats form the majority of the west-central and northwest portions of DPG west and north of Granite Peak. A finger-like bay within the playa flats extends from the northwest to the southeast north of Baker.

Playa flats cover about 25 percent of DPG acreage. The playa flats are normally devoid of both vegetation and wildlife, except for occasional transients. However,

the ecological importance of this community lies in its use by shore birds and migrating waterfowl during the winter and spring months, when standing water covers the playa flats. This characteristic was used to designate a portion of this community as wetlands using COE criteria (ESA, 1994). The foundation of the playa lake food chain is blue-green algae blooms, which support both brine shrimp and brine flies (Trimble, 1989). These brine shrimp and brine flies occur in prodigious numbers that support a variety of shore birds and migrating waterfowl.

Active dunes, unlike the stabilized, vegetative dunes, are void of vegetation. These dunes are constantly shifting shape and location due to wind erosion. As of 2000, the barren community is stable at DPG with no measured changes.

3.4.3 Vegetative Trends

To fully understand the vegetation patterns and species present at DPG, it is necessary to understand how vegetation has changed since DPG was established in the early 1940s. Vegetation has been studied at DPG since the late 1950s. Analysis of this historic vegetation data (Vest, 1962) allows a comparison to the present vegetation classifications and species. This comparison documents the vegetative changes and trends that have taken place over the last 40 years.

These vegetative trends show that the barren community is stable at DPG, whereas the grasslands community is increasing. The low desert scrub, high desert scrub, and pygmy forest communities are all decreasing with the exception of pickleweed in the low desert scrub community which is stable.

The LCTA and LRAM components of the ITAM program, previously described in Section 3.1.4.3, Integrated Training Area Management Program, are used to monitor and sustain the testing and training ranges. The LCTA program mainly monitors changes in vegetation plots in the firing point areas, but also monitors small mammal and insect populations. The 276 plots are surveyed every 5 years to determine vertical vegetation structure and characterization and shrub age and composition. Mitigation measures for repairing or sustaining the land are included within the LRAM program and include:

- Selective removal of cheatgrass through herbicide application (OUST)
- Greenstrip firebreaks and conduct burn trials
- Scalping treatments
- Determining site adaptive plant species
- Revegetation

3.4.4 Wildlife Resources

Surveys of species at DPG have been conducted on a variety of wildlife species. In addition, Federal and state threatened, endangered, and sensitive species are identified and are also summarized in Section 3.4.5, Special Status Species. The following tables in Appendix I, Biological Resources at DPG, provide a list of historical and current wildlife species and their associated habitats present at DPG:

- Table I-2, Wildlife Species Historically and Currently Present at DPG and Their Habitats
- Table I-3, Avian Species Historically and Currently Present at DPG and Their Habitats
- Table I-4, Bats Captured at DPG During a 1995 Survey

DPG often works in cooperation with the UDWR and the BLM to manage the installation's wildlife. The following four categories of wildlife exist at DPG:

- Insects
- Reptiles and Amphibians
- Mammals
- Birds

3.4.4.1 Insects

Information on insect species occurring at DPG are from historical accounts dealing with disease dissemination among biotic communities (Woodbury, 1964) and incidental capture information. Historical inventories identified 1,300 insect and 150 arachnid species at DPG (Woodbury, 1964). Insect information from owl pellet collections is being analyzed by BYU (Kremer-Goodell, 1999). In addition, a moth survey was initiated by the ITAM program in the summer of 1999.

3.4.4.2 Reptiles and Amphibians

Reptiles and amphibians are well represented in recent surveys at DPG; however the efforts thus far cannot be considered complete surveys. Appendix I, Biological Resources at DPG, lists the reptile and amphibian species at DPG, as well as their habitats. Species of special interest include those that were historically present at DPG, but have not been recorded since before 1955:

- Short-horned lizard
- Sagebrush lizard

3.4.4.3 Mammals

Recent studies on mammals can be divided into two specific groups and purposes:

- Small mammals (rodents and bats)
- Large mammals (ungulates and carnivores)

Small Mammals – Vest (1962) described the small mammal communities associated with each vegetation community. AGEISS (1997b and 1998f) repeated Vest's work to compare historical distributions with present day small mammals. During 1996 and 1997, Vest's original eight plots were sampled using live traps, and in 1998, three plots were sampled. An increase in exotic annuals has changed the vegetative communities and hence, the diversity and abundance of small mammal communities at DPG. From this sampling, the following observations were made.

- Deer mice were the most dominant species in all the habitats.
- Declines were observed in habitat-specific species such as the white-tailed antelope ground squirrel, Great Basin kangaroo rat, Ord's kangaroo rat, and the desert woodrat.
- Vegetated dunes were found to have the most diverse species of small mammals as well as the least amount of intrusion by exotic annuals such as cheatgrass, peppercress, bur buttercup, tumbleweed, and musk mustard.
- The decline in the Ord's kangaroo rat was significantly correlated to the increase in cheatgrass (AGEISS, 1997b).

In 1995, a bat survey was conducted at DPG to determine species present, roosting sites, and winter residence areas (AGEISS, 1996c). Bats captured are noted in Appendix I, Biological Resources at DPG.

Leporids (hares and rabbits) are also considered small mammals and are found at DPG. Black-tailed jackrabbits and the mountain cottontail are the most common species, although the desert cottontail may also occur at DPG. Spotlight survey data show a decrease in the rabbit population from historical numbers (AGEISS, 2001).

Large Mammals – Pronghorn and feral horses are the main large herbivore groups at DPG, although the mule deer population is increasing. Feral horses at DPG are ancestors of animals that escaped from Skull Valley and are protected by the Wild-Free Roaming Horses and Burros Act. Feral horses are managed by DPG in

cooperation with the BLM. In some areas, horses are thought to out-compete the native pronghorn for forage.

Feral horses are one of the main large herbivore species at DPG.

A 3-year study by AGEISS (1997c; 1999d) was conducted to determine interactions between feral horses (approximately 100) and pronghorn (approximately 180) at DPG. This study examined food habits, fawning bed sites, home range overlap, and habitat use by the two species. Analysis of the data showed a substantial overlap in core home ranges of the two species in the winter, but not in the summer (AGEISS, 1997c; 1999d). Winter habitat preference was similar in that both species chose mixed brush habitats; however, pronghorn preferred annual weeds and low desert scrub whereas horses preferred juniper habitat during the summer. In the summer of 1998, several human-caused and natural fires occurred in the horse and pronghorn winter range. Increased overlap at the end of the summer and the winter was observed because of these fires due to the new growth of cheatgrass. The only other native ungulate species that occurs at DPG is mule deer, although not in any substantial numbers.

The carnivore group is represented at DPG and includes species from the bassariscid, mustelid, felid, and canid families. One ringtail cat was documented in the Ditto area, and a few were documented on Granite Peak; however, attempts to capture and locate any other individuals has not been successful. Badgers and striped skunks are the most common of the mustelid family at DPG. The larger carnivores consist of two species of felids and three species of canids. Bobcats are the most common felid at DPG, although populations are unknown. Observations of a cougar cub and sign of an adult cougar at a pronghorn kill, have lead to the belief that at least one reproductive group occurs at DPG. Male cougars range widely, and may or may not occur within DPG itself.

The most common carnivore at DPG is the coyote, although there is also a population of kit fox. In some areas like California, kit fox are endangered and are heavily

exploited by the coyote population. A 1-year study on the interaction between coyotes and kit fox was conducted at DPG from 1996 to 1997. Coyote home ranges overlapped the kit fox home ranges, and 25 percent of the kit fox were killed by coyotes. Information about the food habits of the two species showed little overlap in diet. A two-year carnivore ecology project showed that although kit fox reproductive rates are comparable to the historic rate, kit fox densities have decreased. Coyotes are the leading factor for mortality, especially in juvenile foxes. Decrease in kit fox densities is believed to be a culmination of poor juvenile survival and recruitment and lack of available habitat, either from direct competition with the coyote or loss of native habitat to exotics. Observations of red fox may add an additional factor into the canid competition equation.

To learn about the kit fox at DPG, a study was conducted in which species were collared and followed.

3.4.4.4 Birds

Birds at DPG are typical of the Great Basin and of a distinctive combination of species that also occurs beyond the Great Basin in semiarid and montane habitats. Birds at DPG include several habitat-obligate species to sagebrush or pinyon-juniper woodlands (Behle, 1985; AGEISS, 1996g). The results of several extensive surveys have documented migrants (breeding and winter) and breeding resident birds and raptor species. Appendix I, Biological Resources at DPG, lists the bird species currently and historically present at DPG. DPG has collected bird population data since 1995 using point-count methods to determine long-term species-specific habitats for birds. One hundred and twenty data collection stations, in three habitats (greasewood, juniper brush, and mixed brush), have been used each spring to determine species present. Based on the data, the high desert scrub habitat (including juniper, greasewood, and shrubsteppe) is a high use area for migratory birds such as:

- Sage thrasher
- Sage sparrow
- Brewer’s sparrow

- Black-throated sparrow

The UDWR is proposing that these species are among the highest conservation priority in the state of Utah.

The occurrence of neotropical migrants and their relationship to the DPG training events was studied in several phases. DPG staff conducted initial monitoring under the LCTA from 1990 to 1994. The LCTA study found an increase in the number of grassland or edge species such as:

- Horned lark
- Lark sparrow
- Brown-headed cowbird

A more intense survey for migrating birds and the response to Army training was conducted by Texas Regional Institute for Environmental Studies and AGEISS (1996g), and is being continued by Partners in Flight in cooperation with DPG staff and UDWR. Mist netting and banding was conducted in the White Sage and Cedar Mountain Training Areas and in control plots at DPG. Counts at specific points and nest searches of the impact area and the control were also conducted. A nation-wide monitoring program known as MAPS, Monitoring Avian Productivity and Survivorship, was initiated in 1996 by DPG under the direction of the UDWR. This study continued the monitoring of habitat preference and use, breeding productivity and survivorship, fidelity to natal and breeding sites, and response to NG training using banded birds. Paired training and control sites were established for mist netting (60 nets) and point counts (54 stations). A decrease in breeding success was found in the training areas compared to the control plots in 1996 and 1997; 1998 data are not available. The UDWR recommended conservation priorities be given to high desert scrub and pinyon-juniper habitats along with their associated faunal species.

Three raptor studies were conducted at DPG from 1996 to 1997. Pellets from raptors were collected to determine prey preference and are being analyzed by BYU. Nest sites were studied for comparison with historical data of the 1980s. Eighty-six historical nests were visited, of which the majority were in good condition. Despite this, nesting attempts decreased in 1996 and 1997. Only two nests in 1996 and nine in 1997 produced fledging young. Density and diversity of species also decreased from historical data. Generalists species like the red-tail hawk and the great horned owl have replaced the more specialist species like the ferruginous hawk and the Swainson’s hawk at DPG. Both a small-eared owl and an accipiter hawk were found nesting in the juniper habitat. A ferruginous hawk and three Swainson’s hawks were

monitored using radio telemetry in 1996 and 1997 by Chemical & Biological Defense Command. Both species used DPG to some extent during the summer. The ferruginous hawk, northern goshawk, Swainson's hawk, and burrowing owl are high monitoring priorities for DPG. The ferruginous hawk is listed as a state threatened species while the other three species are listed as state sensitive (UDWR, 1998).

Chukars are the only game species present on DPG. These small, partridge-like species were introduced to North America as a game species. Chukars are gregarious birds and have become well established in rocky and arid portions of the west.

3.4.5 Special Status Species

A few Federally endangered, threatened, and candidate plant and wildlife species, as well as state threatened and endangered species and sensitive species of management consequence, potentially occur or have been documented at DPG.

These species are listed in Table 3.4-1, Special Status Species at DPG. The legal basis for designating vegetation and wildlife species for a special status, such as threatened, endangered, or candidate follows:

- Federal – Endangered Species Act
- State – UDWR Policy Number W2AQ-4

Table 3.4-1. Special Status Species at DPG.

Common Name	Federal Status[1]	Utah Status[2]	Species Presence Confirmed at DPG		Scientific Name
			Present	Potential	
Plants					
Dunes four-wing saltbush	None	SP		X	*Atriplex canescens var. gigantea*
Ute Ladies Tresses	T	T		X	*Spiranthes divuvialis*
Wildlife					
Columbia spotted frog	C	Cons		X	*Rana pretiosa*
Utah milksnake	None	SP		X	*Lampropeltis triangulum taylori*
Utah Mountain kingsnake	None	SP		X	*Lampropeltis pyromelana infralabialis*
Fat-whorled pond snail	C	SP/SD		X	*Stagnicola bonnevillensis*
Fish Springs pond snail	None	E		X	*Stagnicola pilsbryi*
Bald eagle	E	E	X		*Haliaeetus leucocephalus*
Peregrine falcon	T	E	X		*Flaco peregrinus*
Ferruginous hawk	None	T	X		*Buteo regalis*
Swainson's hawk	None	SP/SD	X		*Buteo sawinsoni*
Northern goshawk	None	SP		X	*Accipiter gentilis*
Burrowing owl	None	SP	X		*Athene cunicularia*
Short-eared owl	None	SP		X	*Asio flammeus*
Yellow-billed cuckoo	None	T	X		*Coccyzus americaneus occidentalis*

Table 3.4-1. Special Status Species at DPG.

Common Name	Federal Status[1]	Utah Status[2]	Species Presence Confirmed at DPG		Scientific Name
			Present	Potential	
Mountain plover	C	SD	X		*Charadrius montanus*
Black tern	None	SP	X		*Chlidonias niger*
Long-billed curlew	None	SP/SD	X		*Numenius americanus*
Wildlife (Continued)					
Ringtail	None	SD	X		*Bassariscus astutus*
Fringed myotis	None	SP		X	*Myotis thysanodes*
Townsend's big-eared bat	None	SP	X		*Plecotus townsendii*

[1] Federal Status (1998)

E Taxa formally listed as endangered

T Taxa formally listed as threatened

C Candidate species: Any species, subspecies, or population that is likely to become threatened in the foreseeable future, but more data on the species is required before listing.

[2] Utah Division of Wildlife Resources Classification (1998)

E Endangered: Any species, subspecies, or population which is threatened with extirpation from Utah or extinction resulting from very low or declining numbers, alteration and/or reduction of habitat, detrimental environment changes, or any combination of the above.

T Threatened: Any species, subspecies, or population which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

SP Sensitive species: Any species which, although still occurs in numbers adequate for survival, whose population has been greatly depleted, is declining in numbers, distribution, and/or habitat.

SD Sensitive species: Any species that occurs in limited areas and/or numbers due to a restricted or specialized habitat.

Cons Conservation species: Any wildlife species or subspecies, except those currently listed under the Endangered Species Act as threatened or endangered, that meets the state criteria of endangered, threatened, or of special concern, but is not currently receiving sufficient management under a Conservation Agreement developed and/or implemented by the state to preclude its listing.

The sensitive species (including threatened and endangered) likely to occur or documented at DPG are not year-round residents, and therefore, no special management practices have been implemented. The Army, in cooperation with the U.S. Fish and Wildlife Service, has special guidelines for managing threatened and endangered species, should they become residents of DPG.

One plant species at DPG is an SP species of concern. SP species still occur in numbers adequate for survival, but whose population has been greatly depleted and is declining in numbers, distribution, and/or habitat. Dune fourwing saltbush could be found in association with the vegetated dunes at DPG. The Ute ladies tresses, a Federally threatened orchid, occurs in wetland habitats just outside DPG's southern boundary. This threatened plant has not been found at DPG, but may occur there (Johnson, 1999).

Several other species are also of special concern in the State of Utah. The peregrine falcon is a transient to DPG, and has not been found to nest within DPG boundaries. Bald eagles are often observed at DPG during the winter. Two other hawks, the ferruginous hawk (state threatened) and the Swainson's hawk (state sensitive), were found nesting at DPG from 1993 to 1995. The burrowing owl, a state sensitive species due to declining numbers, has also been found nesting at DPG. The mountain plover, black tern, and long-billed curlew have been observed at DPG in the pickleweed area during wet periods.

The two bat species of concern are SP species. The fringed myotis was documented in Tooele County, but was not captured during the 1995 bat survey at DPG (AGEISS, 1996c). Ringtails have been observed at DPG, but data on their distribution is unavailable.

3.4.6 Important Habitats or Biological Resource Areas

Important habitats or biological resource areas can be identified based on the following:

- Critical habitat for species listed as threatened or endangered
- Loss or disturbance of a habitat resulting in the take (death) of a species listed as threatened or endangered
- Habitat of an ecologically critical area (supports a diversity of species)
- Scientifically significant biological assets, such as places where vegetation composition is exemplary or pristine
- Unique characteristic(s) of a specific geographical area
- Natural areas where original conditions have been maintained
- Legal considerations-permit requirements for the dredging and filling of wetlands and waters of the U.S.

Based on these criteria, the following areas at DPG have been identified as having important habitat or biological resources:

- Natural springs are used by a variety of species, and are unique in themselves as the few riparian (habitat near water) areas and permanent open water sources that occur at DPG. The natural springs that occur on DPG land holdings in the Cedar Mountains include: Cane Springs, Mustang Springs, and Orr Springs. Cane

Springs, Orr Springs, and a portion of Mustang Springs are classified as wetlands by the COE (ESA, 1994). Black's Pond, an excavated pond, is also considered a wetland at DPG (ESA, 1994). Species populations are often limited by the availability of water, especially limiting in a desert environment. These springs offer a permanent water source for the wildlife, as well as habitat for riparian-specific species.

- While there is some disagreement and discussion over its status as a jurisdictional wetland, some of the playa-pickleweed area is important for migrating waterfowl. The COE distinguishes the playas, especially those west of Granite Peak, as "special aquatic sites" because the lack of vegetation does not distinguish them as wetlands (ESA, 1994). Special aquatic sites have special ecological characteristics that could easily be disrupted, such as brine shrimp for waterfowl (ESA, 1994).

- The Nature Conservancy recognized several areas at DPG as special areas. Several of the areas (Granite Peak, East Dugway Dunefield, North Baker Sand Island, and Southwest Gypsum Dunefield) were chosen for their unique vegetation. The vegetated sand dunes contain the most diverse species of plants and animals, and is one of the few areas not overridden by annual exotics (AGEISS, 1997b). Granite Peak is unique in that it harbors undisturbed juniper woodlands.

- The small remnant portion of shadscale-winterfat (*Ceratoides lanata*) that occurs in the southeast corner of DPG is considered a unique habitat for DPG. This remnant portion is the only known location of shadscale-winterfat at DPG.

3.5 Socioeconomics

This section describes socioeconomic conditions and characteristics. Historical and current data are presented to characterize the economic and social linkages between DPG and its surroundings. Population and employment projections through the year 2010 provide a foundation for understanding the potential future socioeconomic consequences of the DPG mission alternatives. The remainder of this section addresses the following topics:

- Regulatory Overview
- Socioeconomic Study Area
- Economic Activity
- Income
- Population and Demographics

- Housing
- Selected Public Infrastructure and Services

3.5.1 Regulatory Overview

There are no laws or regulations that apply specifically to socioeconomics relevant to this Future Programs EIS.

3.5.2 Socioeconomic Study Area

Tooele County, UT is the primary socioeconomic study area for this EIS. Tooele County encompasses the geographic area within which existing or foreseeable impacts of DPG's mission are discernible and may potentially be significant. DPG's primary locational characteristic with respect to socioeconomics is its remoteness from other communities. The closest urban area is the City of Tooele (1999 population 18,460), approximately 61 km (38 mi) from DPG. Other towns located closer to DPG, for example Stockton (1996 population of 360), are all much smaller and offer few services and have limited housing availability (U.S. Bureau of the Census, 2000c). Historically DPG's remote location, the large number of military personnel assigned to DPG, and the availability of family and unaccompanied personnel housing led to a substantial portion of the work force employed at DPG residing at English Village.

According to the 1990 census, the resident population of DPG numbered 1,761, or 6.6 percent of the Tooele County, UT population (U.S. Bureau of the Census, 1992). Although isolated from other communities, residents were supported by an array of community services including schools, commissary, post exchange, theater, churches, medical clinics, and recreation facilities. Consequently, many of the social and economic linkages were centered within DPG itself.

Over time, DPG's insular status has diminished, primarily due to improved regional highway access and improved housing availability in nearby communities.

Approximately 65 percent of the work force commutes to DPG from other communities in Tooele County, UT, along the Wasatch Front, and elsewhere in Utah, as shown in Table 3.5-1, Residency Patterns of DPG Federal Personnel. Consequently, the social and economic linkages associated with installation operations extend beyond DPG's boundaries.

Table 3.5-1. Residency Patterns of DPG Federal Personnel.

Place of Residency	Percent of Total	
	1997	2001
DPG - English Village	50	34
Remainder of Tooele County, UT	8	45
Salt Lake City, UT and Wasatch Front Locations	32	16
Elsewhere/Not Determined	10	5
Total	**100**	**100**

SOURCES: Beck, 1997; Warner, 2001

Although DPG's social and economic linkages extend beyond its boundaries, the increasing size of the regional economy and increasing spatial dispersion, as distance from DPG increases, diminishes their potential significance. Estimates of the 1999 population for the five-county Wasatch Front region are presented in Table 3.5-2, Wasatch Front Population, 1999. Despite rapid growth since 1990, Tooele County, including the resident population at English Village, accounts for only 2.2 percent of the region's total 1999 population. With a combined population of over 1.6 million residents elsewhere in the region and the diversity and volume of economic activity associated with a large metropolitan area like Salt Lake City, UT, the socioeconomic effects of DPG beyond Tooele County, UT are limited.

Table 3.5-2. Wasatch Front Population, 1999.

County	1999	Percent of Total
Davis	239,364	14.4
Salt Lake	850,243	51.3
Tooele	35,801	2.2
Utah	346,997	20.9
Weber	185,469	11.2
Regional Total	**1,657,874**	**100.0**

SOURCE: U.S. Bureau of the Census, 2000b

The geographic context for the description of socioeconomic conditions focuses on DPG and its role within the local economy. The discussion broadens to Tooele County as appropriate.

3.5.3 Economic Activity

DPG has played an important role in the economy of Tooele County, UT beginning with its establishment in 1942 and continuing to present times. Modern-day settlement of Tooele County, UT, tied to a combination of agriculture and mineral development, dates to the mid-1800s. Local agriculture consisted primarily of

farming in the Tooele and Rush Valleys east of DPG on the opposite side of the Stansbury and Onaqui Ranges. Some livestock ranching occurred in Skull Valley and in other areas of the county.

Mineral development included smelting and hardrock mining, primarily for gold, in the eastern portion of the county and exploration of minerals from the Great Salt Lake and deposits along the northern tier in what is today the Interstate 80 (I-80) corridor west to Nevada. The Bingham Copper Mine, site of the world's largest open-pit mining operation, is located in Salt Lake County, UT just east of Tooele County, UT.

U.S. entry into World War II signaled a major change in Tooele County's history. The establishment of DPG, followed by the construction and operations of the Tooele Army Depot and the Wendover AFB generated a major military presence in Tooele County, UT, which stimulated the local economy. In 1940 the county recorded a population of 9,133. Population increased rapidly, peaking in 1943 and 1944. Although the county's population declined following the conclusion of World War II, Tooele County's 1950 population registered 14,636, an increase of more than 60 percent compared to 1940 (U.S. Bureau of the Census, 1942 and 1963).

DPG and the other military installations continued to play vital roles in the nation's defense program through the Korean War, Cold War, and to recent times. Consequently, the Federal government has been the major industry in Tooele County, UT throughout much of the recent past, with DPG being a major employer in Tooele County.

The U.S. signing of the international treaty banning bacteriological and toxic weapons in 1972 triggered the onset of declines in activity and employment at DPG that continued into the early 1980s. In 1986, prior to the Persian Gulf crisis, employment at DPG totaled 1,298. DPG employment increased with renewed interest in obscurants and chemical and biological defense, peaking at nearly 2,000 personnel in 1990. This work force accounted for more than 15 percent of all jobs in Tooele County, UT. Since that time, DPG employment has declined by approximately 40 percent, totaling about 1,200 employees in 2000, or less than 9 percent of employment in Tooele County, UT, as shown in Table 3.5-3, Number of DPG Personnel, 1986 to 2000 (U.S. Bureau of Economic Analysis, 2000; Proctor, 1997 and 2000). Even with these reductions, DPG remained the largest employer in Tooele County in 1999.

Table 3.5-3. Number of DPG Personnel, 1986 to 2000.

Year	Military	Federal Civilian	Contractor	Other[1]	Total
1986	149	778	371	NA	1,298
1990	301	811	794	92	1,998
1991	231	820	581	87	1,719
1992	114	844	405	63	1,426
1993	145	712	447	64	1,368
1994	175	665	436	146	1,422
1995	117	662	398	151	1,328
1996	66	603	456	126	1,251
1997	49	542	434	127	1,152
1998	49	535	448	121	1,153
1999	44	496	471	123	1,134
2000	43	506	527	129	1,205

NA not applicable

1 "Other" includes tenants, nonappropriated fund, Post Exchange and other services. Data for "other" were not reported separately for 1986.

SOURCES: Proctor, 1997; Proctor, 2000

DOD funding reductions and realignments affected more than just DPG in Tooele County. In 1993 Tooele Army Depot-North Area was among those military installations affected by the installation realignment process as its major mission was withdrawn. Construction and operations of the Deseret Chemical Depot at the former Tooele Army Depot-South Area offset some of the economic disruption associated with these cutbacks. Facility construction was initiated in 1994. Destruction of the chemical weapon stockpile located on-site began in October 1996 and continues to the present. The combined effect of these events has been a greater than 60 percent reduction in annual DOD expenditures in Tooele County, UT including a loss of nearly $77 million in annual salaries and wages, as shown in Table 3.5-4, Federal Expenditures and Obligations in Tooele County, 1993 and 1999. The dollar amounts are presented in millions of dollars.

Table 3.5-4. Federal Expenditures and Obligations in Tooele County, 1993 and 1999.

Agency/Type	1993	1999	Changes, 1993 and 1999	
			Absolute Change	Percent Change
Salaries and wages	132.52	54.67	-77.85	-59
Direct procurements	137.88	42.72	-95.16	-69
Retirement and other	2.92	3.37	0.45	15
Total Defense Department	273.32	100.76	-172.56	-63
All other Federal agencies	80.91	125.46	44.55	55
Total in Tooele County	**354.23**	**226.22**	**-128.01**	**-36**

SOURCE: U.S. Bureau of Census, 1994-2000

In addition to the loss of jobs and payrolls, the local economy has been affected by reductions in annual procurements associated with the installation closures and cutbacks. The total volume of procurements declined by more than $95 million, from $137.88 million in 1993 to $42.72 million in 1999.

The changes in Federal government activity are part of a shift in the composition of the Tooele County, UT economy. Table 3.5-5, Employment in Tooele County, 1990 to 1998, presents data showing local employment by broadly defined categories. Government at all levels accounted for approximately 6,300 jobs in 1990, more than 47 percent of the total. By 1998 government employment had declined to just over 3,500 jobs, while total private sector employment climbed to an all-time high of nearly 11,150 jobs. A portion of the increase in private employment is attributable to an increased reliance on contractors at DPG and at the Deseret Chemical Depot.

Although government remains a dominant force in the local economy, it now represents 25 percent of the total employment, while local trade and services employment expands to support a burgeoning population.

Table 3.5-5. Employment in Tooele County, 1990 to 1998.

Major Category	1990	1994	1998	Percent Change 1990 - 1998
Farm	422	429	429	2
Private	6,463	8,356	10,173	57
Federal civilian	4,727	2,359	1,815	-62
Federal military	460	385	256	-23
State & local government	1,129	1,294	1,458	29
Total employed	**13,201**	**12,823**	**14,131**	**7**

SOURCE: U.S. Bureau of Economic Analysis, 2000

Economic forecasts from the state indicate accelerated employment growth and continued diversification for Tooele County, UT. More than 5,000 new jobs are forecast to be created within the local economy by 2010, 78 percent of which will be in private industry as shown in Table 3.5-6, Projected Tooele County Employment, 2000 to 2010. Increases in trade and services employment, tied primarily to meeting the needs of an expanding resident population, are forecast at nearly 1,900 jobs. Following declines in the early 1990s, government employment is expected to increase by 843 jobs over the next decade.

Table 3.5-6. Projected Tooele County Employment, 2000 to 2010.

Type/Sector	2000	2005	2010	Percent Change 2000 - 2010
Non-farm proprietors	2,971	3,774	4,601	55
Agriculture	453	442	430	-5
Trade and services	3,922	4,795	5,786	48
Other private	4,129	4,399	4,909	19
Government	3,507	3,884	4,350	24
Total	**14,982**	**17,294**	**20,076**	**34**

SOURCE: Utah Governor's Office, 1999

3.5.4 Income

Various measures of personal income provide further insights into the composition and economic well being of the local economy. This section portrays recent trends in employee earnings and personal income for Tooele County, UT.

Changes in the economic composition of Tooele County, UT are also apparent in local earnings data. Earnings data are presented in Table 3.5-7, Tooele County Earnings, 1990 to 1998. Private sector earnings, not including farm income, more than doubled, climbing by $138.30 million, to $262.57 million in 1998. State and local government earnings also exhibited strong growth during the same period. The combined increases in private and state and local government earnings more than offset the reduction of $47.3 million in earnings from Federal government during the period (U.S. Bureau of Economic Analysis, 2000).

Table 3.5-7. Tooele County Earnings, 1990 to 1998.

Source	1990 Millions of Dollars	1994 Millions of Dollars	1998 Millions of Dollars	Percent Change 1990-1998
Farm income	4.32	1.40	1.93	-55
Private sector earnings	124.28	197.82	262.57	111
State and local government	23.00	32.37	43.89	91
Federal government	163.98	150.62	116.68	-29
Residency adjustment	(38.38)	(36.51)	55.80	Not available
Total earnings	**277.20**	**345.70**	**480.87**	**72**

SOURCE: U.S. Bureau of Economic Analysis, 2000

The earnings data also reveal another fundamental change in the Tooele County, UT economy: a shift from a net outflow to a net inflow of local earnings when adjusting from place of work to place of residence. The residency adjustment accounts for the effect of commuting on local earnings. For many years, Tooele County, UT experienced a net outflow adjustment, as indicated by the negative value in Table 3.5-7, Tooele County Earnings, 1990 to 1998. This occurred as workers employed in Tooele County but residing elsewhere, including many at DPG, resulted in a greater outflow than the earnings inflow generated by residents of Tooele County, UT who worked outside the county. Between 1990 and 1998, the net change in the local residency adjustment amounted to more than $94 million, from -$38.38 million to $55.80 million. Two major influences underlie the shift: decreases in the number of Federal workers employed in Tooele County, UT and the emergence of Tooele County, UT as a “bedroom community” for the Salt Lake City metropolitan area. The former reduced the size of the outflow, while the latter more than offset any remaining outflow generated by remaining commuters from the metropolitan area into Tooele County, UT.

The net inflow of $55.80 million in 1998 will likely increase over time. In doing so, the local economy will become more closely intertwined with that of the Wasatch Front and less dependent upon ongoing operations of DPG and other Federal activities in Tooele County, UT.

Per capita personal income of Tooele County residents was $18,244 in 1998. The average represented a 35 percent increase over 1990 per capita income, slightly higher than inflation during the same period. Nominal per capita income of Tooele County, UT residents, lags both the state-wide and national averages. Per capita income data for the county, state, and U.S. are presented in Table 3.5-8, Per Capita Personal Income, 1990 to 1998. As shown, 1998 local per capita income was only two-thirds (67 percent) of the national average.

Table 3.5-8. Per Capita Personal Income, 1990 to 1998.

Region	1990	1994	1998	Percent Change 1990 - 1998
Tooele County	$13,499	$15,688	$18,244	35
State of Utah	$14,231	$17,912	$22,240	56
U.S.	$19,188	$22,581	$27,203	91
Tooele as a percent of the U.S.	**70 %**	**69 %**	**67%**	**Not applicable**

% percent

SOURCE: U.S. Bureau of Economic Analysis, 2000

According to the 1990 census, 11.5 percent of Tooele County, UT residents had incomes below the poverty level. The percentage was just slightly above the overall statewide average of 11.4 percent (U.S. Bureau of Census, 1992).

3.5.5 Population and Demographics

This section describes key population and demographic characteristics for Tooele County, UT. It reviews recent population growth trends, correlating the changes with the level activity at DPG and other Federal installations in Tooele County, UT. Population characteristics of the resident population at English Village are also described. The 1990 racial composition of Tooele County, UT is summarized. Long-term population projections are presented for Tooele County, UT. These projections provide a frame of reference against which the socioeconomic effects of DPG's future mission can be assessed.

Tooele County, UT is located just west of Salt Lake City, UT and the heavily urbanized Wasatch Front, and yet it is largely rural. Total population of the five-county region was at 1.15 million in 1980; however, Tooele County, UT accounted for only 26,033 of the total. For many years the local economy was linked primarily to DPG and other Federal installations. Thus, local population growth tracked the changes in the level of activity at these installations, but overall population remained relatively stable.

While Tooele County's population remained stable, the region as a whole continued growing, as shown in Table 3.5-9, Wasatch Front Regional Population Growth, 1980 to 1999. In the early 1990s, the region's strong growth began spilling over into Tooele County, UT, prompting substantial new residential development and population growth in the northeastern portion of the county. That area has good access to nearby I-80, facilitating daily commuting by residents to jobs in the metropolitan area. Consequently, the population of Tooele County, UT increased by about 9,200 residents, or 35 percent, between 1990 and 1999.

Table 3.5-9. Wasatch Front Regional Population Growth, 1980 to 1999.

County	1980	1990	1999	Percent Change	
				1980 - 1990	1990 – 1999
Davis	146,540	187,941	239,364	28	27
Salt Lake	619,066	725,956	850,243	17	17
Tooele	26,033	26,601	35,801	2	35
Utah	218,106	263,590	346,997	21	32
Weber	144,616	158,330	185,469	10	17
Regional Total	**1,154,361**	**1,362,418**	**1,657,874**	**18**	**22**

SOURCES: U.S. Bureau of the Census, 1992 and 2000a

Tooele County's emergence as a suburban commuting location for Salt Lake City, UT is evident in estimates of local population distribution within the county. From 1980 to 1990, Tooele County's population increased by 568 residents to 26,601. Population growth was occurring in the unincorporated areas of the county during that period, but declining population in Tooele City offset much of that growth. As shown in Table 3.5-10, Tooele County Population, 1980 to 1999, growth accelerated between 1990 and 1995, resulting in a net increase of about 2,700 new residents. Drawn by housing availability and the relative ease of commuting to jobs in the Wasatch Front, population has risen even more dramatically since then, reaching 35,801 in 1999. The net increase of 9,200 residents over the 1990 population represents total growth of 35 percent and a compounded growth rate of 3.4 percent per year. Most of the recent growth has been located in the city of Tooele.

Table 3.5-10. Tooele County Population, 1980 to 1999.

Location	1980	1990	1995	1999	Percent Change 1980-1999
City of Tooele	14,335	13,887	14,907	18,460	33
City of Grantsville	4,419	4,500	4,953	5,787	27
Remainder of Tooele County	7,279	8,214	9,458	11,554	41
Tooele County Total	**26,033**	**26,601**	**29,318**	**35,801**	**35**

SOURCES: U.S. Bureau of the Census, 1992 and 2000b

DPG is located in a remote and lightly populated portion of Tooele County, UT. The Dugway-Wendover Census Division, which includes DPG and the entire western portion of the county, had a total population of 3,592 residents in the 1990 Census. Of that total, 1,761 resided at DPG and 1,132 lived in Wendover, NV (U.S. Bureau of the Census, 1992). The remaining population within the Census Division is accounted for by dispersed farming and ranch households, and residents of the

unincorporated community of Terra, located about 13 km (8 mi) northeast of DPG along State Road (SR) 299, and Native Americans residing in the following three areas:

- Skull Valley Reservation
- Confederated Tribes of the Goshute Reservation
- The Ibapah-Gold Hill area in western Tooele County

A recent estimate of population in the Dugway-Wendover Census Division is unavailable. However, it is likely that the area's population has declined, principally as a result of decreases in the resident population of DPG. The resident population of English Village is estimated at slightly over 1,000 persons as of 1998, a decrease of more than 40 percent since 1990. These declines have occurred during cutbacks in DPG's work force (Proctor, 1997; Turner, 1997; Allinson, 2001).

Mirroring the state's population, Tooele County's population is predominately white. Table 3.5-11, Tooele County Population, 1990, By Race, presents data on racial composition from the 1990 census. In 1990, almost 92 percent of the total population was Caucasian. Native Americans totaled about one percent of the population. Blacks and all other races combined accounted for the remainder.

Table 3.5-11. Tooele County Population, 1990, By Race.

Race	Persons	Percent of Total
White	24,410	92
Black	223	1
Native American	325	1
Other	1,643	6
Tooele County Total	**26,601**	**100.0**

SOURCE: U.S. Bureau of the Census, 1990

Population forecasts for Tooele County, UT have been prepared by the State of Utah. Through the year 2010, these forecasts indicate continuation of the strong population growth that has recently occurred in Tooele County, UT. By the year 2010, the county's population is forecast to approach 50,333, a net increase of nearly 70 percent compared to the 1996 population, as shown in Table 3.5-12, Forecasted Population to 2010, Tooele County, UT. Within Tooele County, UT growth is expected to be concentrated in the Cities of Tooele, UT and Grantsville and the northeastern portion of Tooele County, UT.

Table 3.5-12. Forecasted Population to 2010, Tooele County.

1995	2000	2005	2010	Percent Change 1996-2010
29,600	36,816	42,450	50,333	70

SOURCE: Utah Governor's Office, 2000b

3.5.6 Housing

This section summarizes pertinent housing information for English Village and for Tooele County as a whole. English Village is a self-contained residential community at DPG. Construction of English Village began in the early 1950s. In addition to mission support and administrative buildings, English Village included housing for families and unaccompanied personnel and an array of community support facilities for personnel assigned to DPG and their families. More than 420 family housing units and barracks for about 200 unaccompanied personnel were built in the 1950s. The family housing inventory was later expanded, eventually reaching 587 in 1987. The Mountain View subdivision is the newest at DPG, built in 1987. Ongoing Army housing programs provided for periodic rehabilitation and renovation of these units over time (Turner, 1997).

Funding and work force reductions at DPG have resulted in declining occupancy of the available units. Most of the barracks were closed in the mid-1990s and part of the family housing inventory was placed on inactive status. In 1997 and 1998, 73 of the oldest family housing units were demolished. As of December 2000, the DPG housing inventory totals 512 units, the oldest of which date to 1959. Of the total, 48 are on inactive status with demolition likely within the foreseeable future (Allinson, 2001). Table 3.5-13, DPG Housing Inventory, December 2000, profiles DPG's recent housing inventory.

Table 3.5-13. DPG Housing Inventory, December 2000.

Subdivision	Number of Units	Number of Bedrooms	Year Built
Wherry	340	2, 3, 4, & 6	1959
St. John Park	66	3	1964
Mountain View	103	2, 3, & 4	1987
Armitage	3	3 & 4	1956/1987
Total Housing Units	**512**		

SOURCES: Turner, 1997; Allinson, 2001

Federal and contractor personnel assigned to DPG are eligible to apply for family housing. Monthly rents vary by size of unit and are established by periodic housing market surveys conducted by the COE to determine prevailing rent rates in nearby

communities. Occupancy rates for DPG's family housing have declined over time as a result of reductions in the number of personnel assigned to DPG. Housing utilization data presented in Table 3.5-14, DPG Housing Utilization, December 2000**,** show overall occupancy at about 88 percent of the active units. Vacancies exist in both the family housing and in the units set aside for unaccompanied personnel housing. The Army's average occupancy targets for on-installation housing is 95 percent. Consequently further reductions are anticipated in the foreseeable future.

Table 3.5-14. DPG Housing Utilization, December 2000.

Type of Housing	Units			
	Occupied	**Vacant**	**Inactive**	**Total**
Command	3	0	0	3
Family	272	20	48	340
Unaccompanied Personnel	106	33	0	139
Subtotal	**381**	**53**	**48**	**482**
Transient	Not applicable	Not applicable	Not applicable	30
Total				**512**

SOURCE: Allinson, 2001

Transient housing is necessitated by DPG's distance from overnight lodging opportunities in Tooele or the Salt Lake City metropolitan area. Transient housing at DPG includes 30 converted family housing units and the Antelope Inn. The latter has a total of 44 rooms providing overnight and short-term sleeping accommodations.

A total of 9,510 housing units, including those at DPG, existed in Tooele County, UT in 1990. Of the total, 8,581 were occupied and 929 were vacant, yielding an overall vacancy rate of 9.8 percent. Available housing for sale or rent, excluding vacant family housing units at DPG, was estimated at about 525 units. Housing costs were below the state-wide averages, with homes having a median value of $60,400 and median monthly rent of $351 (U.S. Bureau of the Census, 1992).

Fueled by the growth and demand emanating from the Salt Lake City, UT area, local residential development has been very active in Tooele County, UT. Since 1990, building permits for nearly 5,000 new dwelling units have been issued in Tooele County, UT. More than 55 percent of that total, or 2,759 of the permits were issued during the 1998 through 2000 time period. Table 3.5-15, New Residential Units Permitted In Tooele County, UT 1990 to 2000, presents residential construction data by year and location within Tooele County, UT. Virtually all of the new residential construction has occurred in the northeastern portion of the county. This area offers ready access to the Wasatch Front via I-80. Little new residential development has occurred in Skull Valley.

Table 3.5-15. New Residential Units Permitted In Tooele County, UT 1990 to 2000.

Year	Grantsville City	Tooele City	Remainder of County	Total
1990	31	30	29	90
1991	23	55	39	117
1992	21	24	67	112
1993	14	51	118	183
1994	34	70	132	236
1995	74	92	153	319
1996	42	326	218	586
1997	51	312	162	525
1998	100	760	110	970
1999	114	724	100	938
2000	91	592	168	851
Total	**595**	**3,036**	**1,296**	**4,927**

SOURCES: U.S. Bureau of the Census, 1991 – 2001; Jorgensen, 2001

3.5.7 Selected Public Infrastructure and Services

This section provides an overview of the provision of public infrastructure and services in Tooele County, UT as they relate to DPG. DPG itself is largely self-sufficient for on-installation services. Despite the size of the DPG work force and the population residing in Tooele County, UT, the installation generates limited demand on public services elsewhere within the county.

Provision of public services at DPG reflects both the installation's remoteness and the historical context of its mission. DPG's remote location meant that no housing, communities or service providers were located in the immediate vicinity. Consequently, the Army was responsible for the construction, operation and maintenance of essential services. This need gave rise to English Village.

Designed to serve as a self-sufficient community, English Village included housing, water and wastewater systems, a post exchange and commissary, health care facilities, a fire department, and a variety of community support functions. The latter included a post office, elementary and secondary schools, a church, recreation center, bowling alley, movie theater, golf course, and community clubs.

Beyond DPG's boundaries, Tooele County, UT is the primary affected local government jurisdiction for Tooele County. The county provides county-wide administrative services, planning and zoning, and law enforcement. Tooele County, UT also coordinates emergency management for the entire county, including an emergency evacuation and response plan developed in conjunction with the Deseret Chemical Depot. Most of these services are housed in county offices located in the city of Tooele, about 61 km (38 mi) from DPG.

Residents and businesses within several incorporated communities receive a variety of services in addition to those provided by Tooele County on a countywide basis. These services generally include local police and central water and wastewater utilities. Table 3.5-16, Local Public Service Providers in Tooele County, UT, presents a profile of the principal public services providers serving various locations throughout the county. Given the residency patterns of DPG's work force, few of the service demands faced by these providers are attributable to DPG.

Table 3.5-16. Local Public Service Providers in Tooele County, UT.

Community	Local Police	Local Fire Department	Central Water	Central Wastewater
DPG	Installation Police	Installation Fire Department	Yes	Yes
Terra/Skull Valley	County Sheriff	Volunteer	No	No
Grantsville	Yes	Volunteer	Yes	Yes
Rush Valley	County Sheriff	Volunteer	No	No
Stockton	Yes	Volunteer	Yes	No
Tooele	Yes	Paid and Volunteer	Yes	Yes
Vernon	County Sheriff	Volunteer	Yes	No
Wendover	Yes	Volunteer	Yes	Yes

Local health care facilities and services include the Tooele Valley Medical Center, a 38-bed hospital located in Tooele and many individual and group medical and dental practices. Most of these practices are also located in Tooele, UT and emphasize general and primary care, for instance, pediatrics, obstetrics, internal medicine, general dentistry, and orthodontics. Specialized health care is available from numerous providers on the Wasatch Front. A network of ambulance services associated with local fire protection districts provides emergency medical transportation, both locally and to the Wasatch Front. Air ambulance service from the Salt Lake City area is available to respond to life-threatening emergencies.

The Tooele County School District, based in the City of Tooele, UT, is responsible for public primary and secondary education throughout the county. The district operates 19 schools, including Dugway Elementary and Dugway High School (Utah Education Network, 1999). The schools at DPG also serve students from the surrounding area, including Terra and Skull Valley.

At the beginning of the 2000-2001 school year, the district's total kindergarten through 12th grade enrollment was 9,177 students. The district's enrollment has risen sharply in recent years due to population growth in the northeastern portion of the county. In addition to needing capacity to accommodate growth, some of its existing facilities in the Tooele area are outdated and over capacity. Consequently, the district has initiated a major capital construction campaign. The campaign includes a new

high school in Tooele, three additional elementary schools and an expansion of the Grantsville City High School (King, 2001).

These district-wide trends contrast with those at DPG, where declining enrollment has accompanied cutbacks in DPG personnel and the resident population of English Village. The two schools at DPG are effectively at 50 percent of enrollment capacity as shown in Table 3.5-17, Public Education at DPG.

Table 3.5-17. Public Education at DPG.

School	Grades	Student Capacity	Staff 2000-2001	Enrollment (October)	
				1995-96	2000-2001
Dugway Elementary	K-6	300	20	193	174
Dugway Junior/Senior High	7-12	325	21	192	135
Total		**625**	**41**	**385**	**309**

SOURCES: Utah State Office of Education, 1997; Senrick, 1997 and 2001; Mohammed, 2001

The Tooele County School District receives Federal payments-in-lieu of taxes to support the operations of the school. However, the amounts have been declining and do not fully reimburse the district for its costs. The declining enrollments at DPG schools, along with fiscal pressures on the district's resources created by growth elsewhere in the county, are causing the district to reassess the efficiency of continued operations of the DPG schools. At some point, it may be in the district's interest to close these schools and transport students to other schools (Stout, 1997).

3.6 Environmental Justice

The environmental justice goal of "fair treatment" is not to shift risks among populations, but to identify potential disproportionately high adverse impacts on minority and low-income populations and identify mitigation measures, if necessary, to lessen these impacts.

> **Fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income….Fair treatment means that no group of people, including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequence.**
>
> **EPA's Office of Environmental Justice**

3.6.1 Regulatory Overview

EO 12898, Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations, requires identifying and addressing disproportionately high and adverse human health or environmental impacts of Federal programs, policies, and activities on minority populations and low-income populations. In accordance with EO 12898, an environmental justice analysis has been conducted as part of this EIS.

3.6.2 Overview of Residential Areas Potentially Affected by Environmental Justice Issues

The study area used in this EIS for investigating potential environmental justice issues is a 32-km (20-mi) radius around the perimeter of DPG's boundary. Most of this area is within Tooele County, UT, and some extends into Juab County, UT, and into the State of Nevada. The residential areas potentially affected by environmental justice issues within the study area include:

- Skull Valley Area
- Skull Valley Reservation
- Ibapah-Gold Hill Area
- Confederated Tribes of the Goshute Reservation

Overviews of these residential areas are provided in the following sections.

3.6.2.1 Skull Valley Area

Land holdings of the Skull Valley area, the closest defined district east of the Main Gate of DPG, include privately owned ranches, the Skull Valley Reservation, the Wasatch National Forest, and BLM land. These land holdings are shown in Figure 3.6-1, Map of Skull Valley Area. Concentrations of populations include:

- Unincorporated town of Terra, UT, a low-density community located on the east benches of the Onaqui Mountains overlooking Skull Valley, made up primarily of civilians who work at DPG and their families

- Residential development in DPG's English Village area

- Skull Valley Reservation, which is described in Section 3.6.2.2, Skull Valley Reservation

The land is primarily used for agriculture, ranching, farming, and grazing on public lands (Gillies, 1995). According to county utility records, there are approximately 30

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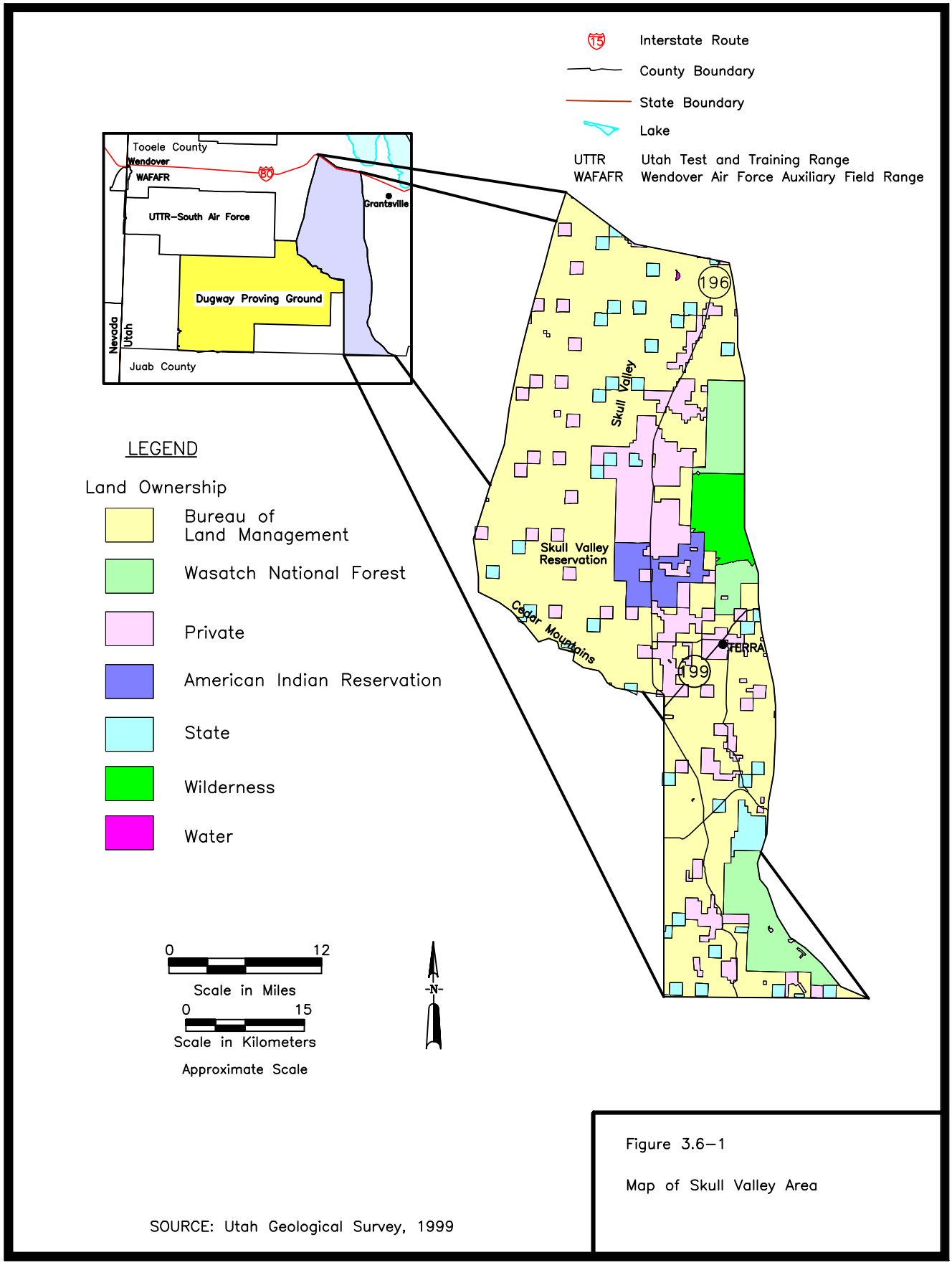

Figure 3.6–1

Map of Skull Valley Area

SOURCE: Utah Geological Survey, 1999

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households in Terra, UT and 11 in Skull Valley, not including the Skull Valley Reservation, comprising an estimated population of 125 persons.

3.6.2.2 Skull Valley Reservation

Information in this section is from the undated Skull Valley Reservation website unless otherwise cited. The Skull Valley Reservation is located in a remote area about 56 km (35 mi) south of the Great Salt Lake and approximately 13 km (8 mi) northeast of DPG. SR 196 travels north/south through the Skull Valley Reservation, connecting to I-80 which travels east into Salt Lake City, UT. The reservation is in a semi-arid valley. A portion of the Wasatch National Forest borders the reservation on the east. The Goshute signed the treaty of Tooele Valley on October 12, 1863. Land was set aside as a reservation for the Skull Valley Goshute in 1912. The original reservation of 72.6 sq km (17,920 acres) was established by EO on September 7, 1917. An EO issued on February 15, 1918 set aside an additional 2.6 sq km (640 acres).

The Goshute are culturally and economically similar to the Western Shoshone. The Goshute occupied a territory in the Great Basin extending from the Great Salt Lake to the Steptoe Range in Nevada and south to Simpson Springs.

At one time, the Skull Valley Goshute numbered about 20,000 members. The most recent census figures indicate that there are less than 500 Skull Valley Goshute with an estimated 112 residents on the reservation (Goshute, Undated-a). The Skull Valley Goshute are governed by an elected Skull Valley Goshute Tribal Executive Committee. The Executive Committee consists of a chairman, vice-chairman, and secretary/treasurer. Executive Committee members serve 4- year terms. The tribe does not have a constitution or charter. Approximately half of this Goshute band are under 30 years old.

The majority of Goshute people of the Skull Valley Reservation are employed off the reservation in Salt Lake City, Grantsville, Stockton, Tooele, and Ibapah. Ninety percent of the tribe’s income to fund programs came from a lease of the Tekoi Test Range to Hercules Aerospace, Inc., now Alliant Aerospace. The range was used to test rocket engines and for testing of explosives of 22.7 kg (50 lb) or less. This lease to Alliant Aerospace ended in September 1999 (Jew, 2000). The tribe operates the Pony Express Station, which is both a gas station and a convenience store and is a majority owner in Earth Environmental Services, Inc., which sells dumpsters to governments and private industries.

Regionally, the Skull Valley Reservation is in an area that contains several hazardous or radioactive waste disposal facilities or incinerators and other industrial development including power plants and a magnesium plant. Additionally, Private Fuel Storage, a private firm formed by utility companies, has applied to the Nuclear Regulatory Commission (NRC) to construct and operate an interim spent fuel storage facility on the Skull Valley Reservation. The tribal leadership supports this application and has signed a lease with Private Fuel Storage (PFS, 1999; Hengesbaugh, 2000).

The reservation land is suitable for grazing. About 0.65 sq km (160 acres) of reservation land are irrigated. Stream water is delivered to the land through a pipeline constructed with Bureau of Indian Affairs funds.

3.6.2.3 Ibapah-Gold Hill Area

The Ibapah-Gold Hill area is a sparsely populated rural area where residents are isolated from the rest of the county because the area is bordered by the UTTR and DPG to the north and east. Figure 3.6-2, Map of Ibapah-Gold Hill Area, identifies the location of this area. Access to this area is either through Juab County to the south before reaching the Overland Canyon Road, or through Nevada. This isolation affects the level of services provided by the county and limits its development potential. Therefore, while there is plentiful land, there is little potential for growth and its impacts. While there is no census data for this specific area, an estimated 80 to 150 people reside in the area in about 30 to 40 households. The area contains a large amount of BLM lands, and the economic base is ranching with little other economic activity.

3.6.2.4 Confederated Tribes of the Goshute Reservation

The Confederated Tribes of the Goshute Reservation also referred to as the Ibapah Goshute are located on approximately 486 sq km (120,000 acres) astride the Nevada-Utah border, in White Pine County, NV and Tooele and Juab Counties, UT. Most of the tribal land is in Nevada covering 285 sq km (70,489 acres) with 196 sq km (48,363 acres) in Utah. The Federal government owns 0.32 sq km (80 acres) of Reservation land in Utah (Goshute, 1999).

The Confederated Tribes of the Goshute Reservation government was organized under the Indian Reorganization Act of June 18, 1934, as amended. The Ibapah Goshute approved a constitution and by-laws in 1940 (Goshute, 1999). The total number of people on the reservation is 122 living in 37 households. Residents include tribal members, nontribal members, and non-Indians including about five ranchers/farmers. Of the 122 residents, 47 are under the age of eighteen. The language spoken is Goshute (Dick, 1999).

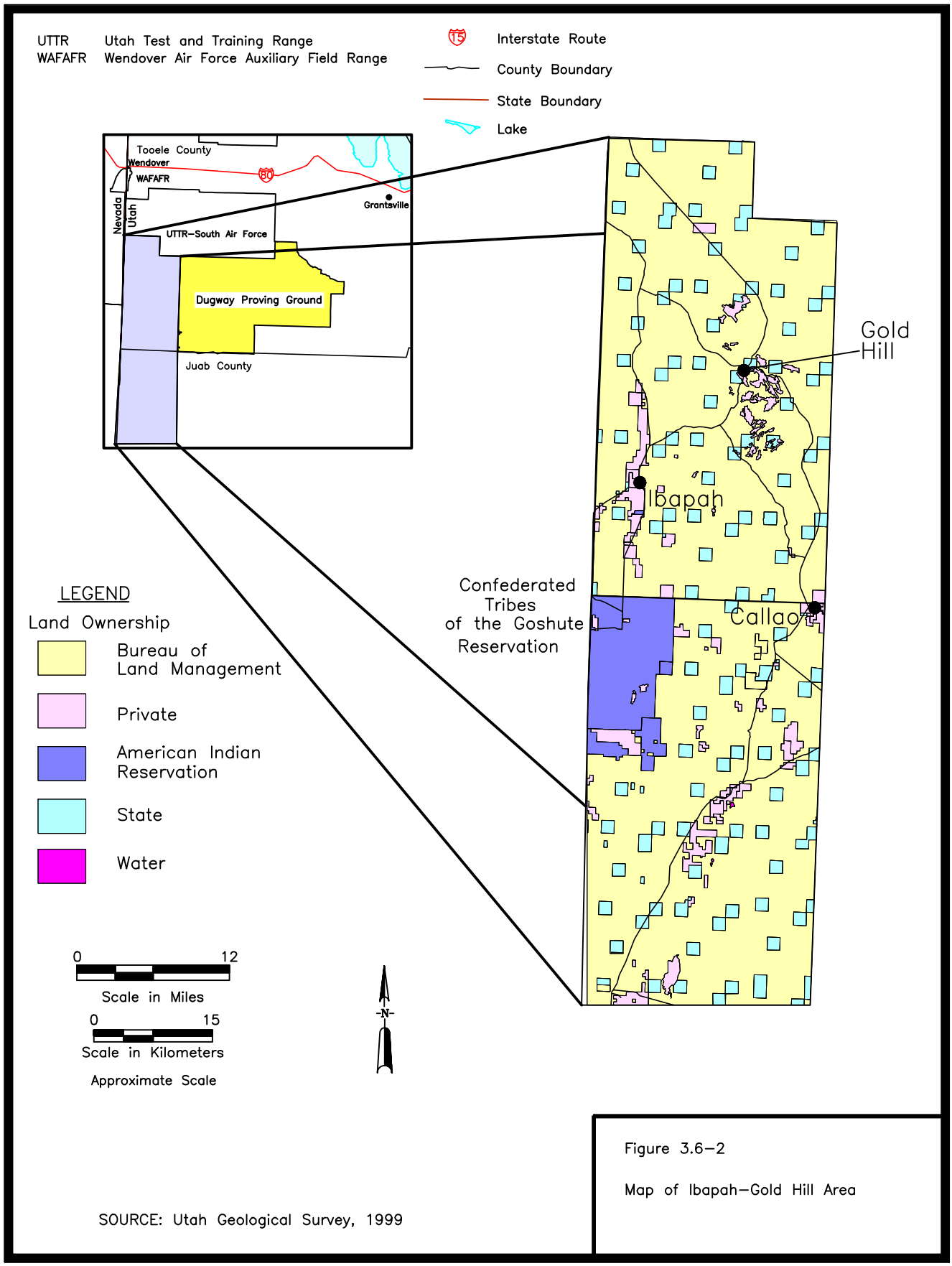

Figure 3.6–2

Map of Ibapah–Gold Hill Area

SOURCE: Utah Geological Survey, 1999

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3.6.3 Environmental Justice Analysis

To conduct an environmental justice analysis, the following questions must be addressed:

- Do minority and/or low-income populations exist within the potentially affected area?
- If minority and/or low-income populations exist within the potentially affected area, are any potential environmental and health impacts likely to fall disproportionately on these populations compared to the general population in the area?

The process in this EIS to identify whether minority and/or low-income populations exist is summarized below. The analysis as to whether any identified minority and/or low-income populations are disproportionately affected is discussed in Section 4.6, Environmental Justice Impacts. The CEQ's *Guidance for Addressing Environmental Justice under the National Environmental Policy Act* (1997) for identifying minority and low-income populations includes:

- Identification of minority populations where either:
  - The minority population of the affected area exceeds 50 percent, or
  - The minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population
- Identification of low-income populations with the annual statistical poverty thresholds from the Bureau of the Census Current Population Reports

For purposes of describing the affected environment, data gathered from EPA Region 8's Environmental Justice Geographic Information System mapping system and database are used as the basis to identify minority and low-income populations. Results of the environmental justice analysis are summarized below:

- Minority Populations – Based on the information available from the EPA, U.S. Census, and local records, the primary residential areas of concern from an environmental justice perspective are the two Native American reservations located near the perimeter of DPG. As shown in Table 3.6-1, Minority and Poverty Populations, the percentage of minority population within the study area is 12.75 percent. The minority population within the surrounding counties of Tooele, UT is 14.24 percent and Juab is 2.48 percent. The State of Utah's minority population is 8.70 percent. These data indicate that the proportion of the

minority population in the study area could be considered as meaningfully greater than the minority population percentage in the general population.

- Population in Poverty – Using the 1990 census data and EPA's database, the percentage of the population in poverty within the study area was not high enough to be identified as an environmental justice issue. However, since these data are relatively old, it is assumed in this EIS that there is a strong likelihood that some of the residential areas within the study area may have population pockets of low-income persons.

Table 3.6-1. Minority and Poverty Populations.

Environmental Justice Criteria	Study Area	Tooele County	Juab County	State of Utah
Total population	4,085	26,601	5,817	1,719,677
Minority population	521	3,788	144	149,569
Percent Minority	**12.75**	**14.24**	**2.48**	**8.70**
Population in poverty	251	3,012	604	192,098
Percent in Poverty	**6.14**	**11.32**	**10.38**	**11.17**

SOURCES: U.S. Bureau of the Census, 1990; EPA, 1998

Minority and low-income populations are believed to exist within the study area. These populations include the two Native American reservations and the Ibapah-Gold Hill area.

Therefore, impact analysis needs to be conducted for this EIS to determine whether there is a potential for disproportionately high and adverse effects from the Proposed Action and alternatives.

3.7 Land Use and Access

The land within DPG is primarily dedicated to military missions and activities, as described in Chapter 2.0, Baseline Activities, Proposed Action, and Alternatives.

DPG's land use management philosophy and practice is that of "dominant use," which ensures that the military-related missions have ultimate priority over all other potential land uses.

DPG's missions and activities require most land to be reserved for firing/bombing ranges, test grids, training areas, etc. These types of activities require large open areas with associated safety/buffer zones and restricted access to and within DPG. Land use relates both to the types of activities conducted on a particular tract of land and issues regarding access to the tract of land. This section includes descriptions of the following land use elements at DPG:

- Regulatory Overview
- Regional Land Uses
- DPG Land Uses
- Access to DPG Facilities

3.7.1 Regulatory Overview

Multiple laws and regulations govern land use and real property at military installations. Laws and regulations governing land use include those regulating natural and cultural resources as well as those regulating traffic and transportation and materials and waste. Army policy, procedures, and responsibilities have been established as a result of these laws and regulations. Army regulations applicable specifically to land use at DPG that are relevant to this Future Programs EIS include AR 200-1, Environmental Protection and Enhancement; AR 200-2, Environmental Effects of Army Actions; AR 200-3, Natural Resources – Land, Forest and Wildlife Management; and AR 210-20, Master Planning for Army Installations. Lists of applicable laws and regulations can be found in the reference list of each AR.

3.7.2 Regional Land Uses

DPG is located in Tooele County, UT. The county includes a variety of environments including the Great Salt Lake, western deserts, fertile valleys, and rugged mountains. The county consists of about 18,016 sq km (4.45 million acres), of which about 95.3 percent is land and about 4.7 percent is water (primarily the Great Salt Lake). Tooele County is the second largest county in Utah in surface area. As of 1999, the county is growing in population and facing increased growth pressures. County residents generally enjoy a rural lifestyle and an open scenic landscape. With the exception of English Village, located within DPG, virtually all of the population and residential development in Tooele County, UT is located in the Tooele and Rush Valleys and in Wendover. The unincorporated community of Terra, the Skull Valley Reservation, and some individual ranches account for the rest of the Tooele County population (Gillies, 1995). A regional land use map is presented in Figure 3.7-1, Regional Land Use and Ownership.

Most of Tooele County is isolated and undeveloped because of the harsh physical environment. Agricultural activities in much of the county are constrained because of limited arable land. The isolation and harsh physical environment characteristics have been seen as ideal for Federal and military land uses.

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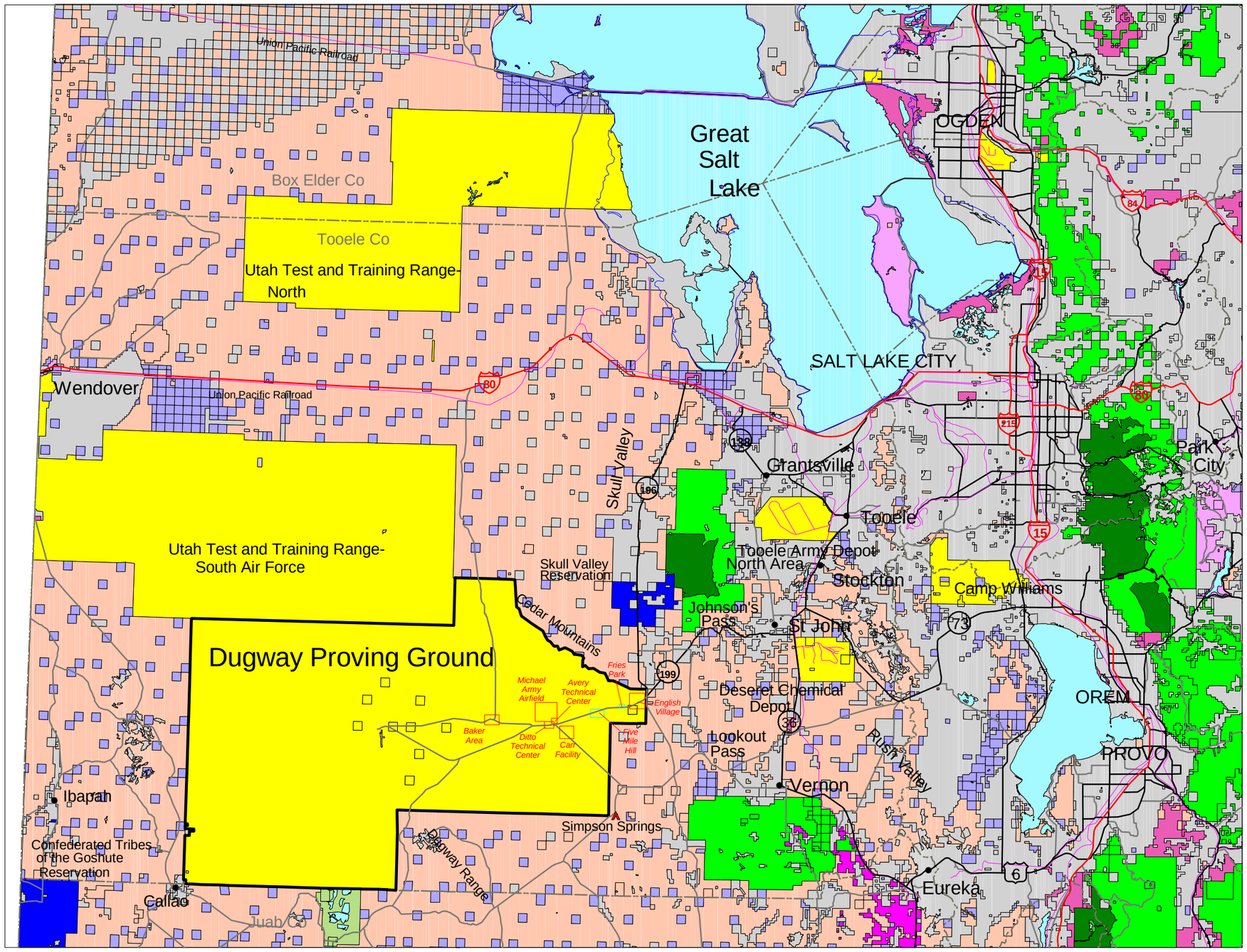

Legend

Land Ownership

- American Indian Reservations
- Bureau of Land Management
- Bankhead Jones
- Military Reservations
- National Parks and Monuments
- Private
- State of Utah (Trust Lands)
- U.S. Forest Service
- USFWS National Wildlife Refuge
- Utah State Parks and Recreation
- Utah State Wildlife Reserves
- Water
- Wilderness Area

- DPG Boundary
- Railroad
- Lake
- County Boundary
- Interstate Highway
- Major Highway
- Secondary Highway
- Campground

Co County
USFWS U.S. Fish and Wildlife Service

N

0 6 12
Scale in Miles

0 6 12 18
Scale in Kilometers

SOURCE: Utah Geological Survey, 1999

Figure 3.7-1

Regional Land Use and Ownership

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Most land in Tooele County is under the administration of Federal agencies:

- **BLM controls about 5,668 sq km (1.4 million acres), or 33 percent of county lands**
- **Military uses account for about 6,478 sq km (1.6 million acres), or 36 percent of county lands**

In addition to DPG, other major Federal facilities in Tooele County, UT include the UTTR, the Tooele Army Depot, and the Deseret Chemical Depot. The Wasatch and Uinta National Forests are also located in Tooele County, UT.

There is one designated Wilderness (the Deseret Peak Wilderness) and the following six Wilderness Study Areas within 8 to 64 km (5 to 40 mi) of DPG boundaries in Tooele and Juab Counties:

- Cedar Mountains
- Deep Creek Mountains
- Big Hollow
- North Stansbury Mountains
- Fish Springs
- Dugway Mountains

Other lands in close proximity to DPG include:

- State of Utah land
- Privately owned land
- Skull Valley Reservation, about 13 km (8 mi) northeast of DPG
- Confederated Tribes of the Goshute Reservation, about 16 km (10 mi) southwest of DPG in Juab County

Two emerging regional land use trends involve hazardous/radioactive waste disposal sites, and the increasing importance of recreation and tourism. With respect to waste disposal, there are several private hazardous waste disposal or incinerator sites in Tooele County, UT and Federal facilities such as DPG and Deseret Chemical Depot. Private waste disposal and incinerator sites in Tooele County include:

- Envirocare of Utah
- Safety-Kleen (Aragonite)
- Safety-Kleen (Clive)
- Safety-Kleen (Grassy Mountain)

Chapter 5.0, Cumulative Impacts, provides more information on these facilities, including their locations. Additionally, Private Fuel Storage, a private firm formed by utility companies, has applied to the NRC to construct and operate an interim spent fuel storage facility on the Skull Valley Reservation.

Because of the nearby scenic natural resources, the region is typical of many areas in the western U.S. with economies that are increasingly supported by the services and retail trade economic sectors. Section 3.5.3, Economic Activity, provides more information about this economic trend. This type of economy is based on increasing tourism and recreation participation, with existing residents and visitors to the area attracted by the opportunities to view natural scenic areas, hike, camp, etc. Preservation of natural areas would be important to maintaining the service/retail trade economic growth underway.

The Tooele County General Plan (Gillies, 1995) discusses land use and other developmental issues within the county. The plan is intended to provide a decision-making framework to guide decisions about the future of the county. The plan does not specifically address land use issues within DPG boundaries, but there are two primary planning districts identified within the plan that involve DPG either directly or indirectly:

- Skull Valley Planning District
- West Desert Planning District

The Skull Valley Planning District is located between the Stansbury and Cedar Mountains. Access to DPG is through Skull Valley. Landowners and administrators of the Skull Valley Planning District include BLM, privately owned ranches, the Skull Valley Reservation, the Wasatch National Forest, and DPG. A concentration of population in the valley is the unincorporated community of Terra, UT, a settlement made up primarily of people who work at DPG. Terra, UT developed from the sale of 0.02-sq km (5-acre) parcels by the BLM. The zoning for the area is RR-5, which allows 0.02-sq km (5-acre) lots. However, much of the development appears to be on smaller lots.

Much of the land in Skull Valley is used for agriculture, ranching, farming, and grazing on public lands. Most of this district is zoned MU-40, which allows a broad spectrum of uses. Other than the Tekoi Test Range on the Skull Valley Reservation, there has been limited commercial development and no industrial development in Skull Valley. The Skull Valley Reservation had leased the range to Alliant Aerospace, however, this lease ended in September 1999 (Jew, 2000). Residents

commute to Tooele Valley for goods and services. The limited infrastructure, population, and services in the valley are not supportive of growth in commercial or industrial land uses.

The vast majority of the West Desert Planning District is under Federal control, including DPG. Other than residents within DPG at English Village, there is no population in this area. This district faces no population growth pressures, but may experience demands and impacts upon natural resources by increasing interest in recreational uses. The Pony Express route and related historical sites are features of this district. There are no commercial or industrial areas in this district and there is not sufficient infrastructure and services to support development.

In addition to the land surrounding DPG within Tooele County, UT, part of the DPG southern boundary abuts Juab County, UT and the Fish Springs National Wildlife Refuge. This wildlife refuge is managed by the U.S. Fish and Wildlife Service. Most of the adjacent land to the south of DPG is under the jurisdiction of the BLM, which manages the land for multiple uses. The Utah State Land Board administers State-owned sections without formal land use plans.

The area beyond the northern boundary of DPG consists mostly of clay and salt flats of the Great Salt Lake Desert. This region is uninhabited and used in connection with training and testing operations on the UTTR.

Landowners and managers in the vicinity of DPG have plans, objectives, and goals for the use of their land. Some owners and managers have commented that DPG activities result in increased noise and invasive weeds on their property that prevent them from accomplishing their plans, objectives, and goals. Information on invasive weeds is provided in Section 3.4, Biological Resources. The sources and management of noise at DPG are described in Section 3.11, Noise.

3.7.3 DPG Land Uses

Land holdings and land uses within DPG are described in the following sections:

- DPG Land Holdings
- Mission and Support Land Uses at DPG
- Other Land Uses at DPG
- Potential Land Use Constraints

3.7.3.1 DPG Land Holdings

Acquisition of lands for DPG operations began on February 6, 1942 when President Franklin D. Roosevelt signed EO 9053. This EO withdrew 513 sq km (126,720 acres) of public lands for use by the War Department as a Chemical Warfare Range. Other major public land withdrawals for DPG operations included:

- 574 sq km (141,680 acres) in April 1942
- 1,640 sq km (405,018 acres) in March 1945
- 421 sq km (104,085 acres) in March 1955

These public domain land withdrawals for DPG operations have been supplemented with acquisitions of:

- Private land purchased by the Federal government
- Land leased from the State of Utah
- Land leased from private parties

Total acreage held for DPG operations is 3,234 sq km (798,855 acres). Of the DPG land holdings, 1.2 sq km (299 acres) are improved areas used for resident housing and facilities/infrastructure at English Village and 2.2 sq km (536 acres) are semi-improved areas associated with the test facilities. The remaining land is in its natural state except where DPG activities have occurred at firing/bombing ranges, test grids, and training areas. The various DPG outdoor activities performed to implement missions and programs generally occur in specific designated areas. Locations for DPG outdoor activities have been chosen primarily based on activity scale and selection of areas that represent realistic conditions for military training maneuvers or testing of equipment reliability under battlefield conditions. These outdoor locations are described in Section 2.1.4.3, Primary Outdoor Facilities.

3.7.3.2 Mission and Support Land Uses at DPG

The following are general mission and support land use categories within DPG:

- Facility testing
- Grid testing
- Installation support
- Military maneuver training
- Mission support
- Range/impact testing and training
- Reserved land or buffer

The locations of these land use categories are depicted on Figure 3.7-2, Locations of Land Use Categories at DPG. Although these land use categories and the scale of Figure 3.7-2 are simplified, the figure effectively portrays the locations of major activities required to accomplish DPG's mission and programs. Generally, the major testing and training areas are in the central portions of DPG, away from on-installation or off-installation residential areas. These locations help to provide a substantial buffer between DPG activities and persons who might be affected by these activities. A brief description of each of these land use categories follows. The discussions on installation support and mission support land use categories are combined since the locations of these activities tend to be in DPG's various activity centers.

Facility Testing – This land use category includes areas where testing facilities, such as laboratories or test chambers, are located. These various facilities are described in Section 2.1.4.2, Primary Indoor Facilities.

Grid Testing – This land use category contains all of the active and inactive grid facilities, as well as a variety of other test facilities including towers, bunkers, and buildings. The nature of each assigned test determines which test facility or grid is used and how it should be configured. In some cases, existing facilities are used without modification over an extended period of time. For other tests, existing facilities may be redesigned or a new facility constructed. However, the overall form and size of the area has remained constant. The various test grids are described in Section 2.1.4.3, Primary Outdoor Facilities.

Installation and Mission Support – These land use categories include a variety of support services essential to the operation of DPG's mission activities and general installation functions. These support activities generally occur in the following activity centers:

- Avery Technical Center
- Baker Area
- Carr Facility
- Ditto Technical Center
- English Village

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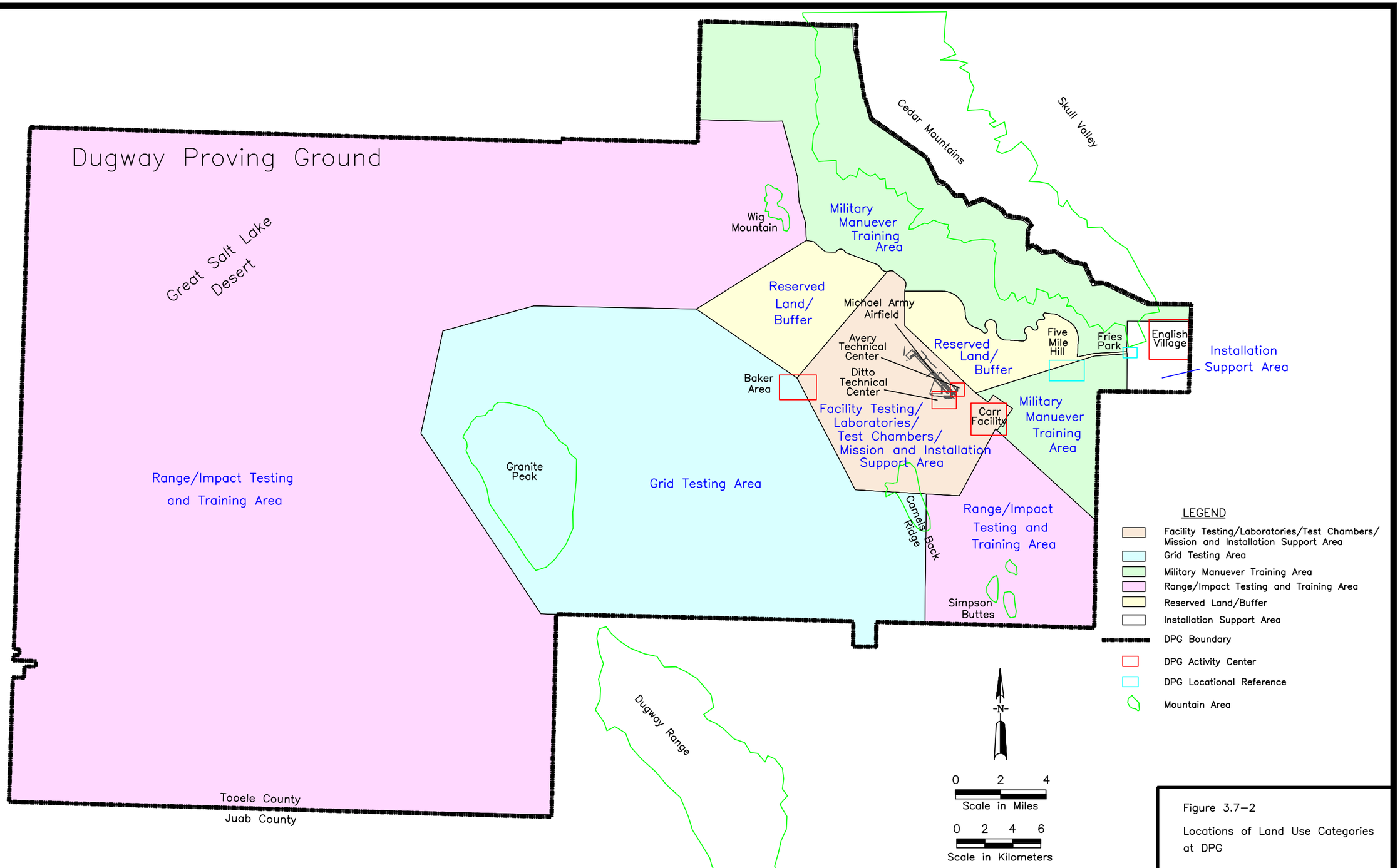

Figure 3.7–2

Locations of Land Use Categories at DPG

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Ditto Technical Center is one of the five major activity centers at DPG.

Installation and mission support activities that occur at the activity centers are described in Table 3.7-1, Summary of Land Uses at DPG Activity Centers. Activity centers with facility testing activities are also indicated. DPG's various support activities are summarized in Section 2.1.8, Baseline Mission Support Activities, and Section 2.1-9, Baseline Installation Support Activities. Section 2.1.4.1, Activity Centers, provides more information on the various activity centers at DPG.

Table 3.7-1. Summary of Land Uses at DPG Activity Centers.

Land Use Category	Avery	Baker	Carr	Ditto	English Village
Administration	•	•	•	•	•
Facility Testing/ Laboratories/Test Chambers					
BangBox™				•	
Bushnell Materiel Test Facility			•		
Chemical Agent Test Chamber			•		
Defensive Test Chamber			•		
Lothar Salomon Life Sciences Test Facility		•			
Reginald Kendall Combined Chemical Test Facility				•	
Mission Support					
Airfield Operations				•	
Ammunition Accountability			•		
Instrumentation				•	
QASAS			•		
Range Control				•	
Technical Escort				•	
Work Clothes Preparation				•	
Installation Support					
Army Corps of Engineers					•
Community Activities					•

Table 3.7-1. Summary of Land Uses at DPG Activity Centers.

Land Use Category	Avery	Baker	Carr	Ditto	English Village
Counterintelligence					•
Environmental Programs					•
Equipment Maintenance			•	•	
Firefighting				•	•
Health Services				•	•
Information Management				•	•
Law Enforcement and Security Division					•
Metal Shop					•
Procurement					•
Retail Sales					•
Security Guards				•	
Supply Operations					•
Utilities	•	•	•	•	•

Avery Avery Technical Center
Baker Baker Area
Carr Carr Facility
Ditto Ditto Technical Center
EOD Explosive Ordnance Disposal
QASAS Quality Assurance Specialist Ammunition Surveillance

Military Maneuver Training – This land use category includes areas surrounding the Cedar Mountains and east of Carr. These areas are primarily used by the NG, AF, and Army Reserve units. The varying terrain provides realistic training conditions. These training areas are described in Section 2.1.4.3, Primary Outdoor Facilities.

Range/Impact Testing and Training – This land use category contains range/impact areas to support testing and training and training areas necessary to support training requirements associated with active Army personnel assigned to DPG. The areas also serve training needs from NG units, reserve component, and active duty component forces from all branches of the military. These range and impact areas are described in Section 2.1.4.3, Primary Outdoor Facilities.

Reserved Land or Buffer –This land use category includes two outlying areas at DPG. Both of these areas have been set aside for environmental considerations. The first area (eastern-most) contains active sand dunes; i.e., the dunes are in the formation stage. Some of the dunes are stabilized with vegetative growth, although most are still changing. The second area is a low-lying tract of land northwest of Baker that is subject to periodic flooding.

3.7.3.3 Other Land Uses at DPG

Besides the mission-related and support land uses, there are few other land uses at DPG. There has been limited hunting of big game (antelope and mule deer) on a small area of about 65 sq km (16,000 acres) on DPG. A decision is made each year to allow hunting based on the size of the game population. There is limited bird hunting allowed from September through January. Other recreation activities are very limited. Hunting, recreational vehicle use, and other public recreational activities occur on public lands managed by the BLM south, west, and north (Rowley Junction area) of DPG.

3.7.3.4 Potential Land Use Constraints

The following land use constraints could potentially limit land use at DPG:

- Environmental Noise Management Plan (ENMP), formerly the Installation Compatible Use Zones (ICUZ) program
- Natural Areas and Special Features Inventory of DPG
- Environmental/Safety Issues
- Cultural Resource Sites

Environmental Noise Management Plan – The Army has adopted a program called the ENMP in recognition that noise can be harmful to an individual's physiological and psychological health and can degrade the quality of life. ENMP is a study process analyzing noise generated by Army activities and the impact of this noise on the surrounding communities. In the ENMP process, present and future incompatible land uses on lands adjoining Army installations such as DPG are identified. The ENMP process is intended to be proactive in that it assesses current uses of land and land use patterns that could lead to conflict in the future. ENMP is further discussed in Section 3.11.1, Regulatory Overview, and has been incorporated into the land use and SDP processes at DPG.

Natural Areas and Special Features Inventory at DPG – An inventory of natural areas and special features on DPG land was conducted by the Nature Conservancy (1993). The inventory, based on biological and geophysical criteria, identified 17 special features and natural areas at DPG. Table 3.7-2, Rank of Inventoried Natural Areas and Special Features at DPG, lists the 17 identified features/areas and Figure 3.7-3, Locations of Natural Areas and Special Features at DPG, shows their locations. The most prominent or recurring themes of these 17 features/areas include:

- Undisturbed transverse sand dune fields
- Topographically defended mountain or butte areas
- A columnar andesite outcrop
- Salt desert shrub communities with no domestic livestock grazing for 50 years

The highest priority area is Granite Peak, which the study characterized as geologically unique and deserving of consideration as a National Natural Landmark. None of the 17 identified special features/natural areas has been significantly or irreparably damaged by DPG testing, artillery, training or maneuver activities. However, unauthorized or unsightly vehicle incursions and debris accumulations are occasionally evident. Nearly all areas and features occur between designated grids, impact areas, activity centers, facilities, and training areas. The location and land use status of each feature/area is summarized in the Nature Conservancy report on inventory results. Public access to any of the identified features/areas is not foreseeable under security restrictions at DPG.

While there has been no special designation for protection of these 17 features/areas at DPG, efforts have been made to include a strong conservation ethic in consideration of DPG activity locations. The Nature Conservancy inventory also supports the DOD's Legacy Program Legislative Purposes program, which provides for the stewardship of all DOD controlled or managed air, land, and water resources.

Table 3.7-2. Rank of Inventoried Natural Areas and Special Features at DPG.

Name	Importance Rank
Granite Peak	1st
East Dugway Dunefield	2nd
North Baker Sand Island	3rd
Southwest Gypsum Dunefield	4th
Devil's Postpile	5th
Dry Lake	6th
North Wig Mountain Dunefield	7th
East Cheriat Dunefield	8th
Wilson Hot Springs	9th
Old River Bed	10th
Cedar Mountains Crags	11th
Northeast Simpson Butte	12th
West Sapphire Mountain	13th
November Road Dune	14th
Southcentral Gray Molly	15th
Land Condition Trend Analysis Winterfat	16th
Between the Springs Hill	17th

SOURCE: Nature Conservancy, 1993

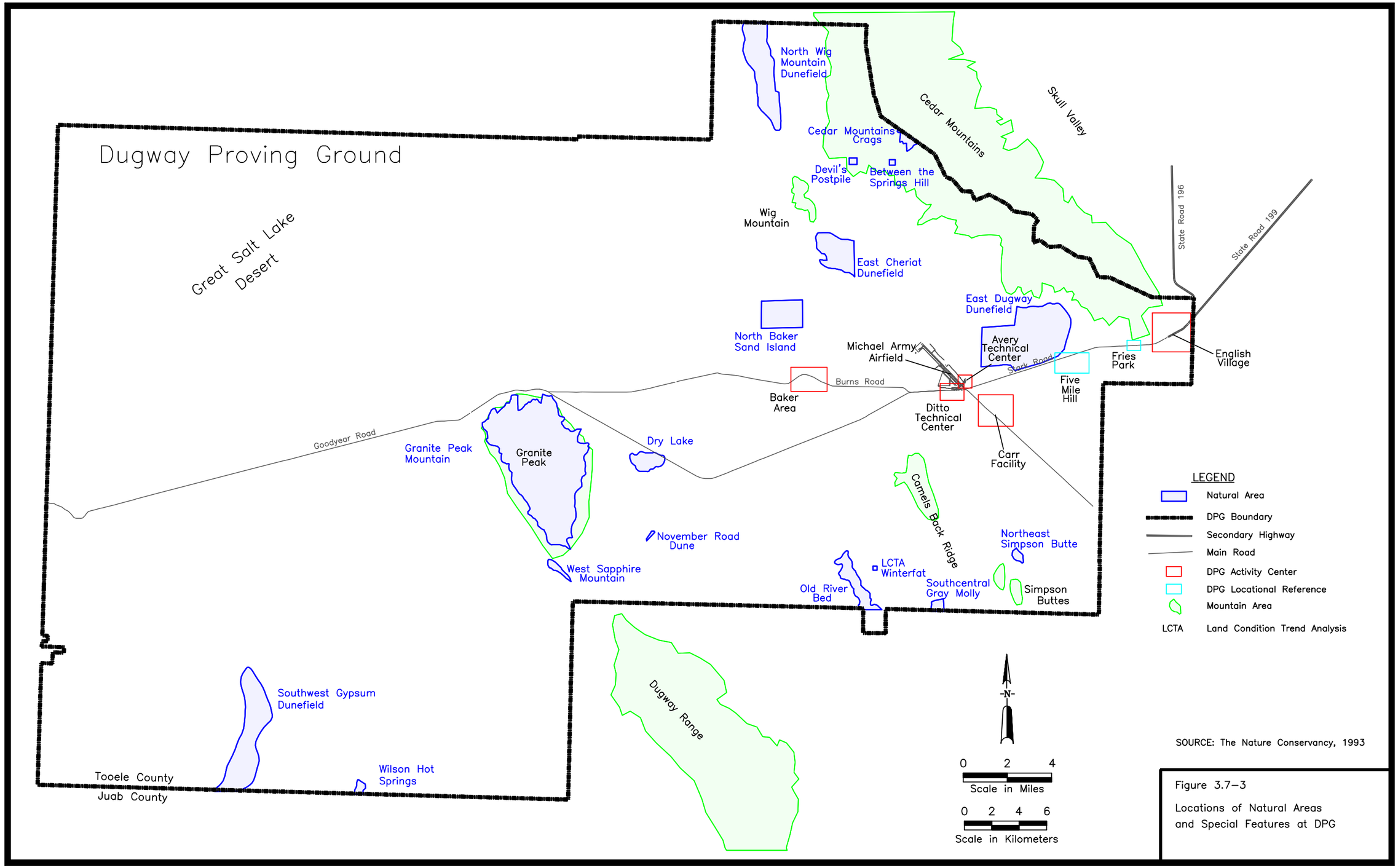

Figure 3.7–3

Locations of Natural Areas and Special Features at DPG

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Environmental/Safety Issues – Past activities at DPG have resulted in environmentally contaminated sites and locations at the installation that may contain UXO. DPG programs to identify and restore these sites are extensive and are described in Section 3.13.5, DPG Restoration Wastes. Section 3.1.4.2, Soil Contamination Investigations, identifies the DPG locations which are potentially contaminated sites or that may potentially contain UXO. Locations with potentially contaminated groundwater and ongoing groundwater contamination investigations are discussed in Section 3.2.3.4, Groundwater Quality.

Cultural Resource Sites – Various areas within DPG are known to contain or may contain cultural resources. Use of these areas for DPG activities could be constrained or delayed until any cultural resource management issues are resolved through appropriate cultural resource management surveys, and/or mitigation of known cultural resources. Cultural resources are described in Section 3.8, Cultural Resources.

3.7.4 Access to DPG Facilities

Access to DPG is granted only to those individuals with an established need to enter the installation.

A car pass or a visitor's pass, issued by the DPG Law Enforcement and Security Division is required for access to DPG. Visitors representing foreign governments or businesses are escorted by DPG personnel during their visits. There are special location and facility restrictions for certain representatives of foreign governments under terms of the Intermediate Range Nuclear Forces Treaty.

Entrance to DPG is controlled at the entrance gate located east of English Village on State Road 199.

The DPG entrance gate is manned by DPG security personnel 24 hours a day, 7 days a week. A fence follows most of the boundary that is not on the Great Salt Lake Desert, and the remainder of the boundary is posted with warning signs positioned approximately every 183 m (600 ft). The entire peripheral area of DPG is checked regularly by ground patrols.

Within DPG, movement in the areas immediately surrounding English Village is uncontrolled, however the area is patrolled by a police force. Just west of the uncontrolled area, however, is the Special Authorization Area, where intermittent activities such as the rifle/pistol range practice and the NG training require clearance from Range Control. Permission to enter this area is obtained from security personnel in English Village who check with Range Control. Range Control responsibilities are summarized in Section 2.1.8, Baseline Mission Support Activities. Individuals entering this area must also notify security when they have left the area. Just west of the Special Authorization Area are the security areas, which include Ditto, Carr, White Sage Flats, and the West Area, where most of the field tests are conducted. There are additional security measures in place at Baker, the CCTF at Ditto, the Tower Grid Holding Area, and the East Igloo Storage Area at Carr. Information about these areas is provided in Section 2.1.4, Activity Centers and Facilities.

Access within DPG is also restricted at locations where UXO may be present or where soils may be contaminated as a result of historic activities. Information about these locations is provided in Section 3.1.4.2, Soil Contamination Investigations. Access is restricted in the White Sage and Wig Mountain Impact Areas and requires an Army escort due to the presence of UXO. UXO are also known to be present within Downwind Grid in an area west of Centerline Road and south of Juliet Road. This area has been fenced to restrict access. Access to SWMUs and HWMUs located east of Five Mile Hill is controlled by DPG's main gate. Each SWMU and HWMU location east of Five Mile Hill, and each SWMU and HWMU covered by a consent order between DPG and the state of Utah is clearly identified and has posted warning signs stating no access is authorized. Access to SWMUs and HWMUs located west of Five Mile Hill is controlled by Range Control. The DPG west area is patrolled 24 hours a day, 7 days a week by armed security guards. Areas adjacent to the SWMUs and HWMUs are patrolled more than once a day. Some areas are fenced for general safety purposes in addition to restricting access, while other areas have a sign restricting entry.

3.8 Cultural Resources

The term "cultural resource" refers to any prehistoric or historic building, site, structure, object, and/or environmental context that has cultural, historical, or spiritual significance. The legal definition of a cultural resource depends on the law or regulation in which it is used.

Cultural resources are historic properties as defined by the National Historic Preservation Act (NHPA), cultural items as defined by the Native American Graves Protection and Repatriation Act (NAGPRA), archaeological resources as defined by the Archaeological Resources Protection Act (ARPA), sacred sites as defined by EO 13007, and collections as defined in 36 CFR 79, Curation of Federally-Owned and Administered Collections. A number and variety of cultural resources have been identified at DPG. Cultural resources at DPG include both prehistoric and historic isolated finds, such as pieces of broken pottery and stone artifacts. Numerous cultural resource sites, which are defined as clusters of three or more separate objects that occur in close association, have also been identified at DPG. Paleontological resources (fossils) that pre-date known human occupation at DPG have been found and are discussed in this section.

Some isolated finds from DPG are discussed in this section; however, most of these finds offer little information on past events and human experiences. Therefore, the following discussions also include archaeological site data from neighboring DPG areas. Based on site context and the types of finds, prehistoric resources are differentiated from historic resources in this discussion. The discussion of cultural resources at DPG is organized into the following sections:

- Regulatory Overview
- Cultural Resources Management at DPG
- Paleontologic Resources
- Prehistoric Resources
- Historic Resources
- Military Historic Resources
- Native American Sacred Sites
- Summary of Cultural Resources Surveys and Findings at DPG

3.8.1 Regulatory Overview

Existing laws and regulations play a major role in determining how and when cultural resources are identified and evaluated. Laws and regulations which are applicable to cultural resources management at DPG include:

- NEPA
- NHPA of 1966
- Antiquities Act of 1906
- ARPA of 1979
- American Indian Religious Freedom Act (AIRFA) of 1978
- NAGPRA of 1990
- EO 13007
- AR 200-4

NEPA and associated CEQ regulations implementing NEPA establish a Federal policy of preserving the natural, historical, and cultural aspects of our national heritage. Federal agencies are required to consider cultural resources when they plan a proposed action. In this context, the supporting cornerstone is the NHPA. The NHPA establishes historic preservation as a national policy and defines it as the protection, rehabilitation, restoration, and reconstruction of historic properties. The NHPA defines historic properties as districts, sites, buildings, structures, or objects included in, eligible, or potentially eligible for inclusion in the National Register for Historic Places (NRHP) and incorporates artifacts, records, and remains related to these properties.

Section 106 of the NHPA mandates that prior to any Federal undertaking, the Federal agency shall take into account the effect of the undertaking on any historic property which is listed on or eligible for the NRHP. An undertaking is defined as any project, activity, or program that can result in changes in the character or use of historic properties as defined by the NHPA. Furthermore, Section 106 mandates protection of historic properties that have not yet been discovered, as in the instance of buried archaeological deposits. Section 106 also requires the Federal Advisory Council on Historic Preservation (ACHP) to have an opportunity to comment on the undertaking if it will cause an effect on a historic property.

Regulations in “Protection of Historic Properties” (36 CFR Part 800), define the key regulatory requirements relative to preserving cultural resources and complying with Section 106. These regulations outline a series of steps called the “Section 106 process” for consulting with the State Historic Preservation Officer (SHPO), ACHP, and other interested parties to ensure that historic properties are duly considered when Federal projects are planned and implemented.

The Section 106 process consists of the following steps:

1. Identify and evaluate historic properties.

2. Assess the effects of the undertaking on historic properties that are eligible for or are listed in the NRHP.

3. Consult with the SHPO and other interested parties to determine ways to avoid or reduce any adverse effects.

4. Provide the ACHP a reasonable opportunity to comment on the undertaking and its effects on historic properties.

5. Proceed with the undertaking under the terms of a Memorandum of Agreement or in consideration of any ACHP comments.

From the perspective of the NHPA, the term "historic properties" is used to refer specifically to cultural resources that are eligible for listing on the NRHP. To be eligible for inclusion in the NRHP, properties must be important in American history, architecture, archaeology, engineering, or culture. They must also possess integrity of location, design, setting, materials, workmanship, feeling and association, and must meet at least one of the following four criteria:

- Be associated with events that have made a significant contribution to the broad patterns of our history

- Be associated with the lives of persons significant in our past

- Embody the distinctive characteristics of a type, period, or method of construction; or represent the work of a master; possess high artistic values; represent a significant distinguishable entity whose components may lack individual distinction

- Have yielded, or be likely to yield, information important in prehistory or history

Archaeological sites, as opposed to standing structures, are generally eligible under the last criterion when valuable data can be recovered. In general, historic features are much more likely to be eligible under the first three criteria. National Register Bulletin #15, *How to Apply the National Register Criteria for Evaluation*, provides these eligibility requirements as well as guidelines for evaluating properties. DPG follows Bulletin #15, as outlined in Standard Operating Procedure #2 of the ICRMP (DPG, 2001).

Section 110 of NHPA mandates that Federal agencies must establish a stewardship and preservation program for the identification, evaluation, and nomination of historic properties to the NRHP. Furthermore, Section 110 mandates that Federal agencies must minimize harm to National Historic Landmarks, and must use, to the

maximum extent feasible, historic properties available to the agency. National Historic Landmarks are buildings, historic districts, structures, sites, and objects that possess exceptional value in commemorating or illustrating the history of the U.S.

According to AR 200-4, the Army supports its cultural resources management program by allocating financial and personnel resources for the identification, evaluation, and management of historic properties. Because properties that are listed on the NRHP are managed in the same way as those that are NRHP-eligible, the Army does not seek to formally nominate historic properties to the NRHP. The nomination process would divert limited financial and personnel resources away from other cultural resources management activities. The Army does formally nominate properties that it intends to interpret, commemorate, or otherwise manage as sites of popular interest that are normally open to the general public.

The Antiquities Act protects ruins, monuments, or objects of antiquity on Federal lands, including paleontological remains, from being damaged or destroyed. Scientific excavations and investigations on Federal lands are authorized and subject to permits and other regulatory requirements.

ARPA is applied to all Federal lands and Native American lands. It allows for confidentiality of information on archaeological site locations and imposes criminal and civil penalties for unpermitted activities that excavate, remove, alter, damage or deface archaeological resources.

Two additional laws and one EO focus specifically on Native American cultural resources. AIRFA protects and preserves the right of Native Americans to believe, express, and exercise their traditional religions. It provides for access to sites on Federal lands for ceremonial uses and requires avoidance of adverse impacts to such sacred sites. NAGPRA establishes a process for the protection and disposition of Native American cultural items found on Federal or tribal lands through intentional excavation or inadvertent discovery. This law also seeks to place ownership or control of such items in the appropriate Indian tribe and imposes specific requirements on how to resolve competing claims (Hutt et al., 1999). EO 13007 provides direction to Federal agencies regarding Native American sacred sites. Federal agencies are “within constraints of their missions” required to accommodate Native American tribes’ requirements for access to and ceremonial use of sacred sites on public lands, and avoid damaging the physical integrity of such sites.

AR 200-4 states the Army’s policy concerning the management of cultural resources to meet legal compliance requirements and support the military mission. Requirements established in NEPA, NHPA, ARPA, NAGPRA, AIRFA, 36 CFR 79

(Curation of Federally-Owned and Administered Collections), EO 13007, and the Presidential Memorandum on Government to Government Relations with Native American Tribal Governments define the basis of the Army's compliance responsibilities for management of cultural resources.

A summary of laws, EOs, and regulations pertaining to the treatment and management of cultural resources is presented in Appendix A, List of Laws, Permits, and Management Plans.

3.8.2 Cultural Resources Management at DPG

The Cultural Resource Management Officer (CRMO), located in the office of Environmental Programs - Conservation and Preservation Division, is responsible for overseeing the cultural resources management program at DPG. The CRMO serves as the coordinating point of review for all projects and missions that may have an impact on cultural and paleontological resources. In addition to consulting with the SHPO and ACHP through the Section 106 process, the CRMO also communicates with Native Americans on cultural resource issues. The CRMO further assists DPG missions by recommending ways in which proposed activities can be modified so that they would have no impacts on cultural resources. When a determination of no impact is impossible, then the CRMO seeks ways to mitigate any adverse impacts caused by the proposed activity (DPG, 2001).

DPG has prepared an Integrated Cultural Resources Management Plan (ICRMP), which is a stipulation of AR 200-4, that presents DPG's philosophy on how cultural resources should be recorded and managed at the installation (DPG, 2001). The CRMO works closely with other DPG groups and tenants to ensure that the requirements of the ICRMP are met. To aid in this process, standard operating procedures were created to provide a clear understanding of the ICRMP priorities and requirements. Section 2.1.3.3, Management Plans, discusses the ICRMP.

3.8.3 Paleontologic Resources

Brachiopods, bryozoans, horn corals, and crinoids are among the types of fossils that have been found at DPG. However, the paleontologic resources at DPG have not been officially recorded or assessed for their significance (Callister, 1999). The existence of significant paleontologic resources at DPG is likely high, particularly at Little Davis Mountain, Simpson Buttes, Camels Back Ridge, Cedar Mountains, Wig Mountain, and in various Quaternary deposits across the installation. Based on the geologic formations that are located at DPG, the following types of fossils may possibly be found in this area (DPG, 2001):

- Quaternary Deposits – Gastropod (snail), ostracode, pelecypod (clam), plant, trace, and vertebrate fossils
- Permian and Pennsylvanian Deposits – Brachiopods, bryozoans, coral, crinoid, cystoid, fusilinid, gastropod, graptolite, pelecypod, porifera (sponge), shark teeth, trace, and trilobite fossils
- Upper Mississippian Deposits – Ammonoid, brachiopod, bryozoan, conodont, coral, crinoid, cystoid, gastropod, nautiloid, ostracode, pelecypod, plant, porifera, protozoa, scaphopod, trace, and trilobite fossils
- Lower Mississippian and Upper Devonian Deposits – Algae, ammonoid, brachiopod, bryozoan, conodont, coral, crinoid, cystoid, gastropod, nautiloid, ostracode, pelecypod, protozoa, scaphopod, trace, and trilobite fossils
- Devonian Sediments – Ammonoid, brachiopod, coral, crinoid, cystoid, echinoid, gastropod, graptolite, nautiloid, ostracode, pelecypod, plant, porifera, and shark fossils
- Silurian Deposits – Brachiopod, coral, crinoid, cystoid, plant, porifera, track, and trace fossils
- Ordovician Deposits – Ammonoid, brachiopod, bryozoan, conodont, coral, crinoid, cystoid, gastropod, graptolite, nautiloid, ostracode, pelecypod, plant, porifera, scaphopod, starfish, trace, trilobite, and worm fossils
- Cambrian Deposits – Brachiopod, coral, mollusc, porifera, trace, track, trilobites, and worm fossils

3.8.4 Prehistoric Resources

Prehistoric sites at DPG and across most of the region are largely represented by:

- Open scatters of flaked stone tools
- Tool manufacturing debris (flakes)
- Stone grinding implements

These cultural resources were left by humans who have occupied the region throughout the past 11,000 years. Other prehistoric resources in the region include habitation sites containing fire hearths and remnants of structures, and stratified caves and rock shelters containing large and diverse assemblages of artifacts.

Approximately 90 percent of the cultural resources identified at DPG are prehistoric (Callister, 2000b).

Since prehistoric habitation of the region spans some 11,000 years, the description of the prehistoric period is divided into four periods:

- Paleoarchaic
- Archaic
- Fremont
- Late Prehistoric

These periods are correlated with regional climatic shifts and are not considered to represent a specific culture or adaptation. Descriptions of each period incorporate information from archaeological work conducted at DPG and from previous regional surveys. Information in each period description includes:

- Time range of each period
- Brief discussions of regional prehistoric activities, including variability in human subsistence and settlement
- Evidence of period-specific human occupation at DPG

3.8.4.1 Paleoarchaic Period

The Paleoarchaic Period spans approximately 3,000 years, from about 11,000 to 8,000 years Before Present (BP). This period marks the onset of human occupation in the Great Basin at about 11,500 BP. It is probable that many groups practiced high residential and territorial mobility in response to varying plant and animal abundance. However, most land use and residential sites centered on lake, marsh, and riverine environments in valley lowlands (DPG, 2001).

Food acquisition and processing tools from the Paleoarchaic Period include flaked stone projectile points, crescents, atlatls, digging sticks, and other stone implements. Human subsistence involved the hunting of large game such as pronghorn and deer, small mammals such as rabbits and hares, and waterfowl. However, a large portion of human diet came from plant resources.

Paleoarchaic Period sites/components that have been identified provide evidence of early human occupation at DPG. Paleoarchaic Period artifacts in the DPG region characteristically occur in low elevation settings, especially shorelines and/or dune features associated with ancient lake-edge environments. Stemmed projectile points

have been reported in dunes and another type of point was found on the clay bed of old Lake Bonneville. Artifacts from this period have also been found in ancient riverine environments such as the Old River Bed Delta.

3.8.4.2 Archaic Period

The Archaic Period spans over 5,000 years, from 8,000 to 2,400 BP. This period encompasses a number of regional climatic shifts and both subtle and pronounced changes in human population size and adaptation. Hunter-gatherers became more mobile during this period, and pursued a variety of resources in regional mountains, mountain foothills, and valley bottoms. Netting was introduced during the Archaic Period, and was used to capture a wide variety of vertebrates, including small- and medium-sized mammals, fish, and birds (DPG, 2001). Trapping devices such as snares were also introduced during the Archaic Period and were used to acquire small game.

The most significant Archaic Period resource is at Camels Back Cave where excavations discovered nine cultural layers that span the period (DPG, 2001). These layers contain milling stones, stone and bone artifacts, animal remains and fire pits, and offer unique information on prehistoric human life and adaptations.

3.8.4.3 Fremont Period

The Fremont Period spans over 1,500 years, from 2,400 to 550 BP. During this period humans exhibited high variability in behavior and adaptations. This period is largely defined by farming, but people did many different things in many different places. Two new tools emerged during this period: the bow and arrow which was used to hunt game, and ceramic pottery that functioned in both resource acquisition and processing tasks. Human subsistence patterns included an abundant and diverse array of plant foods and large and small game. Because farming was heavily utilized during this period, domesticated plant foods such as beans, squash, and corn were an important part of the diet.

Sites containing materials characteristic of the Fremont Period have been discovered in the vast dune fields flanking the southwest and northwest base of Wig Mountain. Camels Back Cave also contains evidence of Fremont Period occupations (DPG, 2001).

3.8.4.4 Late Prehistoric Period

During the Late Prehistoric Period, 550 to 0 BP, humans stopped farming and returned to foraging. It is probable that most groups practiced low residential

mobility and focused on resources associated with regional lakes and marshes, but the number and distribution of sites strongly suggests that some Late Prehistoric peoples were highly nomadic and extensive forays were common (DPG, 2001e).

The Late Prehistoric Period saw changes in projectile point morphology and basketry, as well as the introduction of the seed beater. Seed beaters, which were important components of the Late Prehistoric seed harvesting toolkit, were paddle-shaped implements with short handles extending out from ovate, slightly concave platters. In addition to these changes, the manufacture and use of pottery also continued through this period. Human subsistence no longer included domesticated plant foods, but still relied on a variety of wild plant resources and large and small game. Late Prehistoric Period sites have been identified at DPG, and are diverse and widespread across the area.

3.8.5 Historic Resources

Historic resources are defined as sites, structures, and artifacts identified as Euro-American in origin. Most historic resources in the Great Basin date to the past 100 years, including all of the sites and materials identified at DPG. Nonmilitary historic sites identified on DPG lands include structures, camps, and trash scatters (DPG, 2001).

One important historic site at DPG which is also listed on the NRHP is the Lincoln Highway Bridge. This bridge was constructed over Government Creek on the northern edge of what is now Ditto.

Approximately 5 percent of the cultural resources identified at DPG are historic (Callister, 2000b).

The historic era begins with the arrival of Euro-Americans in the area and is divided into the three periods described in the following sections:

- Early Exploration – marks initial expeditions into the area by Euro-American explorers, the arrival of Euro-American settlers, and the use of the area as a passage west
- Early Transcontinental Travel and Transport – includes changes in mail delivery, communications, and travel
- Settlement and Expansion in the DPG Area – includes continued settlement of the area and increased access to national economic markets with the opening of the transcontinental railroad and introduction of the automobile

3.8.5.1 Early Exploration

Dating from 1826 to 1859, the Early Exploration period marks the arrival of Euro-American explorers into the DPG area. The earliest historic exploration into what is now Utah was undertaken in 1776 by the Domingues-Escalante expedition. The party lacked the equipment necessary to cross the rugged landscape and the expedition was abandoned approximately 97 km (60 mi) southeast of DPG. In 1826, Euro-American fur trappers entered the Great Basin traveling west from the Rocky Mountains. Jedediah S. Smith and his party traveled through the territory now occupied by DPG, becoming the first recorded European crossing of the area (DPG, 2001).

This period also marks the arrival of Euro-American settlers in Utah, notably the arrival of Mormon pioneers in 1847. Fleeing religious persecution in Missouri and Ohio, Mormon pioneers found the isolation of the Salt Lake Valley ideal for their purposes, but this isolation did not last long. A number of communities were established shortly after the Mormons arrived in Utah, including Tooele in 1849. Historic sites dating to the Early Exploration period are very rare in the region and none have been identified at DPG.

The name “Dugway” came from the nearby Dugway Mountains; so named by the early pioneers, when prairie schooners and Conestoga wagons were used to transport personnel and effects across the country. The absence of roads and passes through the mountains forced the trailblazers to dig a serpentine trench just wide enough for the wheels to enter on the up-hill side of the wagon. The oxen were hitched at an angle on the upgrade side of the wagon to pull the wagon in its narrow “dug way.”

3.8.5.2 Early Transcontinental Travel and Transport

The Early Transcontinental Travel and Transport period dates from 1859 to 1869 and includes changes in travel and communications. From 1860 to 1861, the famous Missouri-to-California route of the Pony Express was in operation and passed immediately south of DPG. Some 190 stations were established along the route, including the recently rebuilt Simpson Springs station located about 10 km (6 mi) southeast of DPG. After only 19 months of operation, the Pony Express service was terminated. Factors contributing to the demise of the Pony Express included the costs of operating the service, the high risks involved, the difficulties in finding willing and suitable riders, and the completion of the transcontinental telegraph connecting the east and west coasts (DPG, 2001).

In 1861, after the Pony Express service was terminated, the U.S. Government contracted the route to the Overland Mail Company. The route then became known as the Central Overland Route. None of the Central Overland Route stations were

located within the present boundaries of DPG, although several stations including Simpson Springs were established directly to the south. Long after its abandonment in 1869, Simpson Springs was used by the Army as temporary DPG headquarters during the original construction of the installation. Except for structures and materials associated with the Pony Express, Early Transcontinental Travel and Transport period sites are generally rare in the region and none have been identified at DPG.

3.8.5.3 Settlement and Expansion in the DPG Area

This period dates from 1869 to 1942, and as its name suggests, it marks a significant increase in Euro-American settlement and use of lands across the DPG region and western Utah. This period also saw continued changes and improvements in travel. One of the most consequential developments was the opening of the Transcontinental Railroad in 1869. The railroad brought in large numbers of people, including an increasing number of non-Mormons, and linked local communities to national markets. This subsequently increased the profitability of a variety of local industries. For example, the railroad made large-scale mining a commercially feasible enterprise, as evidenced by the immediate formation of mining districts in the Ophir and Tintic Mountains. At DPG, the Dugway Mining District was established in the early 1870s and promoted prospecting in the Dugway Mountains and at Granite Peak. The discovery of silver deposits at the northern end of the Dugway Mountains prompted the construction of a smelter in 1876, which remained in operation for 2 to 3 years. A turn-of-the-century mine and associated stone structures have been identified on Granite Peak and provide evidence for the perseverance of small-scale prospecting at DPG (DPG, 2001).

By extending access to national livestock markets, the railroad also increased the profitability of local livestock operations. While Rush and Tooele Valleys provided forage for raising livestock, the DPG area did not provide sufficient water for cultivation and no livestock operations were established. However, as expansion forced ranchers into marginal areas of the Great Salt Lake Desert, the upper elevations of the DPG area were found to offer suitable winter habitats and forage for domestic stock, especially sheep.

The most significant technological development of the period was the advent of the motor car. With the automobile came the need to expand and improve the national roads and to construct a paved coast-to-coast highway. A New York-to-San Francisco route was organized by the Lincoln Highway Association in 1912 and, upon its completion in 1919, was the first transcontinental highway constructed in the

U.S. Within what is now DPG, the Lincoln Highway Bridge was a part of this highway and is now listed on the NRHP (DPG, 2001).

The Lincoln Highway Bridge located at DPG is an historical resource.

3.8.6 Military Historic Resources

DPG was established in 1942 during World War II as a proving ground for chemical weapons. An overview of the history of DPG is provided in Section 1.4, DPG History.

An evaluation of DPG historic cultural resources identified military-sites that meet eligibility criteria for NRHP listing (AGEISS, 1998c). This evaluation focused on historic standing structures and did not include archaeological sites. The project included the following elements:

- Search of literature and records
- Review of existing Army historic resources
- Writing a summary of DPG historic activities
- Field inventory of properties at DPG

Military-related buildings and structures at DPG that were found to be potentially eligible for the NRHP include World War II facilities, including German Village, and Cold War facilities. Property types include test and evaluation facilities, control and instrumentation buildings, a training grid, World War II operational support facilities, and research and development laboratories (AGEISS, 1998c). Figure 3.8-1, Locations of Historical Cultural Resources Potentially Eligible for NRHP Listing, shows the locations of military-related properties on DPG that were found to meet NRHP eligibility criteria.

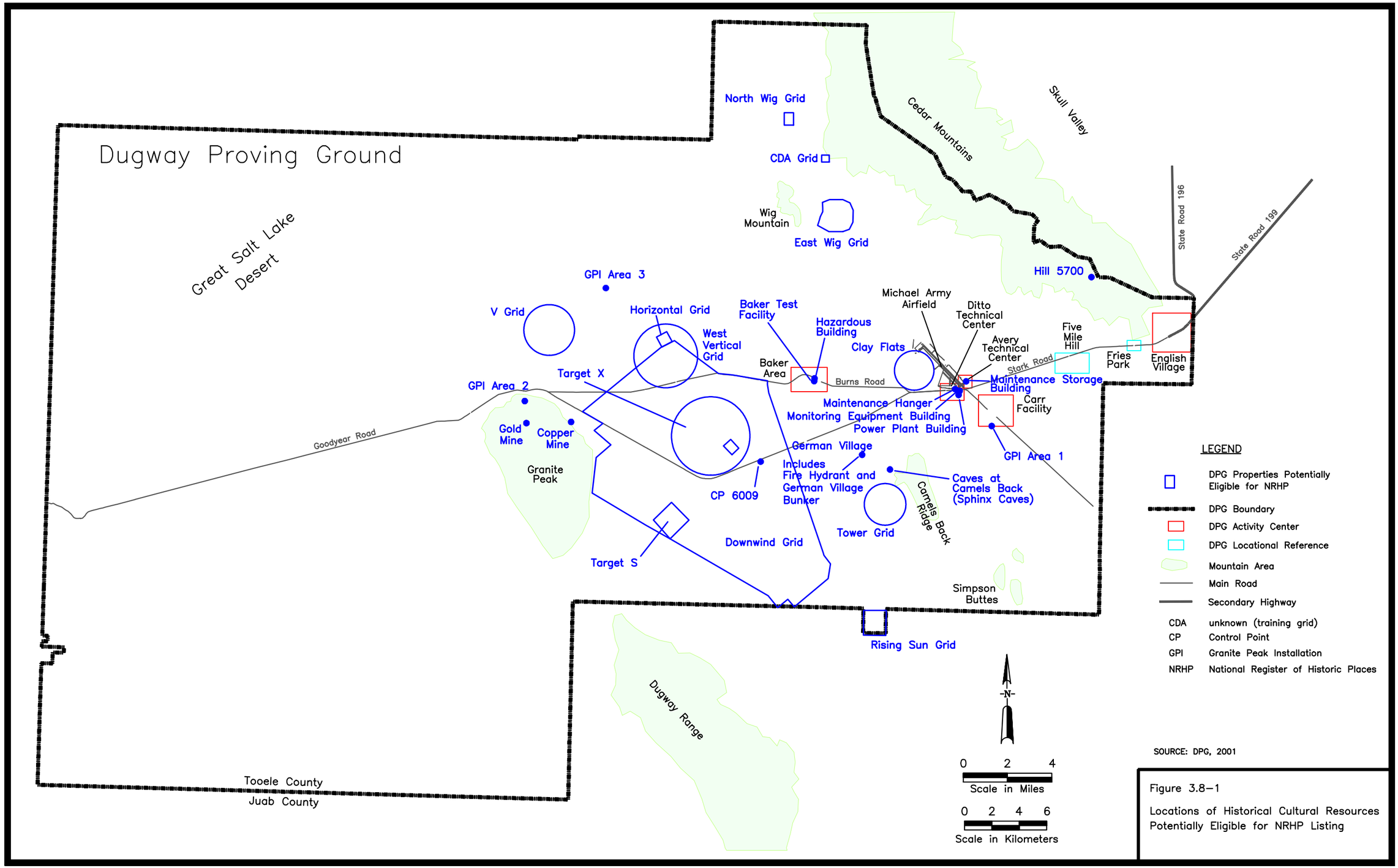

Figure 3.8–1

Locations of Historical Cultural Resources Potentially Eligible for NRHP Listing

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3.8.7 Native American Sacred Sites

The land within DPG boundaries was used by Native Americans for thousands of years prior to the arrival of Euro-American explorers and settlers. Ethnographic and historic accounts indicate that the area was used for traditional purposes until very recently by the Goshute and possibly other tribes. Unfortunately, DPG presently has little information regarding traditional use areas and sacred sites. To ensure compliance with EO 13007 and other laws applicable to Native American cultural resources, the CRMO maintains relationships with local Native American tribes and attempts to identify sacred sites. The following is a list of Federally-recognized Native American tribes that have ancestral ties to the lands encompassed by DPG (DPG, 2001):

- Confederated Tribes of the Goshute Reservation
- Constituent Bands of the Te-Moak of the Western Shoshone Indians of Nevada
- Battle Mountain Band Council
- Elko Band Council
- South Fork Band Council
- Wells Indian Colony Band Council
- Duckwater Shoshone Tribe
- Ely Shoshone Tribe
- Northwestern Band of the Shoshone of Utah
- Shoshone Tribe of the Wind River Reservation
- Shoshone-Bannock Tribes of Fort Hall Reservation
- Shoshone-Paiute Tribes of Duck Valley Reservation
- Skull Valley Band of Goshute Indians of Utah
- Ute Indians of the Uintah and Ouray Reservation
- Ute Mountain Reservation

3.8.8 Summary of Cultural Resources Surveys and Findings at DPG

As of January 2000, cultural resource surveys at DPG had examined 85 sq km (21,000 acres), representing about 2.6 percent of DPG lands (Callister, 2000a). Figure 3.8-2, Areas with Probability to Contain Cultural Resources, presents the location of areas where cultural resources are likely to exist at DPG and the lands that have been surveyed through January 2000. Because cultural resource data acquisition and cultural resource surveys are ongoing at DPG, the number of identified cultural sites is always increasing. Therefore, percentages are used to describe the sites found.

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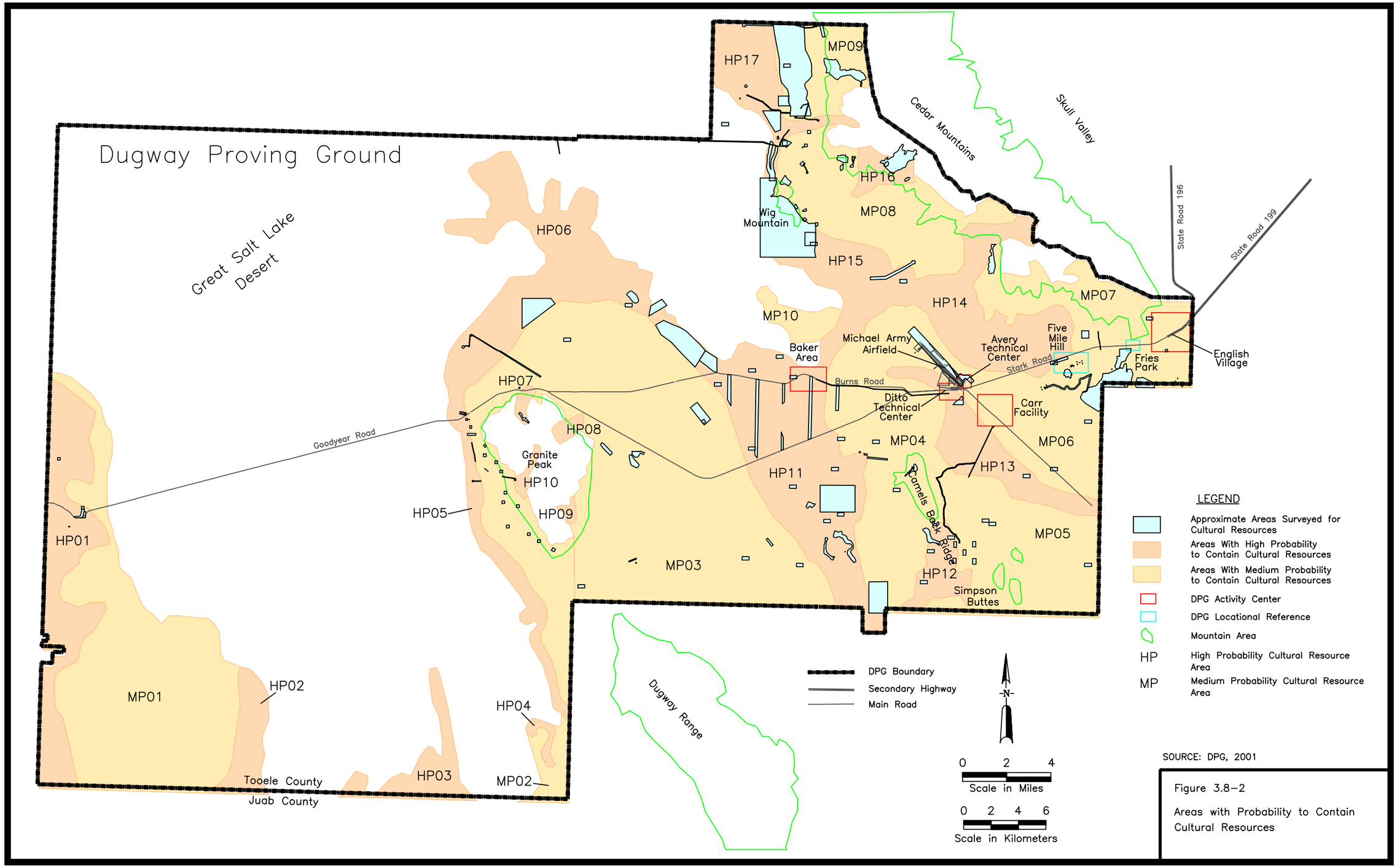

SOURCE: DPG, 2001

Figure 3.8–2

Areas with Probability to Contain Cultural Resources

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The archaeological sites that have been identified and documented at DPG are represented as follows:

- **34 percent are of NRHP quality**
- **3 percent are NRHP eligible with SHPO concurrence**
- **8 percent are not NRHP eligible with SHPO concurrence**
- **35 percent are nonsignificant archaeological sites**
- **19 percent are undetermined**
- **1 percent are listed on the NRHP**

As of 2000, over 50 percent of the cultural resource sites identified at DPG do not have SHPO concurrence regarding their NRHP eligibility. However, DPG's CRMO is working with the SHPO to receive comments on these sites.

A July 1998 study identified military and non-military historic DPG properties which meet eligibility criteria for the NRHP (AGEISS, 1998c). The locations of these sites are shown in Figure 3.8-1, Locations of Historical Cultural Resources Potentially Eligible for NRHP Listing. Areas at DPG where cultural resources have been identified are shown in Figure 3.8-2, Areas with Probability to Contain Cultural Resources. Additional information on cultural resource inventories and evaluations is presented in Appendix J, Cultural Resources Project List at DPG.

3.9 Traffic and Transportation

This section describes the traffic transportation network serving DPG and the surrounding region. The description is based on existing facilities and existing use and conditions of the following traffic and transportation facilities and activities:

- Regulatory Overview
- Roadways
- Airports and Airspace
- Railroads
- Transportation of Materials and Wastes

Key components of the network are shown on Figure 3.9-1, DPG Regional Highway and Road Network.

3.9.1 Regulatory Overview

Army regulations have established policy, procedures, and responsibilities for laws and regulations applicable to traffic and transportation that apply specifically to DPG and are relevant to this Future Programs EIS. Applicable ARs include AR 95-1, Army Aviation: Flight Regulations; AR 55-355, Defense Traffic Management

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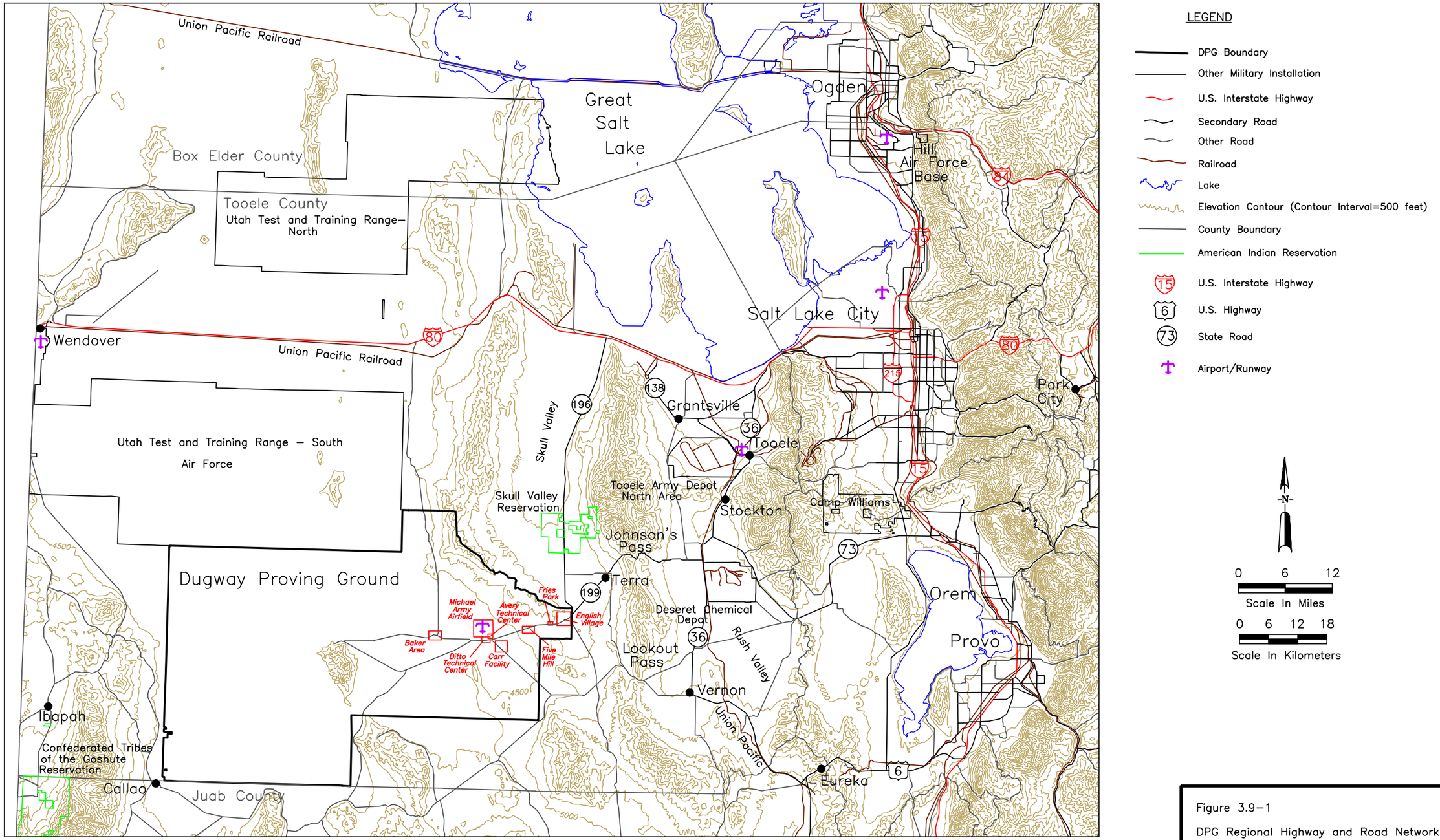

Figure 3.9–1

DPG Regional Highway and Road Network

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Regulation; AR 700-143, Performance Oriented Packing of Hazardous Materials; AR 385-55, Prevention of Motor Vehicle Accidents; AR 95-27, Operational Procedures for Aircraft Carrying Hazardous Materials; and AR 740-32, Responsibilities for Technical Escort of Dangerous Materials. References for each AR include the applicable laws and regulations.

3.9.2 Roadways

DPG's mission requires a network of roads to provide access to the installation and among the activity centers, test ranges, and other locations within DPG. This roadway network, as well as the degree of public access control over the network, is described in the following sections:

- DPG Roadways
- Regional Roadways

3.9.2.1 DPG Roadways

The primary access to DPG is via Utah SR 199, with the main entry gate and security checkpoint located on DPG's eastern boundary. All vehicles and occupants entering DPG are subject to inspections, prior to being allowed entry. Other gates along DPG's perimeter can provide secondary access to remote locations and testing grids. These gates are locked, requiring that access be gained from DPG's Law Enforcement and Security Division.

The main road within DPG's boundaries is known as Stark Road. It is a paved two-lane road that serves as the central arterial road for DPG. From the main gate, it proceeds generally to the west, linking English Village, Ditto, and areas in the western portion of DPG. A network of paved roads, providing access to other activity centers and serving the local circulation needs within those centers, connects to Stark Road at various locations. A total of 209 km (130 mi) of paved roadways are located within DPG. These roads are maintained according to use and as funding permits.

In addition to the paved roadway network, there are approximately 193 km (120 mi) of secondary roads on DPG. Secondary roads are graded, but unpaved. These roads provide access to many test ranges and are used by active and reserve military units during training activities conducted at DPG. Periodic maintenance is provided, depending on use, condition and funding availability.

The DPG road network also includes unpaved trails open to motor vehicle travel. Historically many of these trails were established as a result of informal, but repeated

travel between existing roads and other destinations, some of which occurred as part of training and testing activities.

3.9.2.2 Regional Roadways

Regional roadway access is vital to DPG's mission because of the installation's remote location, its dependency on the surrounding region for support services, and the large percentage of its work force that resides off-installation and commutes to DPG. Trucks are used to transport virtually all supplies, equipment, and materials destined for DPG.

The off-installation roadway network accessing DPG consists of several secondary routes and four principal links. The four principal links are three state roads, SR 199, SR 196, and SR 36, and I-80 as shown on Figure 3.9-1, DPG Regional Highway and Road Network. Comparative traffic levels at several points on SR 199 and on the other primary highway links serving DPG are presented in Table 3.9-1, Annual Average Daily Traffic on Regional Roads. Traffic volumes on this route have remained relatively constant in recent years, despite the decrease in activity and employment levels at DPG. This pattern reflects the comparatively larger decline in the number of households residing at English Village in conjunction with the cutbacks than the number living off-installation.

Table 3.9-1. Annual Average Daily Traffic on Regional Roads.

Highway	Number of Vehicles				Change 1993-1999
	1993	1995	1997	1999	
State Road 196					
North of State Road 199	275	325	235	255	-20
State Road 199					
East of State Road 196	700	675	725	775	+75
West of State Road 36	1,305	1,355	1,460	1,205	-100
Interstate 80					
Rowley Junction/Skull Valley	7,770	8,760	8,495	9,000	+1,230
Tooele Interchange	24,415	25,335	28,316	31,600	+7,185

SOURCES: UDOT, Undated-a; UDOT, Undated-b; UDOT, Undated-c

The two state roads, SR 199 and SR 196, intersect just east of DPG's main entry gate. Both are two-lane asphalt roads maintained by the Utah Department of Transportation. SR 199 proceeds northeast across Skull Valley to the unincorporated community of Terra, UT. Continuing on, it becomes a narrow and winding road over Johnson Pass at an elevation of 1,901 m (6,237 ft). East of Johnson Pass, SR 199 descends into the Rush Valley where it intersects with SR 36 near the Deseret Chemical Depot's western boundary. This is the primary commuting route for the

many DPG employees living in Tooele County, UT and communities along the Wasatch Front. From the intersection of SR 199 and SR 36, the predominant commuting flow is to the north, with SR 36 connecting the communities of Stockton, Tooele and Stansbury Park, UT, before intersecting I-80 at Lake Point Junction near the shoreline of the Great Salt Lake. South of its intersection with SR 199, SR 36 serves several smaller communities and rural areas where fewer DPG employees reside.

Utah SR 196, the other key route to DPG, proceeds north through Skull Valley for approximately 60 km (37 mi) where it connects to I-80 at Rowley Junction. About 6.0 km (3.7 mi) of SR 196 crosses the Skull Valley Reservation, beginning about 13.7 km (8.5 mi) north of the intersection of SRs 196 and 199. SR 196 is also a commuting route for many DPG employees, as well as for the transport of supplies, equipment, and materials to and from DPG. As shown in Table 3.9-1, Annual Average Daily Traffic on Regional Roads, traffic volume on SR 196 is consistently much lower than on SR 199.

I-80 is the major east-west commercial highway through the region, connecting to Salt Lake City, Omaha, Nebraska, and Chicago to the east and Reno, NV, and the San Francisco metropolitan areas to the west. In Salt Lake City, UT, I-80 interchanges with I-15, the major north-south commercial highway between the Pacific Coast and the Rocky Mountains/Continental Divide. I-80 provides the capacity for truck freight transportation and the movement of military equipment. However, it is also vital for its role in accommodating employee commuting and, increasingly, daily commuting by workers from other locations in Tooele County, UT into the Salt Lake City area. This pattern is evident in the traffic data shown in Table 3.9-1, Annual Average Daily Traffic on Regional Roads. Annual average daily traffic volume at Rowley Junction near the interchange with SR 196 is about 9,000 vehicles per day compared to over 28,000 vehicles at the Tooele/Lake Point Junction interchange with SR 36 located about 40 km (25 mi) to the east (UDOT, Undated-c).

In addition to the four principal links, several secondary unpaved roads also serve DPG. These roads are open to public travel, but they are remote and are not all-weather routes. These routes begin just outside the main gate, with a single road extending southward that intersects the Pony Express Trail. About 16 km (10 mi) to the south, this unpaved road intersects another unpaved road that leads toward Lookout Pass and also intersects the Pony Express Trail. The Lookout Pass route is used for transport of chemical agent from Deseret Chemical Depot to DPG. Section 3.9.5, Transportation of Materials and Wastes, provides information about the transport of materials and wastes to and from DPG.

To the south and west, the Pony Express route provides access to the Fish Springs National Wildlife Refuge and various public lands administered by the BLM. To the east, the route crosses the Onaqui Mountains over Lookout Pass before descending into the Rush Valley and intersecting with several other highways and roads. The Utah NG uses this route during their mobilization from Camp Williams to DPG.

3.9.3 Airports and Airspace

Aviation resources include both the physical airport facilities at DPG and within the region and the airspace above DPG and the surrounding area.

3.9.3.1 DPG Aviation Facilities and Airspace

MAAF provides military operational support at DPG. The airfield is located at Ditto, approximately 16 km (10 mi) southwest of the main entrance to the installation. It has a single, 4,000 m long and 61 m wide (13,125 ft long and 200 ft wide) paved runway. Other airfield improvements include taxiways at either end of the runway and 21,331 sq m (229,600 sq ft) of paved tarmac for parking (Rosser, 1994).

Aviation improvements at the airfield include a control tower, an aircraft hangar for both fixed and rotary wing aircraft, fuel storage and handling facilities and general storage facilities. The control tower at MAAF is inactive. Aerial navigation aids at MAAF include a nondirectional beacon.

Numerous helipads are located at DPG, one of which is at English Village. The helipads support DPG's security needs and training activities. The helipads can also facilitate emergency medical transportation from the DPG Health Clinic to the military hospital at HAFB or civilian facilities located elsewhere along the Wasatch Front. DPG does not have a "medivac" helicopter. DPG utilizes a commercial "med flight" medical evacuation helicopter when necessary.

No military aircraft are based at DPG. Consequently, use at MAAF is light, with a total of fewer than 1,000 operations (landings and takeoffs) in 1996 (Ainsworth, 1997a). Flight operations into and from MAAF are controlled by DPG Flight Operations and Range Control. Airspace over DPG and UTTR is controlled by Range Control and Clover Control, an AF activity. MAAF also serves as an emergency landing site for military aircraft engaged in testing and training exercises over DPG or the UTTR. Additional information about MAAF is provided in Section 2.1.4.3, Primary Outdoor Facilities.

A series of restricted airspace areas are located over and around DPG. Restricted airspace is used to maintain the security of activity centers within DPG, allow for

hazardous material use such as live ordnance delivery, and support ground and air-based military training activities. Restricted airspace R-6402 covers much of DPG, with potential restrictions extending from ground level to an altitude of 17,678 m (58,000 ft) MSL.

3.9.3.2 Regional Aviation Resources

Five other airports are located within the area surrounding DPG. Four of these are public airports; the fifth is at HAFB. The civilian airports are Salt Lake City International, Salt Lake City Municipal Airport #2, Tooele-Bolinder Field, and Wendover-Tooele County Airport. Table 3.9-2, Civilian Airports Near DPG, lists these airports and their characteristics.

Table 3.9-2. Civilian Airports Near DPG.

Airport	Airport Type/ Classification	Distance from DPG	Number of Runways
Salt Lake City International	Commercial	64 miles northeast	4
Salt Lake City Municipal Airport #2	General Aviation	52 miles northeast	1
Tooele-Bolinder Field	General Aviation	44 miles northeast	1
Wendover-Tooele County	General Aviation/ Commercial Charter	64 miles northwest	2

DPG U.S. Army Dugway Proving Ground

SOURCES: Gann, 1999; Robinson N., 1999; Woodbury, 1999; and Utah Division of Aeronautics, Undated; Utah Airport Operators Association, 2003

Salt Lake City International Airport is located due west of downtown Salt Lake City, UT and is operated by the Salt Lake City Airport Authority. Eleven passenger airlines schedule over 330 daily departures. The airport served over 21 million passengers in 1998, ranking it the 22nd busiest commercial airport in the nation. The airport has four runways; the most recent completed in 1995. The airport has undergone an extensive modernization and expansion in preparation for the 2002 Winter Olympics that were hosted by Salt Lake City. The 5-year capital improvement plan for the airport includes nearly $1 billion for an upgraded terminal, concourses supporting 74 new passenger gates, and parking (Salt Lake City International Airport, 1999).

Passenger air service, air freight, and most airport operations are clustered together, forming a central core between a pair of 3,658 m (12,000 ft) runways on the western half of the airport property. The eastern half of the airport is comprised of two additional runways, and hangars, tarmac, and facilities for the airport's fixed-base operators and the Utah Air NG (Gann, 1999). The Utah Air NG is composed of over

1,600 personnel in 20 units. Serving as the headquarters for the 151st Air Refueling Wing, the Utah Air NG's facilities occupy 0.33 sq km (82 acres) on the northeast corner of Salt Lake City International Airport. Visible evidence of the Utah Air NG's presence is provided by the KC-135 Stratotankers that can be seen parked on the tarmac or flying in the area (Utah Air NG, 1999a).

Salt Lake City Municipal Airport #2 is owned by Salt Lake City Corporation and operated by the Salt Lake City Department of Airports. It is the principal general aviation reliever airport for Salt Lake City International Airport. The airport is located in West Jordan City and encompasses an area of 920 acres (Utah Airport Operators Association, 2003). General aviation is based at the airport along with a very large Utah Army NG helicopter training base. The Army Aviation Support Facility is located at the southern most end of the property. Two Army Aviation Helicopter Units are housed there as well as Detachment 50, Headquarters, Utah State Area Command, which operates a C-12 Beachcraft SuperKing Air at the facility.

Tooele-Bolinder Field was formerly owned and operated as a general aviation airport by Tooele County, UT. It is now owned by the Salt Lake City Airport Authority. Twenty aircraft are based there. A 5-year plan for the field includes moving the fixed-base operator's facilities to allow straightening the taxiway, and lengthening the runway (Woodbury, 1999).

Wendover-Tooele County Airport is operated by the county as a general aviation airport, with 12 based aircraft. The field has a rotating beacon and a single, lighted runway. A second runway, opened in July 1999, is 3,048 m long and 46 m wide (10,000 ft long and 150 ft wide). With the new runway open, the airport hopes to resume commercial charter operations. Such operations, which were primarily gambling junkets bringing about 60,000 patrons a year to casinos located in nearby West Wendover, NV, had averaged about two flights a day. These flights were voluntarily suspended in 1998 pending improvements to the airfield. The 5-year plan for the airport also includes new taxiways and improvements to the lighting system (Robinson, 1999).

HAFB is an Air Force Materiel Command (AFMC) base located in Ogden, UT, approximately 130 km (81 mi) northwest of MAAF. The base is located on 2.8 sq km (698 acres) of land and hosts a single, 4,115-m (13,500-ft) runway that handles over 40,000 takeoffs and landings annually. Two premier fighter wings make their home at HAFB, the 388th Fighter Wing (active) and the 419th Fighter Wing (reserve). HAFB is also home to many operational and support missions with the Ogden Air Logistics Center serving as the host organization. The center provides world-wide

engineering and logistics management for the F-16 and maintains F-16 and C-130 aircraft. Units at the base overhaul and repair a wide variety of aircraft mechanical, structural, and avionics systems. The mission of HAFB includes responsibility for world-wide logistics management for the nation's fleet of strategic intercontinental ballistic missiles, including both the Minuteman and Peacekeeper missiles. HAFB also operates the UTTR (AF, 1999).

The UTTR is located about 80 km (50 mi) west of HAFB and encompasses 6,925 sq km (2,675 sq mi) of land and the largest special use airspace over land in the continental U.S. It is used by all military services to fly more than 22,000 training and 1,000 test sorties annually. UTTR also provides support capabilities for testing and evaluating CMs, unmanned air vehicles, munitions and weapons systems.

3.9.4 Railroads

The Union Pacific Railroad is the predominant Class I railroad company in Utah, operating more than 2,188 km (1,360 mi) of track. Although no direct rail service is provided to DPG, several of the Union Pacific's lines are located in Tooele County. An east-west mainline generally parallels I-80 across the county's northern tier, linking Salt Lake City, Reno, NV, and the San Francisco bay area. A second mainline runs south through the Tooele and Rush Valleys, connecting Salt Lake City to the Los Angeles area, via Las Vegas, NV. Activities at DPG typically generate no demand for rail service. In the event of special needs, existing sidings near Rowley Junction, about 60 km (37 mi) north, or at the Deseret Chemical Depot, about 37 km (23 mi) east over Johnson Pass, could be placed into service for delivery of materials and equipment to DPG. Such deliveries would need to be transferred to trucks or other motorized means of transportation for the final delivery to DPG, unless the deliveries consist of military or commercial vehicles that could be driven directly to DPG.

3.9.5 Transportation of Materials and Wastes

DPG uses a variety of materials and generates a variety of wastes in support of its mission activities. This section summarizes the ground transportation of materials and wastes to and from DPG.

Materials used and wastes generated by DPG are described and defined in Section 3.13, Materials and Wastes. Types of DPG materials identified and discussed in Section 3.13.3, Materials, include:

- Asbestos
- Biological agents

- Chemical agents
- Biological and chemical simulants
- Hazardous materials
- Munitions and energetics
- Pesticides, herbicides, and rodenticides
- Petroleum fuels
- PCBs
- Radioactive materials
- Smokes, obscurants, and illuminants

Types of DPG waste identified and discussed in Section 3.13.4, DPG Generated Wastes, include:

- Asbestos waste
- Biological agent-related
- Chemical agent-related waste
- Hazardous wastes
- Medical-related waste
- Munition and energetic wastes
- Pesticide, herbicide, and rodenticide wastes
- Petroleum fuel-related wastes
- PCB wastes
- Radioactive wastes
- Smoke, obscurant, and illuminant-related wastes
- Solid wastes

Some materials and wastes identified in Section 3.13, Materials and Wastes, are not transported to or from DPG. For each DPG material or waste type, Table 3.9-3, Summary of Ground Transportation of DPG Materials and Wastes, summarizes the ground routes used to or from DPG, vehicle type used for ground transport, and the EIS section numbers where more information is provided for each material or waste.

Table 3.9-3. Summary of Ground Transportation of DPG Materials and Wastes.

Transportation Route Category	Material or Waste Type	Ground Routes Used to/from DPG	Vehicle Type Used	More Information in Section(s)
Biological Agents	Biological Agents	• SR 196 • SR 199/SR 36	Overnight express package service truck	• 3.13.3.2 • 2.1.5.1
Chemical Agents	Chemical Agents	SR 36/Lookout Pass	Escorted truck	• 3.13.3.3 • 2.1.5.2

Table 3.9-3. Summary of Ground Transportation of DPG Materials and Wastes.

Transportation Route Category	Material or Waste Type	Ground Routes Used to/from DPG	Vehicle Type Used	More Information in Section(s)
Other Mission Materials	Biological and Chemical Simulants	• SR 196 • SR 199/SR 36	Overnight express package service or other delivery truck	• 3.13.3.4 • 2.1.5.2 • 2.1.5.1
	Hazardous Materials	• SR 196 • SR 199/SR 36	Overnight express package service or other delivery truck	3.13.3.5
	Munitions and Energetics	• SR 196 • SR 199/SR 36 • SR 36/Lookout Pass	Delivery truck or part of escorted truck convey with chemical agent	3.13.3.6
	Pesticides, Herbicides, and Rodenticides	• SR 196 • SR 199/SR 36	Delivery truck	3.13.3.7
	Petroleum Fuels	• SR 196 • SR 199/SR 36	Delivery truck	3.13.3.8
	Radioactive Materials	None	None	3.13.3.10
	Smokes, Obscurants, and Illuminants	• SR 196 • SR 199/SR 36	Delivery truck	• 3.13.3.11 • 2.1.5.6
Wastes	Chemical Agent-Related Waste	SR 196	Hazardous waste transport truck	3.13.4.3
	Hazardous Wastes	SR 196	Hazardous waste transport truck	3.13.4.4
	Munition and Energetic Wastes[1]	SR 196	Hazardous waste transport truck	• 3.13.4.6 • 2.1.5.3 • 2.1.5.4
	Pesticide, Herbicide, and Rodenticide Wastes	SR 196	Hazardous waste transport truck	3.13.4.7
	Petroleum Fuel-Related Wastes	SR 196	Hazardous waste transport truck	3.13.4.8
	Polychlorinated Biphenyls Wastes	SR 196	Hazardous waste transport truck	3.13.4.9
	Radioactive Wastes[2]	SR 196	Radioactive waste transport truck	3.13.4.10
	Smoke, Obscurant, and Illuminant-Related Wastes[3]	SR 196	Hazardous waste transport truck	3.13.4.11

SR State Road
1 Non-usable items are destroyed at DPG. Residual wastes are either disposed at the English Village Landfill or transported off-installation as hazardous wastes.
2 Radioactive wastes would use the same route from DPG as hazardous wastes, but could not be disposed of in a hazardous waste disposal facility.
3 Wastes are either disposed at the English Village Landfill or transported off-installation as hazardous wastes.

SOURCE: Wheeler, 2000

The ground transportation routes for DPG materials and wastes are shown in Figure 3.9-2, Primary Routes for Ground Transportation of DPG Materials and Wastes.

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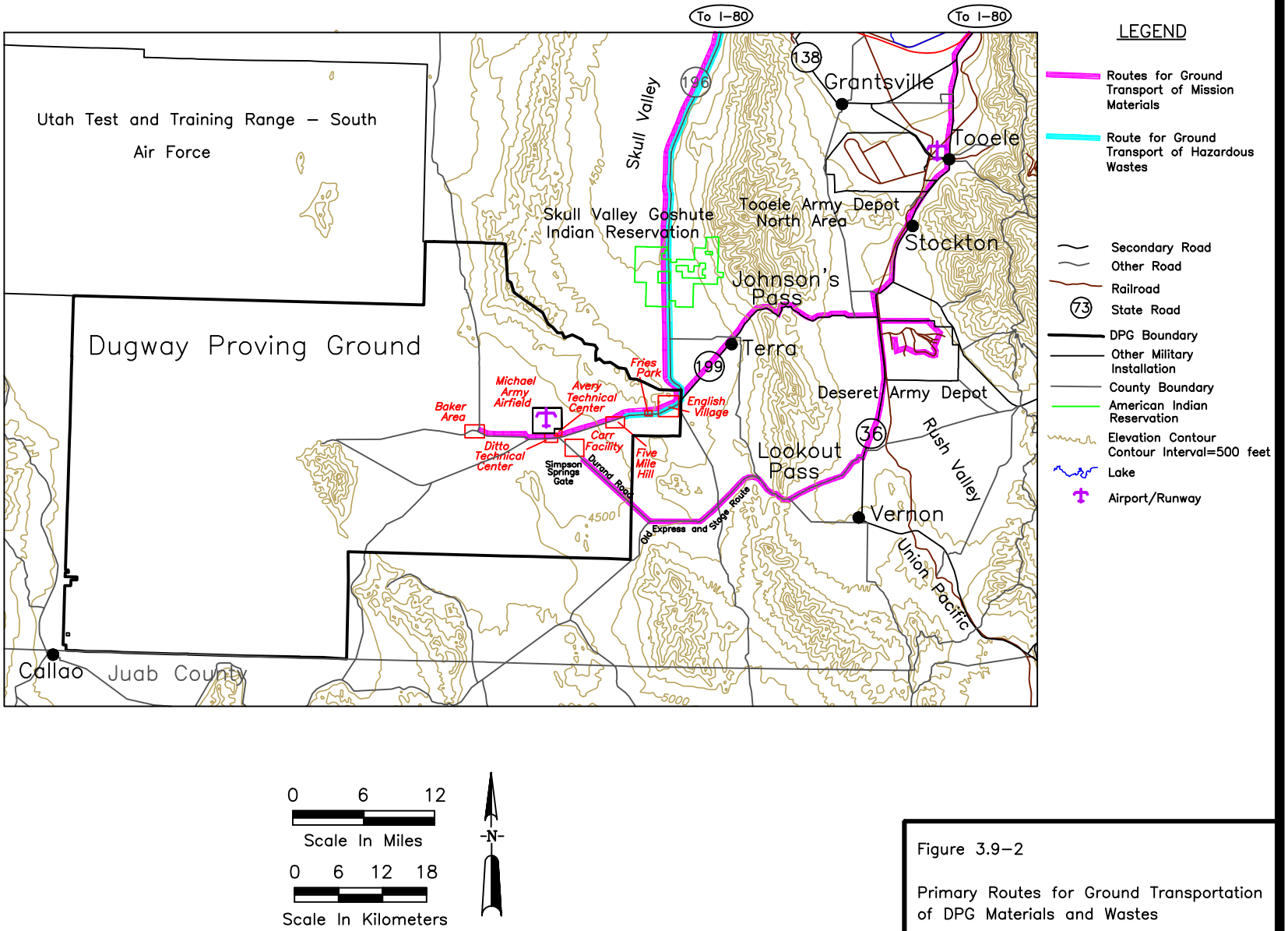

Figure 3.9–2

Primary Routes for Ground Transportation of DPG Materials and Wastes

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3.10 Visual Resources

The visual resources of DPG include natural and man-made physical features that provide the landscape its character and value as an environmental resource. Landscape features that form a viewer's overall impression about an area include landform, vegetation, water, color, adjacent scenery, scarcity, and constructed modifications to the natural setting. This section describes the following elements of the visual resources in and around DPG:

- Regulatory Overview
- Natural Setting
- Constructed Modifications to the Natural Setting
- Regional Visual Resources
- Comparing DPG Lands to BLM's Visual Management System Classifications

3.10.1 Regulatory Overview

There are no laws or regulations that apply specifically to visual resources at DPG relevant to this Future Programs EIS.

3.10.2 Natural Setting

The natural setting of DPG is panoramic, scenic, open, and expansive. The views in and around DPG are typical of many areas within the western U.S., with views of valleys, mountain ranges, and uninterrupted flat and barren lands.

Elements of the natural setting that affect and/or determine the visual resources of DPG are summarized in this section.

The general topography of the region consists of a series of north-south oriented mountain ranges with broad intervening valleys. Occasionally, the valleys are punctuated by "island" mountains or ridges, such as Granite Peak, that may occur independently of distinct ranges.

The general geography of DPG is mountains and broad valleys.

The precipitation of an area largely determines the amount of vegetation, which in turn affects the colors, textures, and contrasts that a viewer would experience. Average annual rainfall is lowest in the basin areas and highest on the mountain tops. Rainwater and springwater flow down mountain slopes toward the Great Salt Lake Desert and the salt flats, an environment largely devoid of vegetation located in the northwest sector of DPG. Playas in the low, central areas of intervening valleys are formed by heavy rains that occasionally occur in the region. Significant surface waters are absent.

DPG is within the Great Basin Desert, which is often referred to as the cold desert. The summers are hot and dry, the spring and fall are cool, and the winters are moderately cold. The land within DPG is considered arid, and vegetation is characterized by very low diversity and abrupt boundaries.

Summer views are characterized by scrubby low-growing gray-green vegetation, reflective sand, heat waves, mirages, distant mountains, and an intense blue sky. In contrast, winter views are monochromatic gray, especially when weather inversions result in fogs. Also typical are bright blue clear skies above an apparently lifeless gray-brown desert with views of distant snow-capped mountain peaks.

An inventory of natural areas and special features on DPG land was conducted by the Nature Conservancy in 1993 and identified 17 noteworthy areas at DPG based on biological and geophysical criteria. Some of these sites also have important visual resource characteristics. Section 3.7.3.4, Potential Land Use Constraints, provides more information on these sites.

3.10.3 Constructed Modifications to the Natural Setting

Constructed alterations to the natural setting take one of the following three forms:

- Terrain alteration efforts include activities such as cut and fill of natural landscape. DPG requirements have been minimal because the land is generally flat; there has been sufficient land available for military mission-related and support activities without extensive terrain alteration.

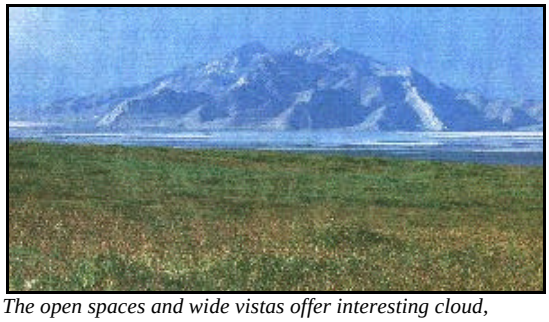
- Land cover changes consist of conversion of natural vegetation to other vegetation types. Changes to natural vegetation over DPG's history have been extensive as described in Section 3.4.3, Vegetative Trends; however, much of this change has been unintended and is the result of both natural and human activities.

- Development activities include the conversion of natural land features to buildings, parking lots, roads, etc. Less than 1 percent of total DPG land has been converted to developed use. Most of this development is within the interior portions of DPG land, and not near DPG boundaries. Installation facilities are a mix of architectural styles including pre-engineered metal buildings, wood frame, stucco, concrete masonry, manufactured mobile trailers, and brick.

Safety and functionality are the primary consideration of use of DPG land to support mission-related and support activities. Exterior appearance of structures and landscaping are considered only when all other functional needs are fulfilled. Because of the security requirements preventing public access and the buffer zones surrounding DPG activity sites, the general public does not see any of the constructed modifications to the natural setting under normal conditions.

3.10.4 Regional Visual Resources

As discussed in Section 3.7.2, Regional Land Uses, the land surrounding DPG includes a variety of landowners, land uses, and physical features. The views in the vicinity of DPG rate low for the following visual criteria: color, texture, roadside details, water, diversity in the landscape, edges, form, line, and contrast. The open spaces and wide vistas offer interesting cloud, weather, and landscape interactions. There is little color in the setting and little variety in texture or perception of edges. Form is provided by the occasional mountain range that is characteristic of the area. Lines are apparent wherever there is commercial or industrial development, and along water's edge. Contrast is also most apparent along water's edge and when mountains are cast in sunset or sunrise light.



The open spaces and wide vistas offer interesting cloud, weather, and landscape interactions.

While persons on land surrounding DPG may be aware of the existence of DPG (e.g., through maps, signage, or access prohibitions), these persons generally do not see DPG activities or facilities. The vast DPG land holdings and AF lands to the north of DPG generally serve as a buffer to any views of DPG from outside the installation's boundaries, except for some elevated viewpoints of DPG from the mountain ranges south of DPG boundaries.

Conversely, persons involved in mission-related or support activities on DPG lands are not generally aware of activities outside of DPG borders. Public viewpoints of DPG are obscured or blocked in a number of areas because the viewer's line of sight is affected by terrain, vegetation, or other visual feature. Aircraft conducting testing or training activities, smokes and illuminant testing, security lighting, dust generated by vehicles, and some training exercises are the major identifiable DPG activities which are occasionally seen from off-installation viewpoints. For example, people camping at Simpson Springs have views of DPG activities including night tests of illumination rounds.

3.10.5 Comparing DPG Lands to BLM's Visual Resources Management System Classifications

Much of the land surrounding DPG is Federal land managed by the BLM. The BLM is responsible for managing this land for multiple uses. However, the BLM is also responsible for ensuring visual resources on its land are not negatively impacted. To accomplish this, the BLM uses its Visual Resources Management System (VRMS) as a way to identify and manage the visual resources on its lands. The VRMS recognizes that public lands have a variety of visual values. These different values warrant different levels of management. The VRMS process first examines a tract of land to rate its visual appeal. The rating received by a tract of land then determines how the land will be managed. There are four visual resource management classifications within the VRMS ranging from Class I, the most restrictive, to Class IV, the least restrictive. These classifications have the following established objectives:

- Class I Objective – To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.

- Class II Objective – To retain the existing character of the landscape. The level of change to the characteristic landscape should be low.

- Class III Objective – To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.

- Class IV Objective – To provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

When a mountain peak or ridge is designated, it is the views of that feature that are protected, not the viewshed from the designated area. Thus, depending on the VRMS classification received, certain activities may be restricted on designated BLM lands.

BLM land surrounding DPG, managed by either the Salt Lake or Fillmore BLM Field Offices, is generally classified as Class IV land. The following scattered Class III areas are identified in areas surrounding DPG:

- Fumarole Butte
- Picture Rock Reservoir
- East side of the Drum Mountains
- South end of the Thomas Mountains including Topaz Mountain
- Southeast and southern flanks of the southern Deep Creek Range

Three areas near DPG are designated as Class II visual resources:

- Core of the southern Deep Creek Range
- Fish Springs Range
- House Range north of Dome Canyon Pass

If some of the nearby Wilderness Study Areas, discussed in Section 3.7.2, Regional Land Uses, become designated Wilderness, it is expected that BLM would re-designate these areas as Class I.

Based on these regional classifications by BLM, it can be assumed that most lands on DPG would be similar to BLM Class IV lands, which allow major modifications to the existing character of the landscape. There would be some potential for Class III lands at DPG in certain mountainous areas such as Granite Peak.

3.11 Noise

Noise is commonly thought of as an undesirable sound. However, it is also considered a source of pollution because it can be a public health hazard, causing hearing impairment and undue psychological stress.

To describe noise at DPG, this section discusses:

- Regulatory Overview
- Noise Measurement
- DPG Noise Sources and Characterization

3.11.1 Regulatory Overview

Federal law and Army requirements regulating environmental noise at Army installations, such as DPG, include:

- Noise Control Act of 1972
- Quiet Communities Act of 1978
- AR 200-1

The Army's obligations for noise management at DPG under Federal law are satisfied through implementing the ENMP, formerly known as the ICUZ program. The State of Utah has no noise control regulations applicable to DPG activities on- or off-installation.

The goal of the ENMP is to identify noise impacted areas so that the public and government officials, working with the Army, can minimize noise impacts through land use planning and control. Implementation of an ENMP requires identification of areas where noise levels from military sound sources are high enough to be incompatible with "noise sensitive uses" such as housing, schools, churches, and hospitals. Implementation of an ENMP also considers noises created by sources off installation that affect areas on DPG.

An ENMP should generate a noise zone map, which uses the following three noise zones to describe an Army installation:

- Zone I – compatible
- Zone II – normally incompatible
- Zone III – incompatible

The goal of the Army is to have all noise sensitive land within Zone I. The relationship between noise level and compatibility category adopted by the Army is presented in Table 3.11-1, Relationship of Noise Zone and Noise Limits. The table presents noise limit goals for the following three types of military noise environments:

- Transportation – noise resulting from aircraft and vehicle activities, described in terms of the A-weighted day-night average sound level (DNL) (ADNL)
- Impulsive – noise resulting from armor, artillery, and demolition activities, and sonic booms, described in terms of the C-weighted DNL (CDNL)
- Small arms ranges – noise resulting from the use of small arms, described in terms of linear peak sound level (dBP)

Table 3.11-1. Relationship of Noise Zone and Noise Limits.

Noise Zone	Percent Population Highly Annoyed	Noise Limits		
		Transportation (ADNL)	Impulsive (CDNL)	Small Arms (dBP)
I	< 15	< 65 dBA	< 62 dBC	< 87 dBP
II	15 - 39	65 - 75 dBA	62 - 70 dBC	87 - 104 dBP
III	> 39	> 75 dBA	> 70 dBC	> 104 dBP

< less than
> greater than

ADNL A-weighted day-night average sound level
CDNL C-weighted day-night average sound level
dBA A-weighted decibels
dBC C-weighted decibels
dBP linear peak sound level

SOURCE: AR 200-1

3.11.2 Noise Measurement

Sound is a variation of air pressure from the mean atmospheric pressure. Sound is commonly expressed in decibels (dB), which measure the relative loudness of sounds. Sound energy is radiated in all directions from its source and weakens as it travels over long distances. Sound is affected by natural ridges, hills and bluffs, and other areas without line-of-sight positioning. The amount of noise generated by a source can have very different physiological and psychological effects for different persons, depending on their individual and/or group values and knowledge of the noise source.

Various noise descriptors are used to quantify noise. Some of these noise descriptors are identified in Table 3.11-2, Noise Descriptors.

Table 3.11-2. Noise Descriptors.

Noise Descriptor	Unit of Measure	Description
A-weighting scale	dBA	Emphasizes the noise spectrum that approximates the response of the human ear by de-emphasizing higher and lower frequencies
C-weighting scale	dBC	Considers the low-frequency content of impulsive noise, such as noise from large weapons, demolition activities, and sonic booms, that contributes to effects such as window rattle
Linear Peak Sound Level	dBP	Weighs all noise frequencies equally
Equivalent Level (LEQ)	dB dBA dBC	Equates decibel levels of noise that vary over a period of time to a steady noise with the same acoustical energy over the same period of time. The LEQ combines the following three important annoyance factors: • Maximum loudness • Duration • Number of annoying sounds
DNL, ADNL, and CDNL	dB dBA dBC	Add a penalty factor to the LEQ for night time noise
Onset rate-adjusted monthly day-night average sound level	dB	Accounts for the "startle effect" due to the sudden appearance of an aircraft. The onset rate is the rate of change of the sound level.

ADNL A-weighted day-night average sound level
CDNL C-weighted day-night average sound level
dB decibels
dBA A-weighted decibels
dBC C-weighted decibels
dBP linear peak sound level
LEQ Equivalent Level

Table 3.11-3, Decibel Ratings of Some Common Noises, shows typical sound levels from common sources.

Table 3.11-3. Decibel Ratings of Some Common Noises.

Typical Decibel	Noise	Dangerous Time Exposure
0	Lowest sound audible to human ear	None
30	Quiet library, soft whisper	None
40	Quiet office, living room, bedroom away from traffic	None
50	Light traffic at a distance, refrigerator, gentle breeze	None
60	Air conditioner at 20 feet, conversation, sewing machine	None
70	Busy traffic, noisy restaurant	Critical level begins
80	Subway, heavy city traffic, alarm clock at 2 feet	More than 8 hours
90	Truck traffic, noisy home appliances, shop tools, lawn mower	Less than 8 hours
100	Chain saw, boiler shop, pneumatic drill	2 hours
120	Rock band concert in front of speakers, sandblasting, thunderclap	Immediate danger
140	Gunshot blast, jet plane	Dangerous at any length of exposure
180	Rocket pad during launch	Hearing loss inevitable

SOURCE: DPG, 1987a

3.11.3 DPG Noise Sources and Characterization

Noise at DPG results from several primary sources and activities:

- Aircraft noise and sonic booms from air testing and training activities
- Detonations from conventional munitions, ECRT, and other testing activities; ground training activities; and EOD activities
- Artillery firing from conventional munitions and smoke, obscurant, and illuminant testing activities, and ground training activities
- Demolitions and construction activities

Noise from aircraft and sonic booms is discussed in Section 5.2.11, Cumulative Noise Impacts.

Locations at DPG where the above activities occur are discussed in the appropriate testing or training sections in Section 2.1, Baseline Description of DPG. Demolitions and construction activities could occur anywhere, but would primarily occur near activity centers. Locations of these activity centers are identified in Figure 2.1-3, DPG Activity Centers and Facilities.

With the exception of aircraft noise, the amount of reliable data and analysis of noise generated from DPG and tenant activities is limited because noise levels are not typically measured during training and testing activities. Available noise information from noise studies conducted at or near DPG is summarized below.

Firing activity data on four artillery ranges during 1987 was collected as part of the DPG ICUZ study (DPG, 1987a). The ICUZ report concluded that due to the minor amount of firing that occurs at DPG, noise contours for blast noises would extend approximately 1 km (0.6 mi) from the various firing points.

In a 1986 study, the U.S. Army Environmental Hygiene Agency (USAEHA) concluded that due to the remoteness of DPG, there was minimal environmental noise created by activity at DPG. However, this 1986 study lacked data regarding aircraft noise and artillery firing at DPG. Therefore, the USAEHA supplemented its earlier work in 1991 by providing outdoor noise monitoring at eight sites throughout DPG and by attempting to gather operational data on the number of rounds of each type fired from each firing point on DPG ranges.

Because of a lack of data, noise contour maps, which would depict the general ongoing noise levels and patterns at DPG, were not generated. Noise data from this study at eight monitoring locations on DPG lands are presented in Table 3.11-4,

Environmental Noise Monitoring Data (1991). Noise was monitored at the eight locations for 7 to 11 days depending on the site.

Table 3.11-4. Environmental Noise Monitoring Data (1991).

Site	Daytime LEQ (dBA)	Nighttime LEQ (dBA)	ADNL (dBA)
1	51.4	45.1	53.2
2	70.3	59.2	69.9
3	49.9	44.4	52.2
4	54.2	44.5	54.3
5	61.1	64.1	69.9
6	53.5	54.1	60.4
7	60.8	58.9	65.6
8	60.1	52.9	61.4

ADNL A-weighted day-night average sound level
dBA A-weighted decibels
LEQ equivalent level

SOURCE: USAEHA, 1991

The DNL exceeded the Zone I "compatible" standard of 65 A-weighted decibels (dBA) at a number of sites (USAEHA, 1991). Although noise sources were not identified by the USAEHA study, higher noise levels were attributed to aircraft, as the noisiest sites were under AF flight tracks. The study did not identify any noise concerns within DPG office and residential areas, as noise levels within such areas (sites 1, 3, and 4) were below 55 dBA.

3.12 Health and Safety

This section describes health and safety for DPG workers and for the public at DPG and in the surrounding area. Section 3.5.7, Selected Public Infrastructure and Services, provides a more detailed discussion of health services offered at DPG and elsewhere in Tooele County, UT. The following health and safety topics at DPG are discussed in this section:

- Regulatory Overview
- Occupational Health and Safety
- Public Health and Safety

3.12.1 Regulatory Overview

Federal agencies operations are not subject to the Occupational Health and Safety Act. There are specific health and safety programs and regulation requirements for the DPG mission activities that must be followed to protect the health and safety of workers and the public. The following three Army safety regulations apply to all

military and civilians assigned to, stationed at, or otherwise engaged in activities at or under the control of the DPG Commander. The DPG Commander is responsible for ensuring all the following Army regulations regarding the occupational health and safety requirements are enforced.

- The Army Safety Program (AR 385-10) prescribes Army policy, responsibilities, and procedures to protect against accidental loss. It provides for public safety as it relates to Army operations and activities, and safe and healthful workplace, procedures, and equipment. This regulation mandates Army Safety Program policies, procedures, and guidelines into one comprehensive safety program for all Army personnel and operations.

- Accident Prevention Program (AR 385-1) prescribes the policies and procedures for complying with applicable Occupational Safety and Health Administration (OSHA), DOD, and Army requirements at DPG (DPG, 1996b).

- Safety Hazard Communications (AR 385-3) establishes procedures by which the Hazard Communication Standard of Title 29, CFR Part 1910.1200, and Army requirements are implemented at DPG (DPG, 1991a).

3.12.2 Occupational Health and Safety

Occupational health and safety refers to the health and safety of workers at DPG. This section describes the health and safety requirements for activities at DPG, injury/illness incident rates, health and safety program audits, and emergency evacuation plans for DPG workers.

3.12.2.1 Occupational Health and Safety Requirements

Occupational health and safety procedures are provided in various types of technical documents, which are designed to protect the health and safety of workers within the DPG boundaries. Brief descriptions of additional health and safety requirements for testing, training, tenant, and mission support activities that occur at DPG are provided in the following tables:

- Table 3.12-1, Summary of Testing Activities Health and Safety Requirements

- Table 3.12-2, Summary of Training Activities Health and Safety Requirements

- Table 3.12-3, Summary of Research Support for Non-DOD Agencies Health and Safety Requirements

- Table 3.12-4, Summary of Mission Support Activities Health and Safety Requirements
- Table 3.12-5, Summary of Installation Support Activities Health and Safety Requirements

Most of the requirements described in these tables are specific DPG regulations (DPGRs) or ARs that apply to each type of test, training organization, tenant, and mission support activity. Many of the safety requirements listed in these tables address safety procedures used to handle hazardous materials and wastes. Section 3.13, Materials and Wastes, discusses the various types of hazardous materials and wastes used and/or stored at DPG for which some of these health and safety requirements are established.

Contractors at DPG may have additional health and safety programs and requirements that may be similar to DPG's health and safety programs. DPG contractors' health and safety programs are not provided in these tables.

Table 3.12-1. Summary of Testing Activities Health and Safety Requirements.

Requirement	Description
Air Force Tests	
DPG AR 70-3, Test Coordination and Conduct	Establishes policies, procedures, and responsibilities for developing, coordinating, and conducting test programs at DPG
DPG Health and Safety Programs for Air Force Activities	Ensure that the Air Force is in compliance with health and safety requirements
Artillery, Mortars, and Missiles	
SOP No. DP-0000-M-028, Emergency Destruction of Unsafe Chemical Munitions Found on Test Ranges	Provides general safety requirements for personnel involved with emergency destruction of unsafe chemical munitions found on test ranges
SOP No. DP-0000-G-139, Munitions Demilitarization-Detonation, Open Detonation of Munitions and Explosives	Provides general safety requirements for personnel involved with demilitarization-detonation or open detonation of munitions and explosives
SOP No. DP-0000-L-650, Transportation, Handling, and Packaging of Ammunition Components	Provides general safety requirements for personnel involved with transporting, handling, and packaging of ammunition components
DPGR 70-3, Test Coordination and Conduct	Establishes policies, procedures, and responsibilities for developing, coordinating, and conducting test programs at DPG
DPGR 50-1, Chemical Surety Program	Ensures compliance with AR 50-6 and AR 190-59 and all supporting regulatory guidance from Army headquarters that will enhance the safety security and reliability of chemical agent and munitions stored or used at DPG
AR 385-64, Ammunition and Explosives Safety Standard	Covers ammunition and explosives safety standards for Active Army, Army National Guard, and U.S. Army Reserve
Biological Defense	
DPGR 70-3, Test Coordination and Conduct	Establishes policies, procedures, and responsibilities for developing, coordinating, and conducting test programs at DPG
32 CFR Part 627, Biological Defense Safety Program (Technical Safety Requirements) (32 CFR Part 627)	Provides technical safety requirements of the Army Biological Defense Safety Program in 32 CFR Part 626 and Army PAM 385-69 for using, handling, shipping, storing, and disposing of etiological agents used in research, development, test, and evaluation for the Biological Defense Program

Table 3.12-1. Summary of Testing Activities Health and Safety Requirements.

Requirement	Description
AR 385-69, Biological Defense Safety Program	Establishes Army safety program for all aspects of Biological Defense Program and provides policy and implements the Center for Disease Control-National Institute of Health guidelines on biosafety in microbiological and biomedical laboratories, DOD and Army policy statements, and other Federal regulations
Biological Emergency Response and Assistance Program (BERAP)	Provides procedures to be followed in case of a biological mishap or suspected exposure and specifies the DOD authorities and local and state public officials who would be notified
Employee Health Monitoring Program for the LSTF	Prescribes preplacement, annual, and termination program requirements developed for LSTF employees who handle biological materials to evaluate employees and determine if any medical problems exist that could affect judgement
WD-L SOP 326, The Laboratory Safety Manual	Provides procedures for most efficient use of laboratory resources by ensuring that a continual and comprehensive effort to protect the safety of laboratory personnel and to minimize losses in labor-hours due to potential illnesses and injuries that may arise from handling infectious human pathogens
WD-L SOP 327, Control and Audit of Infectious Microorganisms and Toxins	Establishes responsibilities and administrative procedures for the control of infectious microorganisms and toxins stored or used at the LSTF to include receipt, long-term secured storage, release for testing or shipping, termination of work, certification of destruction, and annual inventory
WD-L SOP 328, Safety Guide for Work with Toxins at the Life Sciences Test Facility	Provides safety procedures for workers and contract personnel handling and using toxins in the LSTF
WD-L SOP 329, Emergency Evacuation Plan, Life Sciences Division	Prescribes procedures for compliance with DPGR 420-8 and existing National Fire Code regulations, which stipulate safe and effective evacuation of personnel working in high-hazard areas
WD-L SOP 330, Safety Guide for Working in the High Containment, Biosafety Level 3 (BL 3) Laboratories in the Life Sciences Test Facility	Provides operational and safety procedures for the High Containment, BL 3 Laboratories in the Life Sciences Test Facility augmenting Life Sciences Division SOP 326 with additional safety guidelines for workers and visitors in BL 3 laboratories
WD-L SOP 332, Chemical Hygiene Plan for the Safe Storage, Handling, and Use of Hazardous Chemicals in WD-L	Provides operational and safety procedures for workers, contract personnel, and visitors storing, handling, and using hazardous chemicals within the LSTF in compliance with 29 CFR 1910.1450 and DPGR 385-3
WD-L SOP 335, Safe Use of Radioactive Substances for Biological Investigations	Establishes procedures for laboratory handling of radioactive substances
Chemical Defense	
DPGR 70-3, Test Coordination and Conduct	Establishes policies, procedures, and responsibilities for developing, coordinating, and conducting test programs at DPG
AR 385-61, Army Chemical Agent Safety Program	Assigns responsibility for safety studies and reviews of chemical agents and associated weapon systems, and prescribes general safety precautions and procedures for Army and contractor operations
AR PAM 385-61, Toxic Chemical Agent Safety Standards	Explains minimum safety criteria and standards for use in processing, handling, storing, transporting, disposing and decontaminating blister agents H, HD, L, HT and nerve agents GB, GA, and VX including chemical surety threshold levels of chemical agents listed in AR 50-6
DPGR 50-1, Chemical Surety Program	Ensures compliance with AR 50-6 and AR 190-59 and all supporting regulatory guidance from Army headquarters that will enhance the safety security and reliability of chemical agent and munitions stored or used at DPG

Table 3.12-1. Summary of Testing Activities Health and Safety Requirements.

Requirement	Description
AR 50-6, Chemical Weapons and Material Chemical Surety	• Prescribes policies, procedures, and responsibilities for the Army Chemical Surety Program • Implements DOD physical security requirements for chemical agent material, weapons and research, development, test, and evaluation material as it pertains to surety • Provides controls for recovery of chemical warfare material discovered during environmental remediation programs or by chance during other operations • Establishes the Army CAIRA Program
AR 190-59, Army Chemical Security Program	Establishes guidelines to enhance the security of chemical agent and munitions
DPGR 385-4, Chemical Agent Safety Regulation	Establishes policies and procedures for complying with Army chemical safety guidance for active duty civil service, tenants, and contractors assigned to, or working at, DPG
SOP No. DP-000-S-121, Operation of the Defensive Test Chamber	Provides general safety requirements for workers in the Defensive Test Chamber
SOP No. DP-0000-L-027, Movement of Chemical Surety Material Outside the Exclusion Area	Provides general safety requirements for workers involved with movement of chemical surety material
SOP No. DP-0000-M-70, Laboratory Toxic Agent Operations and Safety	Provides general operations and safety requirements for the Reginald Kendall Combined Chemical Test Facility
SOP No. DP-0000-M-80, Chemical Accident/Incident Response and Assistance	Implements the Army Chemical Accident/Incident Response and Assistance Program
SOP No. DP-0000-M-170, M6A1 Filter Operation at Toxic Chemical Agent Storage at Igloo G	Provides general safety requirements for workers involved with M6A1 filter operation at toxic chemical agent storage at Igloo G
Environmental Characterization and Remediation Technology	
DPGR 70-3, Test Coordination and Conduct	Establishes policies, procedures, and responsibilities for developing, coordinating, and conducting test programs at DPG
AR 385-64, Ammunition and Explosives Safety Standard	Covers ammunition and explosives safety standards and applies to Active Army, Army National Guard, and U.S. Army Reserve
SOP No. DP-0000-P-851, Propellant, Explosive, and Pyrotechnic Thermal Treatment Evaluation Test Facilities (PEP_TTET)(BangBoxes™)	Provides general operations and safety requirements for the BangBox™
Smokes, Obscurants, and Illuminants	
DPGR 70-3, Test Coordination and Conduct	Establishes policies, procedures, and responsibilities for developing, coordinating, and conducting test programs at DPG
SOP No. DP-0000-S-199, Munitions Demilitarization for Smoke Producing Munitions	Provides general safety requirements for workers involved with operating and testing smoke-producing munitions (M76 smoke grenades, modified XM81, XM82, XM6, smoke pots, and smoke grenades)
DPGR 350-2, Range and Training Area Regulation	Prescribes policy and procedures for all military units, organizations, and other authorized individuals and agencies governing control and safe operation of training ranges and maneuver areas at DPG, and implements policies contained in applicable ARs and other directives

Table 3.12-1. Summary of Testing Activities Health and Safety Requirements.

Requirement	Description
Physical	
DPGR 70-3, Test Coordination and Conduct	Establishes policies, procedures, and responsibilities for developing, coordinating, and conducting test programs at DPG
SOPs and explosive safety training	Provide activity specific procedures for physical tests

AR Army Regulation
Army U.S. Army
BL biosafety level
CAIRA Chemical Accident/Incident Response and Assistance
CFR Code of Federal Regulations
DOD Department of Defense
DPG U.S. Army Dugway Proving Ground
DPGR DPG Regulation
LSTF Lothar Salomon Life Sciences Test Facility
No. number
SOP standing operating procedure

SOURCES: Army, 1997a; DPG, 1987b; DPG, 1993; DPG, 1995a; DPG, 1995b; DPG, 1995c; DPG, 1995d; DPG, 1995e; DPG, 1996d; DPG, 1997c; DPG, 1997o; DPG, 1997f; DPG, 1998b; DPG, 1998c; DPG, 1999b; DPG, 1999g; DPG, 2000a; DPG, 2000b; Dynamac, 1992; Zaccardi, 1999

Table 3.12-2. Summary of Training Activities Health and Safety Requirements.

Training Organization	Requirement	Description
Air Force	DPGR 50-1, Chemical Surety Program	Ensures compliance with AR 50-6 and AR 190-59 and all supporting regulatory guidance from Army headquarters that will enhance the safety security and reliability of chemical agent and munitions stored or used at DPG
	DPGR 350-2 Range and Training Area Regulation	Prescribes policy and procedures for all military units, organizations, and other authorized individuals and agencies governing control and safe operation of training ranges and maneuver areas at DPG, and implements policies contained in applicable ARs and other directives
	DPG Health and Safety Programs for Air Force Activities	Ensures that the Air Force is in compliance with health and safety requirements
Army National Guard	DPGR 50-1, Chemical Surety Program	Ensures compliance with AR 50-6 and AR 190-59 and all supporting regulatory guidance from Army headquarters that will enhance the safety security and reliability of chemical agent and munitions stored or used at DPG
	DPGR 350-2, Range and Training Area Regulation	Prescribes policy and procedures for all military units, organizations, and other authorized individuals and agencies governing control and safe operation of training ranges and maneuver areas at DPG, and implements policies contained in applicable ARs and other directives
	AR 385-64, Ammunition and Explosives Safety Standard	Covers ammunition and explosives safety standards
Other Organizations	DPGR 50-1, Chemical Surety Program	Ensures compliance with AR 50-6 and AR 190-59 and all supporting regulatory guidance from Army headquarters that will enhance the safety security and reliability of chemical agent and munitions stored or used at DPG
	DPGR 350-2, Range and Training Area Regulation	Prescribes policy and procedures for all military units, organizations, and other authorized individuals and agencies governing control and safe operation of training ranges and maneuver areas at DPG, and implements policies contained in applicable ARs and other directives

AR Army Regulation
Army U.S. Army
DPG U.S. Army Dugway Proving Ground
DPGR DPG Regulation

SOURCES: DPG, 1995e; DPG, 1997a

Table 3.12-3. Summary of Research Support for Non-DOD Agencies Health and Safety Requirements.

Research Activity	Requirement	Description
Cosmic Ray Research	University of Utah Health and Safety Requirements and Utah Board of Health recommendations	Provides health and safety procedures which are based on Occupational Safety and Health Administration regulations and guidance regarding Hanta virus

SOURCE: Sokolsky, 1998

Table 3.12-4. Summary of Mission Support Activities Health and Safety Requirements.

Mission Support Activity	Requirement	Description
Airfield Operations	AR 385-95, Army Aviation Accident Prevention	Establishes Army aviation accident prevention as an integral part of the Army Safety Program (AR 385-10) including interaction between the man, the machine, and the environment and prescribes policies, procedures, and guidelines for implementing accident prevention as part of the Army Safety Program
Ammunition Accountability	DPGR 350-2, Range and Training Area Regulation	Prescribes policy and procedures for all military units, organizations, and other authorized individuals and agencies governing control and safe operation of ammunition on training ranges and maneuver areas at DPG, and implements policies contained in applicable ARs and other directives
Instrumentation	Army Technical Bulletin TB MED 503 Occupational and Environmental Health	Provides procedures that address the Army industrial hygiene program.
Quality Assurance Specialist Ammunition Surveillance	No activity specific requirements	Not Applicable
Range Control	DPGR 350-2, Range and Training Area Regulation	Prescribes policy and procedures for all military units, organizations, and other authorized individuals and agencies governing control and safe operation of training ranges and maneuver areas at DPG, and implements policies contained in applicable ARs and other directives
Technical Escort	Safety Training for Technical Escort and Disposal Detachment Activities	Addresses health and safety requirements for handling explosive and chemical agent weapons as a technical escort and disposal detachment. Types of safety training include: J5 Technical Escort training, FM9-20, FM3-5, FM3-9, packaging and shipping of chemical weapons and materials, and TM 60 Series (training for health and safety associated with weapon systems)
	SOP No. DP-000-M-028, Emergency Destruction of Unsafe Chemical Munitions Found on Test Ranges	Provides general safety requirements for personnel involved with emergency destruction of unsafe chemical munitions found on test ranges
	SOP No. DP-0000-G-139, Munitions Demilitarization-Detonation, Open Detonation of Munitions and Explosives	Provides general safety requirements for personnel involved with demilitarization-detonation or open detonation of munitions and explosives
	SOP No. DP-0000-L-650, Transportation, Handling, and Packaging of Ammunition Components	Provides general safety requirements for personnel involved with transporting, handling, and packaging ammunition components
	DPGR 70-3, Test Coordination and Conduct	Establishes policies, procedures, and responsibilities for developing, coordinating, and conducting test programs at DPG
	DPGR 50-1, Chemical Surety Program	Ensures compliance with AR 50-6 and AR 190-59 and all supporting regulatory guidance from Army headquarters that will enhance the safety security and reliability of chemical agent and munitions stored or used at DPG

Table 3.12-4. Summary of Mission Support Activities Health and Safety Requirements.

Mission Support Activity	Requirement	Description
Technical Escort (continued)	AR 385-64, Ammunition and Explosives Safety Standard	Covers ammunition and explosives safety standards and applies to Active Army, Army National Guard, and U.S. Army Reserve
	AR 50-6, Chemical Weapons and Material Chemical Surety	• Prescribes policies, procedures, and responsibilities for the Army Chemical Surety Program • Implements DOD physical security requirements for chemical agent material, weapons and research, development, test, and evaluation material as it pertains to surety • Provides controls for recovery of chemical warfare material discovered during environmental remediation programs or by chance during other operations
Work Clothes Preparation	Activity-specific SOPs	Address how to prevent exposure to hot water, compressed air, and solvent type chemicals

AR Army Regulation
Army U.S. Army
DOD Department of Defense
DPG U.S. Army Dugway Proving Ground
DPGR DPG Regulation
No. number
SOP standing operating procedure

SOURCES: DPG, 1997a; DPG, 1987b; DPG, 1995e; DPG, 1997f; DPG, 1999d; DPG, 2000l

Table 3.12-5. Summary of Installation Support Activities Health and Safety Requirements.

Installation Support Activity	Requirement	Description
Army Corps of Engineers	EM385-1-1	Prescribes policies, procedures, and responsibilities for the environmental, health and safety programs for Army Corps of Engineers jobs at DPG
Community Activities	No activity specific requirements	Not Applicable
Environmental Programs	DPGR 420-8 Fire Prevention and Protection and DPGR 420-90 Fire Regulation	Establishes responsibilities and procedures for prevention, control, and extinguishment of fire on DPG and sets forth common potential causes of fire and methods by which they may be eliminated
Equipment Maintenance	No activity specific requirements	Not Applicable
Grounds and Road Maintenance	No activity specific requirements	Not Applicable
Health Services	DPGR 40-6, Medical Requirements for the Chemical Testing Program	• Describes symptoms and outlines procedures to be followed in treating personnel exposed to chemical agents • Provides guidance and requirements for the issuance of Nerve Agent Antidote Kits and emergency response equipment and prescribes limitations on their use • Applies to all personnel who are at risk of being exposed to toxic chemical agents and are issued Nerve Agent Antidote Kits
	DPGR 40-5, Medical Services Occupational Health Program	• Prescribes policies, procedures, and responsibilities for the Occupational Health Program at DPG • Establishes a uniform procedure for occupational health services
Housing	No activity specific requirements	Not Applicable

Table 3.12-5. Summary of Installation Support Activities Health and Safety Requirements.

Installation Support Activity	Requirement	Description
Metal Shop	No activity specific requirements	Not Applicable
Procurement	No activity specific requirements	Not Applicable
Retail Sales	As a tenant, follows standard DPG requirements	Not Applicable
Security and Counterintelligence	No activity specific requirements	Not Applicable
Supply Operations	As a contractor, follows standard DPG requirements	Not Applicable
Utilities	As a contractor, follows standard DPG requirements	Not Applicable

DPG U.S. Army Dugway Proving Ground
DPGR DPG Regulation

SOURCES: DPG, 1978

3.12.2.2 Occupational Health and Safety Program Incident Rates

The occupational health and safety program has been evaluated based on the injury/illness incident rates. The incident rate was chosen as an evaluation method because it provides an objective measure of the overall occupational health and safety program at DPG.

OSHA requires industry in the U.S. to track injury and illness cases that occur at their facilities in the form of an incident rate. Incident rates are based on the exposure of 100 full-time workers using 200,000 work hours. This is the equivalent of 100 workers working 40 hours per week for 50 weeks per year. The incident rate is calculated as follows:

This formula was used to calculate the incident rates at DPG shown in Table 3.12-6, Calculation of Injury/Illness Incident Rates at DPG. This calculation is for the workforce that includes military, civilians for DPG operations, civilians for tenant operations, and contractors.

Table 3.12-6. Calculation of Injury/Illness Incident Rates at DPG.

Year	Number of Injuries[1]	Number of Illnesses[1]	Total Injuries and Illnesses[1]	Number of Workers	Number of Hours/Year	Incident Rate
1998	40	0	40	1,128	2,256,000	3.6
1997	38	1	39	1,039	2,078,000	3.8

Table 3.12-6. Calculation of Injury/Illness Incident Rates at DPG.

Year	Number of Injuries[1]	Number of Illnesses[1]	Total Injuries and Illnesses[1]	Number of Workers	Number of Hours/Year	Incident Rate
1996	36	0	36	1,218	2,436,000	3.0
1995	77	0	77	1,292	2,584,000	6.0

1 These numbers include all visits to the DPG Health Clinic and are believed to represent the majority of injuries and illnesses that have occurred at DPG.

SOURCES: Developmental Test Command, 1996; Developmental Test Command, 1997; Developmental Test Command, 1998; Developmental Test Command, 1999; McBride, 2000a

OSHA maintains a database of incident rates for all the major industries in the U.S. This database provides a point of comparison by year and industry for the DPG incident rates. General, manufacturing, and chemical industries were chosen as comparison values because they most closely represent activities at DPG. The workplace injury and illness rate in the U.S. has continued to drop over the last few years, as can be seen in Table 3.12-7, Comparison of Incident Rates for DPG to General, Manufacturing, and Chemical Industries. This trend is also evident at DPG. DPG's incident rates have generally been below comparable national averages from 1995 through 1998.

Table 3.12-7. Comparison of Incident Rates for DPG to General, Manufacturing, and Chemical Industries.

Year	DPG	General Industry	Manufacturing Industry	Chemical Industry
1998	3.6	6.7	9.7	4.2
1997	3.8	7.1	10.3	4.8
1996	3.0	7.4	10.6	4.8
1995	6.0	8.1	11.6	5.5

SOURCE: OSHA, 2000

The total number of occupational injuries and illnesses in the U.S. for 1998 was 5.9 million, which included:

- 5.5 million injuries – 93 percent of the total incident rate
- 392,000 newly reported cases of occupational illness – 7 percent of the total incident rate. Sixty-five percent of the illnesses reported were associated with carpal tunnel syndrome and noise-induced hearing loss.

DPG's similar trend to the national statistics is shown in Table 3.12-6, Calculation of Injury/Illness Incident Rates at DPG. The number of injuries is significantly greater than the number of reported illnesses.

The accident files in DPG's health and safety office indicate that most of the injuries that occur at DPG are minor, such as sprained ankles and minor lacerations. There have been two deaths as a result of accidents occurring on DPG in the last 15 years. In 1990, a soldier died during a parachute exercise, and in 1995, a contractor was killed when he drove his semi-truck off the road and it rolled over. The accident files in the health and safety office do not include all accidents associated with tenant activities such as the Army NG and the AF.

3.12.2.3 Occupational Health and Safety Program Audits

The Army periodically conducts audits and reviews of DPG operations to ensure compliance with established procedures. The operation documentation and procedures are also audited from a programmatic standpoint and an implementation standpoint.

3.12.2.4 Occupational Emergency Evacuation Plans

The following three emergency evacuation plans pertain to DPG workers:

- The DPG Disaster Control Plan (DCP) specifies DPG emergency evacuation procedures for potential emergencies caused by DPG testing activities (DPG, 1986b). Section 2.1.3.3, Management Plans, briefly describes the DCP. There has never been an emergency evacuation at DPG requiring the use of procedures in the DCP.

- The Biological Emergency Response and Assistance Plan describes procedures to be followed in case of a biological mishap or suspected exposure (DPG, 1996d) and provides direction for notifying DOD authorities and local and state officials who will manage the medical emergency or accident.

- The LSTF Emergency Evacuation Plan described in WD-L Standing Operating Procedure (SOP) 329 prescribes the following procedures for safe and effective evacuation of personnel working in high-hazard areas (DPG, 1995b):

    - Chemical Accident/Incident Response
    - Biological Emergency Response and Assistance
    - Fire
    - Non-surety Chemical Spill

- Bomb Threat
- Range Fire
- Earthquake
- Nuclear War
- Radionuclide Spill or Incident

3.12.3 Public Health and Safety

Public health and safety refers to the health and safety of residents of Tooele County, UT who reside at DPG or in areas near DPG, and for public visitors to DPG. Visitors at DPG are not required to adhere to the health and safety programs described in Section 3.12.2, Occupational Health and Safety; however, they should abide by the recommendations of their DPG guide. This section describes public emergency evacuation plans and hazards to public health and safety.

3.12.3.1 Public Emergency Evacuation Plans

The DPG DCP and the Biological Emergency Response and Assistance Plan described in Section 3.12.2.4, Occupational Emergency Evacuation Plans, pertain specifically to DPG workers and residents. In addition, the Tooele County Emergency Operations Plan (TCEOP) provides the following information to Tooele County residents (Tooele County, 1994):

- Hazard analyses for Tooele County
- Guidance to county officials in the event of a natural or man-made disaster
- Guidance to county officials to assist them with recovery operations

The TCEOP contains several annexes covering a wide range of response functions, specific guidance for survival in the event of a nuclear attack, and response procedures for chemical agent events at Tooele Army Depot. Lists of state and Federal agencies that can provide disaster recovery aid and example forms that must be submitted to obtain disaster assistance are also provided in the TCEOP.

3.12.3.2 Public Health and Safety Hazards

Public health and safety hazards are hazards that may adversely impact visitors at DPG and visitors and residents in the area surrounding DPG. Potential public health and safety hazards that may result from activities at DPG include:

- Accidental release of chemical or biological agents
- Artillery, mortars, and missiles missing targets
- Uncontrolled wildland fires resulting from training

Accidental Release of Chemical or Biological Agents – Chemical and biological agents are used within facilities that are specifically designed to prevent accidental release of agents to ambient air. Facilities used for chemical and biological agent testing are described in Sections 2.1.5.1, Biological Defense Testing and 2.1.5.2, Chemical Defense Testing. Appendix B, DPG Facility Control Forms, describes the engineering and administrative controls designed to prevent releases for each facility authorized for chemical and biological agent use. Multiple safety programs, presented in Section 3.12.2.1, Occupational Health and Safety Requirements are followed to prevent accidents. There have been no accidental releases of chemical or biological agents from facilities at DPG.

Artillery, Mortars, and Missiles Missing Targets – Multiple impact areas, shown on Figure 2.1-6, Baseline Locations of Grids, Ranges, and Impact Areas, are used at DPG during testing and training exercises. The White Sage Impact Area is located at the southern border of DPG and is next to public lands managed by the BLM. If munitions miss their target they may hit BLM lands. Because BLM land is accessible to the public, munitions that miss their target may present a safety hazard to the public. In 1996, a NG artillery accident during a training exercise resulted in minor injuries to campers at Simpson Springs Campground located on BLM land.

Uncontrolled Wildland Fires – Wildland fires are common in and around DPG, particularly during the summer months. Fires may be ignited by lightening or accidentally by training activities. The locations of recent fires on DPG are identified on Figure 3.1-4, Fires Occurring at DPG from 1994 through 1998. There are no data indicating how many fires result from training activities. Emissions from wildland fires at DPG could potentially present an acute health risk to the public. If wildland fires spread from DPG to the surrounding area there could be a public safety risk. DPGR 420-8 establishes responsibilities and procedures for prevention, control, and extinguishment of fire on DPG. All fires are to be immediately reported and extinguished as rapidly as possible in accordance with the DPG Fire Management Plan. However, wildland fires have remained uncontrolled for several days. In 1994, there was a 24-hour power outage at DPG as a result of fire (Good, 1994a, Good, 1994b).

DPG has both engineering and administrative controls in place to ensure that fire would not result in a release of chemical or biological agents. All vegetation is removed from areas around Igloo G and the laboratory buildings. Buildings themselves are constructed to withstand natural disasters and all buildings containing chemical or biological agents are under 24-hour security monitoring. DPG also has its own fire department.

3.13 Materials and Wastes

DPG uses a variety of materials and generates a variety of wastes in support of its mission activities. During the public scoping process for this EIS, the public expressed a concern for how these various materials and wastes were managed at DPG. This section discusses materials and wastes used at DPG that have been identified to be of most concern to the public.

Materials that represent a public concern meet any one or more of the following criteria:

- The material is regulated by specific Federal or State of Utah environmental protection laws
- The material is regulated by specific Federal or State of Utah environmental protection laws when it becomes a waste
- The material is a mission material that is the focus of DPG's mission tests, including:
    - Biological agents and simulants
    - Chemical agents and simulants
    - Munitions and energetics
    - Smokes, obscurants, and illuminants

Wastes that represent a public concern meet one or both of the following criteria:

- The waste is regulated by specific Federal or State of Utah environmental protection laws
- The waste is a mission material-related waste generated by the use of mission materials in DPG's mission tests

The main Federal and State of Utah environmental protection laws regulating materials and wastes discussed in this section are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

Wastes identified in this section are divided into the following categories:

- Wastes generated from DPG test and training operations and from DPG mission and installation support activities referred to as installation generated wastes

- Wastes generated as a result of previous activities conducted at DPG referred to as installation restoration wastes

DPG uses its pollution prevention program to reduce the amount of materials used and installation wastes generated at the installation. DPG's pollution prevention program and DPG's materials and wastes are described in the following sections:

- Regulatory Overview
- Pollution Prevention
- Materials
- DPG Generated Wastes
- DPG Restoration Wastes

Wastewater treatment is described in Section 3.2.2.3, Surface Water Quality. DPG does not incinerate any wastes. If incineration were to be conducted in the future, any applicable permits would be obtained through the appropriate regulatory authorities, and additional environmental analysis and documentation would be performed in accordance with NEPA.

3.13.1 Regulatory Overview

Multiple laws and regulations apply specifically to materials and wastes at DPG relevant to this Futures Programs EIS. Laws and regulations governing materials and wastes include those regulating health and safety as well as those regulating traffic and transportation and environmental protection and enhancement. AR 200-1, Environmental Protection and Enhancement, assigns responsibility for and establishes policy for all program areas, most of which are associated with materials and wastes. Hazardous wastes and underground storage tanks (USTs) are regulated by RCRA. Release notification to the National Response Center, long-term cleanup, emergency cleanup and enforcement with cost recovery are regulated by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Lists of the applicable laws and regulations can be found in the reference list of AR 200-1.

3.13.2 Pollution Prevention

Pollution prevention eliminates or minimizes the creation of pollution by reducing the amount of hazardous substances, pollutants, or contaminants before they enter a waste stream. Recycling, treatment, or disposal are not considered to be pollution prevention techniques.

DPG attempts to minimize the amount of materials used and wastes generated through implementation of its pollution prevention program. DPG's Pollution Prevention Plan provides information about DPG's pollution prevention program (AGEISS, 2000d). The pollution prevention program at DPG is managed in accordance with AR 420-47 and AR 200-1 by the Installation's Pollution Prevention Coordinator, with the assistance of a Pollution Prevention Assessment Team.

The long-term pollution prevention goals of DPG are to reduce the use of hazardous materials, reduce the generation of wastes, and reduce emissions of pollutants to the environment.

By 1991, DPG had successfully implemented a 50-percent reduction in all waste streams excluding chemical agent-related waste, based on a 1987 baseline. In 1998, DOD established a new Pollution Prevention Measure of Merit. This Measure of Merit states that by the end of fiscal year 2005, installations will ensure the diversion rate for nonhazardous solid waste is greater than 40 percent, while ensuring integrated nonhazardous solid waste management programs provide an economic benefit when compared with disposal using landfilling and incineration alone. As of 1999, DPG is evaluating installation operations to develop a prioritized list of project and investment strategies with implementation schedules for this pollution prevention initiative.

3.13.3 Materials

Materials that represent a public concern are defined at the beginning of Section 3.13, Materials and Wastes. According to this definition, the following materials are identified at DPG:

- Asbestos
- Biological agents
- Chemical agents
- Biological and chemical simulants
- Hazardous materials
- Munitions and energetics
- Pesticides, herbicides, and rodenticides
- Petroleum fuels
- Polychlorinated biphenyls
- Radioactive materials
- Smokes, obscurants, and illuminants

3.13.3.1 Asbestos

Asbestos containing materials exist within various buildings at DPG. In 1988, a preliminary survey was conducted of approximately 100 buildings at DPG to define the extent of asbestos presence and to recommend approaches to abatement (Diagnostics, 1988). This survey identified both friable and nonfriable asbestos containing materials. Friable materials can crumble under hand pressure thereby allowing the release of fibers into the air. The following types of friable asbestos were identified in buildings at DPG:

- Pipe insulation and lagging
- HVAC flexible connectors
- HVAC duct insulation, lagging, and wrap
- Boiler insulation and lagging
- Boiler flue insulation
- Hot water tank insulation
- Ceiling tile
- Furnace insulation
- Light fixture insulation
- Fire-rated door core

The following types of nonfriable asbestos containing materials were also identified:

- HVAC duct tape and mastic
- Resilient floor tile
- Exterior siding
- Roofing materials

Asbestos is managed according to DPG's Asbestos Management Plan (Lewis, 1996) and Asbestos Abatement Training Manual. Inspections of all buildings at DPG are conducted annually by the installation operations contractor. During these inspections, locations of asbestos containing materials and the buildings that need abatement are noted. Repairs and abatement are done on an as-needed basis or based on building inspection results. Approximately 20 buildings have been completely abated and approximately 70 buildings still have some asbestos containing materials (Schafer, 1999).

DPG's Division of Installation Support (DIS) and the installation operations contractor maintain asbestos records on buildings that have asbestos containing materials or that have been abated. The main laws and/or documents used to manage

asbestos containing materials at DPG are provided in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.3.2 Biological Agents

DPG uses biological agents for the biological defense testing program. The biological defense testing program is regulated under the Biological Defense Safety Program.

Biological organisms that are BL 3 or lower and that have been approved through DPG's environmental and test review process, can be used for biological defense testing at DPG.

Discussion on DPG's BL capabilities and testing activities is in Section 2.1.5.1, Biological Defense Testing. Biological agents are biological organisms such as bacteria or viruses or a product of a biological organism such as toxins. Toxins are chemical products of an organism such as snake venom. CDC applies the term biological agent to all BL categories of biological organisms. In this EIS, any biological organism or toxin that has not been approved for outdoor use at DPG will be referred to as a biological agent.

The LSTF is the only DPG facility where biological agents can be used for testing purposes.

Biological agents that have been used for testing purposes at DPG from 1996 through 1998 are provided in Appendix C, Mission Materials. Descriptions of biological agents are provided in Appendix D, Toxicity Information About Mission Materials.

Registration and controlled storage are required for BL 2 or BL 3 biological agents. The secured storage area at DPG consists of refrigerator(s) and freezer(s) within a double-locked biological holding room in the LSTF. A classified listing is maintained of all items in the secured biological holding area and all withdrawals and returns are logged. Inventory of biological agent holdings at the LSTF is conducted annually to verify the items and quantities in stock (Dynamac, 1992).

Biological agents removed from storage must be grown or cultured to produce enough organisms for test purposes. Because the preparations of microorganisms are unstable they tend to die off during storage, and it is difficult to quantify the total amount of biological agents actually used in testing. Even the analysis conducted to quantify how many organisms are in a particular sample, requires producing more organisms. Since organisms are then destroyed following a test, the amount of biological agents present at DPG can fluctuate greatly in a given period. For this

reason, limits are applied to the maximum quantities of a particular type or strain of biological agent that can be present in the LSTF at one time. These limits are listed in Table 3.13-1, LSTF Biological Agent Maximum Quantity Limits.

Table 3.13-1. LSTF Biological Agent Maximum Quantity Limits.

Category	Maximum Quantity
Bacteria	10^{13} CFU (CFU = colony-forming units in the media)
Rickettsiae	10^{14} ID_{50} (ID_{50} = infectious dose for 50 percent of the exposed population)
Viruses	10^{14} PFU (PFU = plaque-forming units in the media)
Toxins	50 grams

SOURCE: Andrulis, 1998

Special limits are also placed on the maximum quantities of a particular strain or type of biological agent that can be used in a single aerosol test in the LSTF. These limits are listed in Table 3.13-2, LSTF Biological Agent Maximum Aerosol Test Quantity Limits.

Table 3.13-2. LSTF Biological Agent Maximum Aerosol Test Quantity Limits.

Category	Maximum Quantity[1]
Bacteria	3×10^{11} CFU (CFU = colony-forming units in the media)
Rickettsiae	3×10^{11} ID_{50} (ID_{50} = infectious dose for 50 percent of the exposed population)
Viruses	3×10^{12} PFU (PFU = plaque-forming units in the media)
Toxins	120 milligrams

1 With maximum aerosol generation rate of 1 milliliter of slurry per minute and a duration of 30 minutes.

SOURCE: Andrulis, 1998

All infectious biological agents must be handled in Class I, II, or III biosafety cabinets. The difference between these different biosafety cabinet classes is how the airflow is supplied and exhausted. All toxic materials must be handled in fume hoods, glove boxes, or an applicable biosafety cabinet. Specific procedures are required for removal of an infectious biological agent from the confines of a biosafety cabinet within a LSTF laboratory or when an infectious biological agent must be transported from one laboratory to another in the LSTF (DPG, 1998b). At the LSTF, decontamination of test equipment used may include one or more of the following: paraformaldehyde vapor, vaporized hydrogen peroxide, disinfectant solution, and/or steam cycle (DPG, 1998b).

When a test with biological agents is complete, the test officer submits a formal notice and certifies that the biological agent has been appropriately disposed of by either destruction or submittal back to the secured biological holding area. When biological agents are destroyed, a certification of destruction is completed. The

method of destruction is recorded as well as the person responsible for the destruction, witness, and date of destruction (DPG, 1997c).

Biological agents are shipped to DPG for test purposes or shipped from DPG to other locations for analysis. Biological agents and simulants are packaged, labeled, and shipped in accordance with 42 CFR Part 72, Interstate Shipment of Etiologic Agents requirements published by the Public Health Service and 49 CFR 172 and 173 published by the Department of Transportation. These same procedures for biological agents and simulants are used by CDC, NIH, research foundations, and universities. All biological agents are shipped using overnight express package services (Dynamac, 1992; DPG, 1997c). Many shipments consist of samples that must be sent to other laboratories for analysis. The biological agents in these shipments are often gamma irradiated prior to shipment to inactivate the organism (Johnson, 1996). The routes used by DPG for transport of biological agents are described in Section 3.9.5, Transportation of Materials and Wastes.

The main laws and/or documents used to manage biological agents at DPG are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.3.3 Chemical Agents

DPG uses chemical agents in support of its chemical defense testing activities. Section 2.1.5.2, Chemical Defense Testing, describes DPG's chemical defense testing program. DOD and NATO define chemical agents as chemical substances which are intended for use in military operations to kill, seriously injure, or incapacitate people through their physiological effects. Excluded from this definition are riot control agents, herbicides, smoke, and flame retardants (Army, 1996a).

Chemical agents used at DPG are provided in Appendix C, Mission Materials. Toxicological information on chemical agents commonly used at DPG is presented in Appendix D, Toxicity Information About Mission Materials.

Some chemical agents may be sent directly to DPG by the test customer. All other chemical agents are ordered directly through the Ammunition Accountability Branch (AAB) that is responsible for the storage of chemical agents at DPG and accounting for how the agents are used. AAB responsibilities are summarized in Section 2.1.8, Baseline Mission Support Activities. Most chemical agents are sent to DPG on military aircraft under technical escort. However, some chemical agent shipments may also be transported to DPG by motor vehicle (DPG, 1997f). Section 3.9.5, Transportation of Materials and Wastes, describes the routes used by DPG for transport of chemical agents. When an aircraft shipment of chemical agent arrives at MAAF, it is met by both AAB and TEU personnel. AAB personnel sign for the

chemical agent and are provided chemical agent hazard forms. QASAS performs an inspection of all chemical agent shipments prior to their acceptance into storage by the AAB. A summary of QASAS responsibilities is in Section 2.1.8, Baseline Mission Support Activities. The amount of chemical agent accepted into storage is then verified by the AAB.

Chemical agents are transported primarily from the BMTF to other facilities as needed for planned tests. Only DPG employees who are on an approved list are authorized to order chemical agents for test purposes.

Army requirements for handling chemical agent vary based on the concentration and quantity of chemical agent used. Quantities or concentrations of chemical agent exceeding those listed in Table 3.13-3, Dilute Chemical Agent Quantities and Concentrations, are considered to be neat or pure concentrated levels of chemical agent. Neat chemical agents require more stringent safety, security, and accountability controls, including the requirement that testing be conducted in the presence of at least two individuals. All personnel working with chemical agent are trained in the use and handling of chemical agent, PPE, and decontamination procedures. All personnel in an affected building are notified when chemical agent is stored in a new location or moved from an old location.

Table 3.13-3. Dilute Chemical Agent Quantities and Concentrations.

Agents	Maximum Total Quantity (in milligrams)	Maximum Concentration (milligrams per milliliter)
GA, GB, GD, GF	20	2.0
EA 1699	10	1.0
VX	10	1.0
H, HD, HN, HT, T	100	10.0
Lewisite and HL	50	5.0

SOURCE: AR 50-6

Chemical agents intended for test purposes are stored primarily at the BMTF. Small quantities may be temporarily stored at the CCTF and the Chemical Agent Test Chamber as part of defense testing activities. These various facilities are described in Section 2.1.4.2, Primary Indoor Facilities. For a description of the facilities where chemical agent is used, see Section 2.1.5.2, Chemical Defense Testing.

The BMTF has a secure 1.8-m by 3.7-m (6-ft by 12-ft) room for storing chemical agents in which up to 500 kg (1,102 pounds) of chemical agents may be stored. In the CCTF, chemical agent is also stored in a controlled room.

In the BMTF and CCTF, individual containers for neat chemical agent storage are 1 L (0.26 gal) or smaller (DPG, 1999b). In the CCTF all neat chemical agent is stored

in double containers consisting of an inner and outer container (DPG, 2000g). These containers are stored in an approved laboratory hood. Neat chemical agent may be stored in refrigerators in a metal can or over a metal spill tray. Containers of neat chemical agent are marked with a label indicating "TOXIC CHEMICAL" and other descriptive information. Dilute chemical agent may be singly contained and stored in designated refrigerators having high temperature alarms. Dilute chemical agent may be stored in refrigerators in a metal can or over a metal pan of sufficient capacity to hold all of the dilute solution. Chemical simulants are not controlled and managed as chemical agents.

The AAB conducts an inventory of chemical agent every quarter. During this inventory the amounts of chemical agent stored in various locations are determined and all chemical agent that has been used in the past quarter is accounted for.

In addition to the laboratory quantities of chemical agent that are stored at DPG for test purposes, the following types of non-stockpile materiels are stored in Igloo G.

- Range recovered munitions include chemical weapons recovered during range clearing operations. See Section 3.13.5.2, Range Recovered Munitions, for a description of how these chemical weapons are managed.

- Chemical agent that was stored in Igloo G prior to international chemical agent treaty requirements. Igloo G is not approved for storage of chemical agent that will be used for defensive test purposes. However, since this chemical agent was already in Igloo G prior to treaty restrictions, it can continue to be stored in the igloo. This chemical agent can not be used in support of defense and detection tests at DPG, unless the National Inventory Control Point and treaty approval are granted.

Chemical agents in the 7.9 by 24.4-m (26 by 80-ft) earth covered Igloo G are stored in containers with different agents stored separately (DPG, 2000b; Army, 1997a). For more information on Igloo G see Section 2.1.4.2, Primary Indoor Facilities.

The main laws and/or documents used to manage chemical agents at DPG are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.3.4 Biological and Chemical Simulants

DPG often uses simulants in place of the actual biological or chemical agents being studied. A biological or chemical simulant is a chemical or biological organism that shares at least one physical property of the biological or chemical agent under study. In addition to sharing at least one characteristic with the biological or chemical agent under study, the biological or chemical simulant must be less hazardous than the agent. A biological or chemical simulant should be reasonably safe for people to handle and not cause significant environmental or human health effects.

In this EIS, chemical or biological simulants are chemicals or organisms that are approved for outdoor test purposes. Chemicals used as chemical simulants may be VOCs or SVOCs. VOCs are chemicals that vaporize easily. As a general rule, VOCs have a vapor pressure greater than 0.5 mm of mercury and a dimensionless Henry's Law constant of greater than 0.01. SVOCs do not vaporize as easily and tend to adhere to other organic compounds in soil. Organisms used as biological simulants outdoors are BL 1 organisms that have been identified to present no risk to humans or the environment and have been approved through the NEPA review process. DPG prefers using biological simulants for testing purposes. However, DPG still needs to use the actual biological or chemical agent of interest to ensure that equipment would actually protect against the agent or that the equipment can be effectively decontaminated if it were exposed to the actual agent. Biological and chemical simulants are necessary for outdoor biological and chemical defense testing because the release of biological and chemical agents into the open air for such testing is strictly regulated by law (50 U.S.C. 1512).

Biological simulants are stored in the LSTF. Chemical simulants are stored in the CCTF, BMTF, DTC, Chemical Agent Test Chamber, and other various buildings in Carr. These various facilities are described in Section 2.1.4.2, Primary Indoor Facilities. Biological and chemical simulants are used for defense testing purposes at the LSTF, the BMTF, and outdoor locations such as Tower Grid. For outdoor locations where biological and chemical simulant testing is conducted see Figure 2.1-9, Baseline Locations of Biological Defense Testing Activities, and Figure 2.1-11, Baseline Locations of Chemical Defense Testing Activities. Types of biological and chemical simulants that may be used for testing purposes at DPG are listed in Appendix C, Mission Materials. The main laws and/or documents used to manage chemical and biological simulants at DPG are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.3.5 Hazardous Materials

This section describes management of hazardous materials used at DPG in support of the testing, training, and support activities conducted at the installation. Hazardous materials described in this section are materials that when they become wastes, are required to be managed in accordance with the requirements of RCRA. According to this description, some of the other materials discussed in Section 3.13.3, Materials, such as pesticides and petroleum fuels are also considered hazardous materials. However, these other hazardous materials are discussed in separate sections because they have other very specific requirements that regulate them. Hazardous materials at DPG covered by this section include:

- Corrosives
- Flammables
- Laboratory chemicals
- Paints and thinners
- Photo processing chemicals
- Solvents

DPG uses hazardous materials while conducting operations to support its missions.

The following DPG organizations are the primary users of these hazardous materials (UDSHW, 1998a; AGEISS, 2000b):

- WDTC including the Chemical Test Division, Life Sciences Division, Test Operations Division, and Meteorology and Obscurants Division
- DIS
- Logistics Branch
- Tenants such as the Health Clinic and the Utah NG

Hazardous material quantities, storage locations, and methods are presented in DPG's SPCCP/ISCP, which is discussed in Section 2.1.3.3, Management Plans. Material

Safety Data Sheets (MSDSs) presenting hazardous material handling and disposal information are provided by DPG's Safety Office that keeps a master file of these MSDSs. The hazardous material quantities listed in the SPCCP/ISCP (AGEISS, 2000a) were used to develop the baseline hazardous material quantities.

As of October 1998, DPG began tracking hazardous material usage with its Hazardous Substances Management System (HSMS). HSMS was developed by the Secretary of Defense for tracking environmental activities performed by the DOD. This system is described as a "cradle-to-grave" tracking system since it is used to track hazardous materials from their arrival at the installation until they are appropriately disposed of. The system maintains an inventory of all hazardous materials at DPG and can be used to generate environmental reports on hazardous material usage and management. This system provides DPG with an efficient and accurate means for determining the following information:

- Types of hazardous materials ordered, received, issued, and recycled
- Amounts of hazardous materials on hand, in use, and used
- Types and amounts of hazardous waste generated, generation process, and how the hazardous wastes are managed such as recycling, treatment, or disposal

The routes used by DPG for transport of hazardous materials are described in Section 3.9.5, Transportation of Materials and Wastes. The main laws and/or documents used to manage hazardous materials at DPG are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.3.6 Munitions and Energetics

Munitions consist of all ammunition products and components of products including small arms and artillery ammunition, grenades, mines, and cluster munitions and dispensers. Energetics consist of propellants, explosives, and pyrotechnics. Propellants are fuels in powder or compressed solid form used to provide energy for propelling munitions. Explosives are chemicals that undergo a rapid chemical change when ignited resulting in a release of large quantities of energy. There are high and low explosives. Pyrotechnics are flares, illuminants, and smoke devices used for sending signals and/or warnings. Pyrotechnics react to produce light, smoke, sound, or gas.

DPG stores munitions and energetics in support of the testing, training, and support activities conducted at the installation (DPG, 1986a). DPG does not manage or store any air testing or training related munitions. However, these items may be

temporarily stored at DPG once they become a waste. Section 3.13.4.6, Munition and Energetic Wastes, discusses air testing and training related wastes. See Figure 2.1-12, Baseline Locations of Conventional Munitions Testing Activities, for locations where munitions and energetics testing is conducted at DPG. The following two groups are responsible for management of munitions and energetics at DPG (DPG, 1996c).

- QASAS personnel are trained ammunition specialists and are responsible for assuring the safety and serviceability of all DPG munitions and energetics, that munitions and energetics storage and management is conducted properly, and that all munitions and energetics are accounted for.

- AAB personnel are responsible for performing the functions which QASAS personnel oversee.

DPG's munitions and energetics are stored in Carr. Presently, three magazines and 11 igloos (DPG, 1998a) are used to store the following types of munitions and energetics:

- Small arms ammunition (ammunition through 30 mm)
- Ammunition over 30 mm through 125 mm
- Bombs and dispenser munitions
- Grenades
- Rockets
- Land mines
- Military chemical agent and smoke pots
- Pyrotechnics
- Demolition materials such as explosives
- Artillery fuzes and primers

Munitions and energetics may be sent directly to the AAB by the test customer. All other munitions and energetics for testing, for maneuver and training exercises, or for general DPG security requirements must be ordered directly through the AAB (DPG, 1996c). When munitions and energetics arrive at DPG they are inspected by QASAS for integrity and to ensure they were not damaged in shipment. QASAS conducts a visual inspection to see how the item compares to applicable drawings and equipment may be used to verify the integrity of the item (DPG, 2000a).

Following the QASAS inspection of newly arrived munitions and energetics, the items are logged into a record and placed into an appropriate storage location based on their hazard class and compatibility characteristics. All munitions and energetics and their quantities are entered into an ammunition database and logged into a card catalogue system. The card catalogue system is used by DPG to keep an historical record of the munition quantities that are in stock (Eva, 1998). Only DPG employees who are on an approved list are authorized to withdraw ammunition from the AAB. Groups using munitions and energetics at DPG attempt to plan for their activities so that only the amounts required are requested and withdrawn from storage. Therefore, all munitions and energetics are usually used up in testing and training activities.

If munitions or energetics remain following a test, the items may be returned to the test customer, returned to storage at DPG, shipped for storage to an off-installation DOD stockpile facility, functioned, or if necessary destroyed. Functioned means the item is disposed of by using it up in the manner it is suppose to be used, such as firing or igniting the items out on the range. Management of items that must be destroyed is discussed in Section 3.13.4.6, Munition and Energetic Wastes.

Munitions or energetics that were not used following testing and training activities, must be inspected again by QASAS before being returned to storage. If QASAS determines the item is unstable and can not be returned to storage the item becomes a waste. Items such as an opened package of propellant can no longer be returned to storage. These incomplete commodities are also classified as waste and must be handled appropriately. Management of munition and energetic wastes is discussed in Section 3.13.4.6, Munition and Energetic Wastes.

Munitions and energetics that are to be shipped off-installation are packaged and shipped in accordance with the Department of Transportation's 49 CFR requirements (DPG, 1996c). QASAS is responsible for ensuring that the munitions and energetics have been properly prepared prior to shipment off of the installation. The routes used by DPG for transport of munitions and energetics are described in Section 3.9.5, Transportation of Materials and Wastes.

The munition and energetic storage magazines and igloos are located in two separate areas at Carr (Andrulis, 1992). The magazines and eight of the igloos are located within a 0.36-sq km (89-acre) fenced area with posted warning signs. The three remaining igloos are located in a 0.06-sq km (14.8-acre) fenced area.

The main laws and/or documents used to manage munitions and energetics at DPG are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.3.7 Pesticides, Herbicides and Rodenticides

DPG's Pest Management Plan (Griffin-Albers, 1997) uses an integrated pest management approach to control insects, weeds, and rodents at DPG. This approach uses both chemical and nonchemical control methods. Chemicals used at DPG for pest management include pesticides, herbicides, and rodenticides. Nonchemical control methods include traps for mice control and mowing or cutting grass for weed control. Commonly controlled pests include the white grub or cut worm, sod web worm, dandelions, bindweed, Russian thistle, sagebrush, kochia weed, mice, and pocket gophers.

DPG's pest management program uses two State of Utah certified pest control officers. These officers are responsible for the overall management of pesticides, herbicides, and rodenticides at DPG and are trained in pesticide, herbicide, and rodenticide preparation, application, and storage requirements. The pest control officers maintain records of pesticide, herbicide, and rodenticide usage. Two herbicides, Diuron, and Round Up are used throughout the summer at DPG. 2,4-D is applied twice a year to control dandelions (Christiansen, 1999). Most pesticides and rodenticides are used on an as needed basis. Pesticides are mainly sprayed in buildings and in the family housing areas. 2,4-D is mainly used in improved areas, while Roundup is mainly used in parking lots, streetways, and sidewalks. Approximately 1.2 sq km (300 acres) are sprayed with 2,4-D for broadleaf weeds. Approximately 0.4 to 0.6 sq km (100 to 150 acres) are sprayed with Roundup for all weed types. Approximately 0.12 sq km (30 acres) undergo ground sterilization in unimproved gravel areas like substations, which controls weeds for up to 2 years. Rodenticides in the form of anticoagulants and zinc phosphate are used for gophers and mice, both in English Village and installation-wide (Pitt, 2000). Pesticides, herbicides, and rodenticides are stored in English Village in 0.5- to 19-L (1-pint to 5-gallon) plastic or metal containers (AGEISS, 2000a).

The routes used by DPG for transport of pesticides, herbicides, and rodenticides are described in Section 3.9.5, Transportation of Materials and Wastes. The main laws and/or documents used to manage pesticides, herbicides, and rodenticides at DPG are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.3.8 Petroleum Fuels

Various types of petroleum fuels are stored and used at DPG. DIS, DEP, and the installation operations contractor are responsible for managing petroleum fuels at DPG. DEP developed an underground storage tank (UST) monitoring program which monitors the locations and status of the USTs at DPG. Most of the USTs at DPG are not required to comply with any specific Federal or State of Utah

regulations. DEP also manages a database that contains information about all ASTs and USTs at DPG and their locations. DPG USTs are inspected annually by the Tooele County Health Department and DEP maintains a book of these inspections. DPG is planning to eliminate the use of USTs and only use ASTs for storage of petroleum fuels in the future (Craig, 1996).

There are numerous Federal and state regulations about managing and using petroleum fuel materials. A summary of these regulations is provided in the following technical documents used as guidance for managing petroleum fuel materials at DPG:

- Final Tank Farm Pollution Study (AGEISS, 1996d)
- Pollution Prevention Plan (AGEISS, 2000d)
- SPCCP/ISCP (AGEISS, 2000a)

Section 3.9.5, Transportation of Materials and Wastes, describes the routes used by DPG for transport of petroleum fuels.

3.13.3.9 Polychlorinated Biphenyls

DPG is attempting to remove all PCB-containing equipment from the installation. PCBs are toxic heat resistant liquids used in various types of electrical equipment and heat transfer systems (EPA, 1994). Transformers and fluorescent light ballasts are the only types of PCB-containing equipment remaining at DPG (Hancock, 1999a). DPG's DEP and installation operations contractor are responsible for the management of these types of PCB-containing items. Chlorine halogen test kits are used to determine concentrations of PCBs in the transformers. Confirmatory samples are often collected from oil contained in the transformers to verify actual concentrations of PCBs. DPG maintains the analytical results and locations of transformers in their records and a database.

The types of PCB wastes disposed of at DPG are described in Section 3.13.4.9, Polychlorinated Biphenyl Wastes. The main laws and/or documents used to manage PCBs at DPG are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.3.10 Radioactive Materials

The LSTF is the only facility at DPG that may use radioactive materials for testing purposes in the form of radionuclides used as tracer materials (McBride, 1999). The LSTF did not use radioactive materials during the baseline years of 1996, 1997, or 1998 (McBride, 1999). However, if the need arises, radionuclides may be used as

tracer materials again in the future. The Life Sciences Division and the Chemical Test Division also use analytical instruments that contain small amounts of radionuclides. These are considered to be sealed sources of radionuclides. DPG is responsible for maintaining a current NRC license to store and use radioactive materials.

Procedures for ordering and receiving, use, decontamination, storage, personnel protection, and personnel monitoring of radioactive materials are specified in the Life Sciences Division's WD-L SOP 335, Safe Use of Radioactive Substances for Biological Investigations (DPG, 1997e).

The main laws and/or documents used to manage radionuclides at DPG are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.3.11 Smokes, Obscurants, and Illuminants

A variety of smokes and obscurants are used for indoor and outdoor tests and training activities at DPG. Illuminants are not used indoors. General descriptions of how smokes, obscurants, and illuminants are used for testing and training purposes at DPG are provided in Section 2.1.5.6, Smoke, Obscurant, and Illuminant Testing, and Section 2.1.6.1, Ground Training.

Smokes consist of small solid or liquid particles which become hydrated in contact with air and therefore intercept or diffuse light (Army, 1996b). Obscurants include smokes, graphite fibers, graphite flakes, and brass flakes. Smokes, obscurants, or other materials used to "interfere" with the intended function of a piece of equipment are called interferents. At DPG, interferents are used during testing of biological/chemical detectors to evaluate how an interferent would impact the detector's ability to function. The same material might be used for more than one purpose. For example, a material used as an obscurant in one test might be used as an interferent in another test. Furthermore, smokes and obscurants may be interferents, but not all interferents are smokes and obscurants.

Illuminants are used for signaling, warning, and lighting purposes and consist of a mixture of materials used in pyrotechnic devices to produce high intensity light. Illuminants can be designed to provide light for both ground and air operations and can be deployed by hand, artillery, or aircraft.

Some smokes and obscurants present more of a potential hazard to the environment than others.

The smokes and obscurants considered to be most persistent with the potential to cause adverse impacts to the environment include fog oil, diesel, gas turbine fuel, hexachloroethane (HC), red phosphorus, white phosphorus, colored smokes, and brass powder (Battelle, 1988).

The types of smokes and obscurants that may be used for testing and or training purposes at DPG are listed in Appendix C, Mission Materials and toxicological information on these smokes and obscurants is presented in Appendix D, Toxicity Information About Mission Materials.

Many of the smokes and obscurants such as the phosphorous smokes, HC smoke, and brass powder are components of different types of burning and bursting munitions (Shinn et al., 1987), therefore, these smokes and obscurants are managed as munitions. Munitions and energetics management is discussed in Section 3.13.3.6, Munitions and Energetics.

Other smokes and obscurants dispersed through aerosolization include fog oil, diesel fuel, graphite fibers and flakes, kaolin dust, and brass flakes. Brass flakes, fog oil and diesel fuel are contained in drums; graphite fibers and flakes are contained in boxes or cans; and kaolin dust is contained in bags. These materials are stored at Carr. Smokes, obscurants, and illuminants shipped to DPG are inspected when they arrive to ensure they were not damaged during shipment. If the material is fog oil or diesel fuel, it is treated as a fuel or combustible material.

The Chamber Test Facility Branch is responsible for test execution, management of materials, and equipment and material maintenance for these smokes and obscurants. The Obscurants and Environmental Test Branch provides the test director. Personnel who work with aerosolized smokes and obscurants are trained in using the disseminators and follow established SOPs.

Groups using aerosolized smokes and obscurants attempt to plan their activities so that only the amounts required are requested and withdrawn from storage. The activity is usually performed until the material runs out. If material remains after the activity, it is returned to storage at DPG. The main laws and documents that pertain to the management of smokes, obscurants, and illuminants are provided in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.4 DPG Generated Wastes

Wastes that represent a public concern are defined in Section 3.13, Materials and Wastes. The following wastes are identified at DPG:

- Asbestos waste
- Biological agent-related waste

- Chemical agent-related waste
- Hazardous wastes
- Medical-related wastes
- Munitions and energetic wastes
- Pesticide, herbicide, and rodenticide wastes
- Petroleum fuel-related wastes
- PCB wastes
- Radioactive waste
- Smoke, obscurant, and illuminant-related wastes
- Solid wastes

Each of these wastes is described in the following sections. Wastewater treatment is described in Section 3.2.2.3, Surface Water Quality.

3.13.4.1 Asbestos Waste

Asbestos wastes may be generated from the removal of asbestos containing materials found in buildings and piping systems at DPG. The various types of asbestos containing materials that can be found at DPG are discussed in Section 3.13.3.1, Asbestos. Asbestos removal and abatement at DPG is conducted by certified contractors. During removal operations, asbestos waste is placed in 6-mil or thicker double plastic bags. The bags are labeled with the name of the waste generator, the location where the waste was generated, and tagged with a warning label. DPG contractors bring asbestos wastes to DPG's landfill for final disposal. A manifest for tracking the appropriate disposal of the asbestos waste is prepared by the contractor prior to transport. The contractor keeps one copy of the manifest and a copy is also provided to the landfill operator. Asbestos wastes at the landfill are managed in accordance with procedures specified in the Permit Application for the English Village Landfill (AGEISS, 1998d). According to landfill records, approximately 400 pounds of asbestos waste were disposed of at the DPG landfill in 1997.

The main laws and/or documents used to manage asbestos wastes at DPG are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.4.2 Biological Agent-Related Waste

Biological agent-related wastes are produced at DPG as a result of biological defense testing conducted by the Life Sciences Division. All biological agent-related liquid and solid wastes such as PPE, paper towels, sharps, agar solutions, and petri dishes are sterilized with steam in an autoclave. The sharps such as razor blades, scalpel blades, and syringes are placed in industrial accepted biological sharps containers and

sealed shut prior to autoclaving. Once autoclaved, these wastes are considered to be standard solid wastes and can be disposed of at the English Village Landfill (Johnson, 1996). Air filters in the LSTF air filtration system and in the biosafety cabinets are also autoclaved and disposed of in the landfill. It is estimated that 18 cubic m (24 cubic yards) of biological-related waste is disposed of in the landfill annually (Parker, 2000).

The main laws and/or documents used to manage biological and medical-related wastes generated at DPG are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.4.3 Chemical Agent-Related Waste

Chemical agent-related wastes are produced as a result of DPG's chemical defense testing conducted by the Chemical Test Division. Chemical agent-related waste is not regulated by Federal RCRA requirements. However, the State of Utah regulates it as a hazardous waste. Chemical agent-related wastes at DPG are managed in accordance with DPG's Chemical Agent Waste Management Plan (CAWMP) (AGEISS, 1999a) and the waste analysis plan in DPG's RCRA Permit (UDSHW, 1998b). Section 2.1.3.3, Management Plans, describes the CAWMP. All chemical agent-related materials are decontaminated before becoming wastes. Decontamination procedures are described in the CAWMP. The waste analysis plan describes analyses required before chemical agent-related materials can be managed as wastes.

The majority of chemical agent-related waste results from decontamination of materials involved in chemical defense testing activities. Section 2.1.5.2, Chemical Defense Testing, describes DPG's chemical defense testing program and the locations where chemical agent may be used for testing purposes. Chemical agent-related wastes are handled much in the same way as hazardous wastes discussed in Section 3.13.4.4, Hazardous Wastes. Following test operations, waste generators are responsible for transferring any generated chemical agent-related wastes to a satellite accumulation point or a 90-day storage area. Chemical agent-related wastes at all satellite accumulation points are segregated by the type of agents and the decontamination solution used. The main difference regarding managing chemical agent-related wastes and the hazardous wastes discussed in Section 3.13.4.4, Hazardous Wastes, is that prior to transport to the CHWSF, chemical agent-related wastes have been effectively decontaminated. The DPG hazardous waste contractor transports waste from the satellite accumulation points or 90-day storage area to the CHWSF after analytical results are received confirming that no chemical agent is

present. The hazardous waste contractor then manages chemical agent-related wastes as described in Section 3.13.4.4, Hazardous Wastes.

The chemical agent-related wastes generated at DPG are classified into the following main categories (UDSHW, 1998b):

- Spent decontamination solutions result from using decontamination solutions to decontaminate test items exposed to various chemical agents. Decontamination solutions used include bleach, alcohol caustic, and sodium hydroxide solutions.

- Decontaminated test-related debris includes the following types of solid test items which must be decontaminated following test operations:

  - Test supplies and equipment such as mask canisters, vehicles, mannequins
  - Operations equipment such as contaminated expendable equipment and supplies, filters, hoses
  - PPE such as boots, masks, gloves
  - Laboratory wastes such as expendable plasticware, glassware, paper towels

- Debris combined with decontamination solutions consists of decontaminated solid items, that are combined with liquid decontamination solutions in a storage container

- Ventilation system wastes that result from the removal of contaminated filters, plenums, and ductwork from building ventilation systems where chemical agent testing is conducted

- Miscellaneous chemical agent-related wastes consist of such items as oils and hydraulic fluids potentially contaminated with chemical agent

There are two less common categories of chemical agent-related wastes generated at DPG:

- Spills involving chemical agents are another potential source of chemical agent-related wastes. Spills may occur at any of the facilities where chemical agent is used. These spills may generate additional chemical agent-related wastes materials such as PPE, soil contaminated with the spill material, or spill response equipment. These wastes are assigned the State of Utah waste code for pure chemical agent as well as the chemical agent-related waste residue code. The spilled materials are then managed as other chemical agent-related wastes.

- IRP wastes and investigation derived waste (IDW) may also be potentially contaminated with chemical agent. Chemical agent analysis is performed on IRP wastes and IDW when site history indicates a possibility of chemical agent contamination. If analysis indicates a presence of chemical agent, the IRP wastes and IDW are decontaminated. These wastes are then managed as described in Section 3.13.5.1, Installation Restoration Program.

Section 3.9.5, Transportation of Materials and Wastes, describes the routes used by DPG for transport of chemical agent-related wastes. The main laws and/or documents used to manage chemical agent-related wastes generated at DPG are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.4.4 Hazardous Wastes

DPG generates hazardous waste during fulfillment of its mission testing and training activities and related support activities. Mission testing activities which can result in the generation of hazardous wastes, include chemical and biological defense; conventional munitions; smoke, obscurant, and illuminant; physical; and ECRT testing. See Section 2.1.5, Baseline Testing Activities, for a description of these testing activities.

Hazardous wastes described in this section are regulated as RCRA coded wastes and meet the requirements of the Federal RCRA and the State of Utah hazardous waste. Petroleum fuel waste which, based on analytical results, is not RCRA coded waste is discussed in Section 3.13.4.8, Petroleum Fuel-Related Wastes. If a petroleum fuel waste is also coded as a RCRA waste, it is considered a hazardous waste. Hazardous wastes generated at DPG include:

- Charcoal filters
- Corrosives
- Flammables
- Laboratory chemicals
- Paints and thinners
- Petroleum, Oils, and antifreeze sludges
- Photo processing chemicals
- Solvents

This section describes how these hazardous wastes are generated, stored, and managed at DPG. Managing RCRA or State of Utah hazardous wastes as chemical agent-related wastes, munition and energetic-related wastes, and petroleum fuel-related wastes is discussed in Section 3.13.4.3, Chemical Agent-Related Waste,

Section 3.13.4.6, Munition and Energetic Wastes, and Section 3.13.4.8, Petroleum Fuel-Related Wastes, respectively. Managing potentially hazardous wastes resulting from installation restoration activities is discussed in Section 3.13.5.1, Installation Restoration Program.

A description of the primary hazardous waste types and volumes generated at DPG in 1996, 1997, and 1998 is provided in Appendix K, DPG Hazardous Waste Types and Volumes Generated. This appendix also presents a list of the DPG activities that typically generate these hazardous wastes.

DPG generators are required to manage their hazardous wastes in compliance with applicable RCRA regulations. This is accomplished by adhering to the DPG Hazardous Waste Management Plan (HWMP) (AGEISS, 2000b) and the waste analysis plan in DPG's RCRA permit (UDSHW, 1998b). The HWMP is briefly described in Section 2.1.3.3, Management Plans. In general, when generators believe a hazardous waste will be generated, they contact the hazardous waste management contractor to coordinate storage and disposal of the anticipated waste. The generator accumulates the waste at a satellite accumulation point or a 90-day storage area. Generally, waste is stored at a satellite accumulation point until an accumulation limit is reached. Up to 55 gallons of hazardous waste or one quart of acutely hazardous waste can be stored without a permit. The waste is then sampled by the hazardous waste management contractor for analysis, and moved to a 90-day storage area or the hazardous wastes storage facility within 72 hours. Storage time in the 90-day storage area does not exceed 90 days unless an extension has been granted by the State due to unusual circumstances.

The generator arranges for chemical and/or physical analyses to be conducted on a sample of the waste to obtain information to properly characterize the waste so that it may be stored safely and the appropriate treatment and disposal methods chosen. A Utah certified laboratory analyzes the waste samples. If generator knowledge is sufficient to fully characterize a waste, waste analysis is not required.

The generator enters information regarding their generated waste into the DPG Hazardous Waste Tracking Database and labels the waste container. The generator's data are reviewed by the hazardous waste management contractor who can accept or reject the characterization. All wastes that are rejected by the hazardous waste management contractor typically require supplemental testing to help further characterize the waste.

The hazardous waste management contractor is responsible for the ongoing management of the hazardous waste at the CHWSF. The CHWSF was constructed to

provide a centralized storage area for the storage of hazardous wastes generated at DPG before transportation to an off-installation TSDF. See Section 2.1.4.2, Primary Indoor Facilities, for a more detailed description of DPG's CHWSF. Upon receipt of hazardous waste at the CHWSF, the waste is segregated for storage in accordance with DPG's RCRA permit. While the containers are in storage, the hazardous waste management contractor inspects the containers weekly for leaks and damage prior to transport off-installation. Generally, the waste is moved from the CHWSF to an off-installation TSDF, but occasionally the waste may be transported directly from a generator location.

The hazardous waste management contractor and/or the Defense Reutilization and Marketing Office (DRMO) make arrangements with licensed and permitted hazardous waste transporters to remove hazardous waste to off-installation TSDFs for final treatment and/or disposal. The hazardous waste management contractor is responsible for verifying that all containers have been accurately marked and labeled, that all appropriate documentation is complete, and that all vehicles transporting hazardous waste are placarded appropriately. DEP is responsible for signing hazardous waste documentation such as manifests and land disposal restriction notification forms. Applicable regulations and manifesting requirements for off-installation transport are summarized in the HWMP. Section 2.1.9, Baseline Installation Support Activities, summarizes Environmental Programs.

At times wastes are discovered at DPG outside of a known hazardous waste generating activity. These unknown wastes are referred to as orphan wastes. Examples of orphan wastes are small quantities of unlabeled, unmarked, or unclaimed containers or materials. DEP assumes generator responsibility for these wastes and researches the wastes to attempt to establish a history of the wastes. These wastes are then assigned hazardous wastes codes based on the results of research and analytical tests and if appropriate, they are managed as other hazardous wastes.

Another potential source of hazardous wastes are spills involving chemicals or fuels. Spills may occur at various DPG locations, including hazardous wastes storage locations such as the CHWSF, satellite accumulation points, and 90-day storage areas. These spills may generate additional hazardous materials such as PPE, soil contaminated with the spill material, or spill response equipment. These wastes are assigned hazardous waste codes according to the spilled materials and managed as other hazardous wastes.

There are many hazardous wastes generated at DPG that are collected and recycled by a vendor such as oil, oil filters, antifreeze, hydraulic fluid. Oil filters are collected

for oil and metal reclamation. The oil is removed from the filters and is either recycled or disposed of. Filter casings are usually crushed and reclaimed for their metal content. Other materials that are reclaimed or recycled include batteries, silver, and a number of solvents. If for some reason these wastes can not be recycled, they are managed as other hazardous wastes. Batteries, fluorescent lamps and thermostats fall under the Universal Waste rules and are managed separately from other hazardous wastes.

The routes used by DPG for transport of hazardous waste are described in Section 3.9.5, Transportation of Materials and Wastes. The main laws and/or documents used to manage hazardous wastes generated at DPG are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.4.5 Medical-Related Wastes

Medical-related wastes are produced by the DPG Health Clinic in English Village and the Ditto first aid station. Medical-related wastes are considered to be clinic infectious wastes such as surgical instruments, bandages, human blood, patient cultures, and PPE. These clinic infectious wastes are identified at the point of origin, placed in rigid or semirigid leak-proof containers, and double-bagged in red biohazard bags before removal from the collection site. The infectious wastes are then transferred to the Health Clinic's laboratory for autoclaving prior to disposal at the English Village Landfill (Castro, 1997). As in the LSTF, sharps in the Health Clinic are placed in a rigid sharps container prior to being autoclaved. It is estimated that 46 cubic m (60 cubic yards) of medical-related waste is disposed of in the landfill annually (Smith, 1999).

3.13.4.6 Munition and Energetic Wastes

Munition and energetics wastes may be generated by any group conducting testing or training activities at DPG. However, the following activities are the primary generators of munition and energetic-related wastes at DPG:

- Physical Testing
- Conventional Munitions Testing
- ECRT Testing
- Air Testing and Training

More information on these testing activities is provided in Sections 2.1.5.7, Physical Testing; 2.1.5.3, Conventional Munitions Testing; 2.1.5.4, Environmental Characterization and Remediation Technology Testing; 2.1.5.8, Support to Air Testing; and 2.1.6.3, Support to Air Training. Munitions and energetics are described

in Section 3.13.3.6, Munitions and Energetics. Munition and energetic wastes result when residues and UXO are collected and removed from the range during range clearance operations or residue is collected from indoor test operations (Bodrero, 1999a). Management of UXO is discussed in Section 3.13.5.2, Range Recovered Munitions. Munition and energetic related wastes also result when energetics have exceeded their shelf life or do not meet the item's specified quality assurance standard. A rare munition and energetic-related waste situation that occurs at DPG is when munitions do not dislodge properly from an aircraft conducting testing or training activities over the UTTR. This situation is referred to as hung ordnance. If an aircraft has a hung ordnance it must land at DPG's MAAF rather than fly back to its starting point and the hung ordnance must be destroyed at DPG.

As described in Section 3.13.3.6, Munitions and Energetics, groups usually completely use the munitions or energetics they have withdrawn from storage for testing or training activities. However, at times test or training items remain after completion of the activity. QASAS must determine whether remaining test or training items intended for storage are stable. If QASAS determines the item is unstable, it becomes a waste. QASAS may determine items to be waste if they did not function properly, such as UXO, or munitions that have been handled many times, for example munitions that have undergone drop tests or have been thermally challenged. Items that remain after a test and that will not be returned to the test customer, returned to storage at DPG, shipped for storage to an off-installation DOD stockpile facility, or functioned, must be destroyed. Any items such as an opened package of propellant are categorized as incomplete commodities that can no longer be returned to storage and are classified as waste.

Unstable munitions and energetics, energetics which have exceeded their shelf life or do not meet the item's specified quality assurance standard, and munition and energetic related residues which are determined to contain explosives are brought to DPG's on-installation OB/OD facility. Section 2.1.4.2, Primary Outdoor Facilities, describes the OB/OD facility. Explosive munitions specialists are responsible for treatment of munition and energetic related wastes at the OB/OD area. Section 2.1.8, Baseline Mission Support Activities, summarizes Technical Escort responsibilities. Most items brought to the OB/OD area must be detonated. However, items such as bulk propellants are burned since unlike other items, propellants will burn without having to be detonated. Items are detonated until no explosive residues remain.

Following OB/OD treatment, metal scraps are disposed of at the English Village Landfill or collected and sent to the DRMO for recycling (Bodrero, 1999). Any residual wastes such as ash, are collected and stored at a satellite accumulation point until they can be sent to the CHWSF. At the CHWSF samples are sent to a

laboratory to determine whether the residues are hazardous. Residues determined not to be hazardous can be disposed of at the English Village Landfill. Hazardous residues must be sent off-installation for disposal at an approved facility.

At DPG, CM use by the AF does not produce many wastes. Except for Conventional Air Launched Cruise Missiles (CALCMs), which are obliterated upon impact, CM components are recovered. Wastes produced through CM testing and training missions include non-recoverable scrap from obliterated CALCMs. Other payloads, such as depleted uranium used for ballast or instrument clusters, are recoverable and are not wastes (Teters, 1999).

As of 1999, DPG is working to determine how munition and energetic wastes that result from range testing and training activities need to be managed to comply with 40 CFR Part 260, the Federal Military Munitions Rules finalized in February 1997 (EPA, 1997a). The Federal Military Munitions Rule states that munitions used for their intended purpose are not solid wastes. Under this rule, when a munition at DPG is used for training of military personnel or development, testing, and evaluation purposes, a waste product is not generated. Solid waste is not produced when a munition is destroyed on the range as part of range clearance operations. However, any munition residue shipped off range for disposal and treatment is a solid waste. As of December 2000, the State of Utah is evaluating adopting an amended version of the Military Munitions Rule, which may be more stringent than the Federal Rule.

The main laws and/or documents used to manage munition and energetic wastes at DPG are listed Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.4.7 Pesticide, Herbicide, and Rodenticide Wastes

DPG attempts to completely use up all pesticides, herbicides, and rodenticides or turn them in for re-use or resale instead of disposing of them as a waste. Usually, no more than 38 L (10 gallons) of pesticide, herbicide, and rodenticide wastes are stored, until they are picked up for disposal by DPG's hazardous waste contractor (Christiansen, 1999). The hazardous waste contractor then manages these pesticide, herbicide, and rodenticide wastes as described in Section 3.13.4.4, Hazardous Wastes.

3.13.4.8 Petroleum Fuel-Related Wastes

Petroleum fuel-related wastes described in this section are wastes, which based on analytical results are not regulated as hazardous wastes. Petroleum fuel-related wastes are primarily generated at DPG by the motor pools, MAAF, English Village tank farm, and from the removal of USTs and ASTs. DPG attempts to recycle empty

ASTs and USTs that were used for storing petroleum fuels. Recycled ASTs and USTs are managed according to the salvageable tank program procedures in the DPG landfill permit application (AGEISS, 1998d).

Petroleum contaminated soils are generated as a result of the removal of USTs at DPG. These petroleum contaminated soils are being stored at the English Village Landfill until they can be treated at the Bioremediation Treatment Facility being designed at DPG. This facility will be located directly adjacent to the existing landfill. TPH concentrations ranging from nondetect to 10,000 parts per million (ppm) are expected to be treated at this facility. Techniques that will be used to bioremediate these petroleum contaminated soils are provided in the design analysis for the Bioremediation Treatment Facility (USACE, 1997).

The main laws and/or documents used to manage petroleum fuel-related wastes at DPG are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.4.9 Polychlorinated Biphenyl Wastes

PCB wastes are managed by the installation operations contractor who monitors the locations of PCB-containing materials and the hazardous waste management contractor who is responsible for storing the PCB containing materials until they can be shipped off-installation for final disposal (Hancock, 1999a).

The DPG hazardous waste management contractor stores PCB wastes at a building located next to the CHWSF near Five Mile Hill. A logbook is maintained of all PCB-containing items disposed of by DPG. The DRMO is responsible for contacting an approved treatment storage and disposal facility to dispose of the PCB wastes off-installation in accordance with appropriate Federal regulations.

Transformers and fluorescent light ballasts are the only types of PCB-containing items remaining at DPG. Between 1987 and 1990 all transformers containing greater than 500 ppm of PCBs were removed from DPG (Merill, 1998). By 1992, all transformers containing PCBs had been removed from operation at DPG (Hancock, 2000). According to DPG's PCB storage and inventory log, ballasts were the only type of PCB containing waste with PCB levels greater than 500 ppm disposed of by DPG in 1997 and 1998.

Some transformers containing PCBs were stored historically in a building at Fries Park. This location is now part of SMWU 48. See Section 3.13.5.1, Installation Restoration Program, for a discussion on SWMUs and Appendix E, Solid and Hazardous Waste Management Units at DPG, for a discussion on SWMU 48.

Elevated PCB concentrations greater than 50 ppm were detected in the soil near this site. According to Foster Wheeler (FWEC, 1997a) DPG would excavate the contaminated soil, have it hauled to an off-installation storage facility, and arrange for it to be transported to an off-installation hazardous waste management facility for disposal.

The routes used by DPG for transport of PCB wastes for disposal off the installation are described in Section 3.9.5, Transportation of Materials and Wastes. The main laws and/or documents used to manage PCB wastes at DPG are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.4.10 Radioactive Waste

The Life Sciences Division is the only group at DPG that has required an NRC license to use radioactive materials for testing purposes. When radiological wastes are generated, the Life Sciences Division disposes of them in approved containers, which are labeled and packaged according to the Life Sciences Division's WD-L SOP 335, Safe Use of Radioactive Substances for Biological Investigations (DPG, 1997e). These containers are held for pick-up and disposal by a radioactive waste contractor. Radioactive material was not used at DPG during the baseline years of 1996, 1997, or 1998 and therefore no uncontained radioactive waste was produced.

Historical records and analytical sampling results indicate that radioactive wastes may have been disposed of at various SWMUs at DPG. SWMUs that potentially contain radiological wastes are listed in Appendix E, Solid and Hazardous Waste Management Units at DPG. For a discussion on SWMUs, see Section 3.13.5.1, Installation Restoration Program

The main laws and/or documents used to manage radioactive wastes at DPG are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.4.11 Smoke, Obscurant, and Illuminant-Related Wastes

DPG generates smoke, obscurant, and illuminant-related wastes from the use of smoke, obscurant, and illuminant delivery devices such as munitions that contain smokes, obscurants, or illuminants. Many of the smokes and obscurants contained in these delivery devices such as white phosphorus, red phosphorus, fog oil, sulfuric hydroxide obscurant, and HC are considered to be hazardous chemicals. Most smokes, obscurants, and illuminants are released to the atmosphere during testing and training and are discussed in Section 3.3, Air Resources. However, discarded unspent munitions and residues from spent munitions containing these smokes, obscurants, and illuminants are managed as the hazardous wastes described in

Section 3.13.4.4, Hazardous Wastes (AGEISS, 2000b). Munition housings that contained these types of smokes, obscurants, and illuminants that are completely spent are managed as nonhazardous wastes.

The main laws and/or documents used to manage smoke, obscurant, and illuminant-related wastes at DPG are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

3.13.4.12 Solid Wastes

For this EIS, solid waste refers to sanitary, construction, and demolition wastes, and properly containerized asbestos. Sanitary wastes also include autoclaved biological agent-related and medical-related wastes, and nonhazardous portions of munition and energetic wastes and smoke, obscurant, and illuminant-related wastes.

Solid waste generated at DPG is disposed of in the English Village Landfill which is a permitted Class II landfill. Class II landfills accept a maximum of 18,000 kg (20 tons) of waste per day. The landfill is located 4.8 km (3 mi) west of English Village, and less than 0.8 km (0.5 mi) west of Fries Park. It is approximately 396 by 1,524 m (1,300 by 5,000 ft), incorporating 0.61 sq km (150 acres). The English Village Landfill began operation on November 30, 1987. The initial 0.12-sq km (30-acre) phase has been covered with soil and seeded with grass. In October 1990, a 0.24-sq km (60-acre) phase was opened, and is in use. No date has been projected for landfill closure. Over 60 percent of landfill capacity remains and it is expected to accept wastes at least through 2026.

DIS is responsible for the landfill operator, which is the installation operations contractor. DEP is responsible for quarterly inspections. The landfill is open 5 days a week. Refuse drop-off from DPG dumpsters and residences occurs 5 days per week. Contractors and residents may bring refuse directly to the landfill for disposal.

There is also a 0.04-sq km (10-acre) Class IV monofill located in the center of the Baker Strong Point target complex. The Baker Strong Point Monofill is composed of two distinct 0.02-sq km (5-acre) units and is solely for bomb wastes generated at Baker Strong Point. Bomb wastes consist of practice bombs, shells, rockets, and associated materials such as parachutes. Wastes contain no hazardous material, explosive residue, live bombs, or other explosives. HAFB EOD manages the Baker Strong Point Monofill.

3.13.5 DPG Restoration Wastes

DPG restoration wastes include the following two wastes:

- Waste from sites which are potentially contaminated with hazardous materials
- Munitions which are recovered from the range

Potentially contaminated sites at DPG are the result of historic operations conducted to support DPG's mission of chemical, biological, and conventional weapons and equipment testing. In 1986, Congress established the DERP to clean up military sites with hazardous wastes that may pose a threat to human health and the environment.

3.13.5.1 Installation Restoration Program

DPG's IRP is used to address management of sites at the installation that are potentially contaminated with hazardous materials. These potentially contaminated sites at DPG consist of SWMUs, HWMUs, and AOCs.

SWMUs and HWMUs at DPG are primarily sites that resulted from historical operations, including material storage and waste disposal practices. Contaminants of concern at the various SWMUs include caustics, chemical agents, chemical ABPs, explosives, metals, PCBs, solvents, VOCs, and SVOCs (Ebasco, 1995a; PES, 1996). For a description of these SWMUs, see Appendix E, Solid and Hazardous Waste Management Units at DPG.

AOCs are locations being used for mission activities at DPG where the State of Utah identified that a concern exists for the potential release of hazardous materials to the environment. The AOCs most common at DPG are the test ranges that have been used for open-air and other testing of chemical, biological, and conventional weapons (USHWCB, 1992). Figure F-1, Areas of Concern at DPG, identifies the locations of these areas. A brief description of these AOCs is presented in Appendix F, Areas of Concern at DPG.

The following two types of wastes are produced as a result of the IRP investigation/clean-up process.

- IDW is generated as a result of site investigations to identify whether contamination exists and to what extent it exists. IDW consists primarily of environmental media such as soil and groundwater.

- IRP wastes are generated as a result of SWMU clean-up activities. IRP wastes consist primarily of environmental media such as soil and groundwater and potentially contaminated debris such as concrete, wood, and metal.

IDW is managed by the DPG hazardous waste contractor in accordance with the DPG IDW Management Plan (AGEISS, 1995a) or a site specific IDW management plan approved by the State of Utah (Davis, 1999). Generated IDW is transferred to a 90-day storage area where samples are drawn to determine if the wastes are hazardous. Wastes determined to be hazardous are then transferred to the CHWSF prior to transport to an approved off-installation facility for final disposal. The hazardous waste contractor then manages IDW as other hazardous wastes described in Section 3.13.4.4, Hazardous Wastes.

IRP-generated wastes are managed by the contractor conducting the remediation activities in accordance with the remediated site's State of Utah approved work plans. IRP wastes may also be sent to the CHWSF and then managed as other hazardous wastes described in Section 3.13.4.4, Hazardous Wastes.

In early 2000, DPG established a formal Restoration Advisory Board, which is comprised of approximately 20 members representing diverse community interests. The Board addresses issues pertaining to the Installation Restoration Program.

3.13.5.2 Range Recovered Munitions

Since it was established in 1942, DPG has conducted open-air munitions testing and training activities. These munitions can penetrate the soil surface on impact and remain buried and relatively undamaged. Over a period of time, frost heaving and erosion can bring these buried munitions to the surface. Munitions exposed in this manner, are referred to as range recovered munitions since they must be collected from the range by Technical Escort personnel. For a summary of Technical Escort responsibilities, see Section 2.1.8, Baseline Mission Support Activities.

Because DPG conducted open-air testing of chemical munitions in the past, Technical Escort must determine if the range recovered munitions contain chemical agent. The following techniques are used by Technical Escort to determine if a range recovered munition contains chemical agent.

- Reviewing historical information such as markings found on the range recovered munition - a date, the manufacturer, a serial number - and historical records such as test plans.
- Using x-ray analysis to identify whether the munition has a liquid fill.
- Using Portable Isotopic Neutron Spectroscopy (PINS) to measure the munition's liquid fill to determine if it contains chemicals commonly found in chemical

agents. Because PINS uses radiation to identify the presence of these chemicals, the munition is not penetrated to conduct this analysis.

- Analyzing all the information gathered for a range recovered munition to validate if it contains chemical agent. This analysis is conducted by the Munitions Assessment Review Board, comprised of explosive munition and chemical agent experts.

When a range recovered munition is discovered, Technical Escort personnel examine the historical information to identify whether the munition may contain chemical agent. In addition to using x-ray analysis to identify the presence of a liquid fill, it is used to examine the integrity of the munitions components to determine if the range recovered munition is safe to transport. If it is determined that the range recovered munition is a conventional munition and is safe to move, the munition is transported to DPG's permitted OB/OD facility for detonation. For a description of DPG's OB/OD facility, see Section 2.1.4.3, Primary Outdoor Facilities. If the range recovered munition is identified as a conventional munition, but unstable for transfer, an emergency destruction permit is requested from the State of Utah and the munition is detonated in place out on the range. Undamaged conventional munitions may be detonated in place without a permit under the Military Munitions Rule (EPA, 1997a).

Range recovered munitions that potentially contain chemical agent and are safe to transport, are then transported to Carr for further analysis using PINS. If PINS analysis indicates chemical agent may be present, the munitions are transported to Igloo G. For a more detailed description of Igloo G, see Section 2.1.4.2, Primary Indoor Facilities. Munitions are placed in Igloo G pending final review of the munition's data by the Munitions Assessment Review Board. DPG has an interim status RCRA permit from the State of Utah allowing them to store chemical munitions at Igloo G. At this time, these range recovered munitions will be stored in Igloo G until final disposal. The Army is examining various disposal methods. If at any stage of this process it is validated that the munition does not contain chemical agent, it is destroyed. Range recovered munitions which potentially contain chemical agent but are not safe to transport off the range are destroyed in place after an emergency destruction permit has been received from the State of Utah. The destruction is complete and all chemical agent is completely destroyed. Through thorough research, the Army has established procedures to ensure destruction of the chemical agent. Procedures are described in SOP DP-0000-M-028, Emergency Destruction of Unsafe Chemical Munitions Found on Test Ranges. Table 3.13-4, Status of Baseline Range Recovered Munitions, shows the number of range recovered munitions managed in 1996, 1997, and 1998.

Table 3.13-4. Status of Baseline Range Recovered Munitions.

Year	Conventional RRMs		Potential Chemical Agent Filled RRMs	
	Destroyed at OB/OD Facility	Destroyed in Place	Transported to Igloo G	Destroyed in Place
1996	5	2	0	2
1997	13	5	0	1
1998	2	9	0	0

OB/OD Open Burn/Open Detonation
RRM range recovered munition

SOURCE: DPG, 1996c; Johnson, 2000

The main laws and/or documents used to manage range recovered munitions at DPG are listed in Appendix A, List of Environmental Laws, Permits, and Management Plans.

4.0 Impacts of the Proposed Action and Alternatives

This chapter of the EIS presents an analysis of the potential environmental and socioeconomic consequences that could result from implementing DPG's Proposed Action or the alternatives to the Proposed Action.

An environmental impact is a modification in the status of the environment as it presently exists, or as it is anticipated to exist in the future, as a result of the Proposed Action or alternatives. Environmental impacts can:

- Be beneficial or adverse.
- Occur directly as a result of the action or indirectly as a secondary result. Direct impacts are caused by, and occur at the same time and place, as a specific action. "Indirect" impacts are reasonably foreseeable and may be attributable to a particular action, but they occur later in time or farther removed in distance from the action than a direct impact.
- Be long-term (greater than 10 years) or short-term (less than 10 years) in duration.
- Be of small magnitude with negligible change. An identifiable change that does not constitute a substantially adverse impact on the environment is a nonsignificant impact.
- Be an identifiable major adverse change to the environment. These impacts are known as significant impacts. Significant impacts are defined by their context and intensity. Generally, impacts are identified within the context of the project area, and the extent these impacts are perceptible beyond the project area. Intensity relates to the magnitude of the impact on environmental resources and the amount of controversy or risk.

Impacts, beneficial and adverse, are presented in the same order of environmental resources and topics presented in Chapter 3.0, Affected Environment. Environmental impact sections in this chapter include:

- Geology and Soils
- Water Resources
- Air Resources
- Biological Resources
- Socioeconomics
- Environmental Justice

- Land Use and Access
- Cultural Resources
- Traffic and Transportation
- Visual Resources
- Noise Impacts
- Health and Safety
- Materials and Wastes

In addition to the impact analysis of each of these environmental resources, Chapter 4.0 also includes assessments of the following impact topics required by NEPA:

- Unavoidable Adverse Impacts
- Relationship Between Short-Term Uses of the Human Environment and Long-Term Productivity
- Irreversible and Irretrievable Commitment of Resources

Cumulative impacts are considered separately in Chapter 5.0, Cumulative Impacts.

Factors used to evaluate context and intensity for each environmental resource include:

- Resource sensitivity, or the probable response of a particular resource to an action
- Resource quality, or the present condition of the resource potentially affected
- Resource quantity, or the amount of the resource potentially affected
- Duration of impact, or the time over which the resources would be affected

An impact that violates a law or regulation imposed for the protection of the environment would be considered significant. Legal/regulatory and other criteria to evaluate impact significance are identified as "significance criteria" in each environmental resource section.

Quantitative assessments of impacts are discussed where possible. Where numerical measurements are not possible or readily available, qualitative criteria are used, based on agency guidelines and professional evaluations.

Extensive mitigation measures, designed to reduce potential environmental impacts, have been incorporated into DPG's existing operations. Detailed mitigation measures are followed in accordance with:

- INRMP
- ICRMP
- IRP Biomonitoring Plan
- MTAMP

When impacts would remain after DPG's mitigation measures have been applied to future activities, additional mitigation measures are identified within this EIS. General mitigation measures are outlined in each environmental resource section to mitigate impacts to those specific resources. Mitigation compensation and other guidelines for testing and training, based on the type of habitat, maneuver impact miles, duration, and number of personnel and vehicles, will be outlined in the MTAMP and in the INRMP. Each habitat, near pristine, moderately degraded, and severely degraded, will have incrementally increasing costs associated with it based on the level of effort for mitigation.

DPG's existing mitigation activities would continue under the No Action Alternative. This installation-wide EIS has identified a broad array of proposed mitigation measures that would supplement DPG's existing mitigation activities to avoid or lessen potential future impacts. These proposed mitigation measures are relevant to, and would be implemented for, all action alternatives (the Proposed Action, Decreased Mission Alternative, and the Maximum Expanded Mission Alternative). However, the timing and intensity of these mitigation measures would vary by alternative.

For example, if the Decreased Mission Alternative was chosen as DPG's future, the proposed mitigation measures could potentially be implemented at a slower and less intensive manner than for the Proposed Action, because the magnitude, duration, and location of impacts would be different. Concomitantly, if the Maximum Expanded Mission Alternative was chosen, proposed mitigation measures would likely be implemented at a faster and more intensive manner than for the Proposed Action.

Since the EIS broadly assesses the potential environmental impacts, mitigation measures must be somewhat broad as well. These broad mitigation measures can be clarified, if necessary, within the ROD after a decision has been reached. In order for any mitigation measures to be enforceable, they must be clearly defined in the ROD even if they are discussed in the EIS text. Furthermore, any future proposed action requiring case-specific NEPA analysis would likely include more specific mitigation measures that would support the broad mitigation measures identified in this EIS.

Residual, or unavoidable, impacts projected to occur after all mitigation measures have been applied are also identified in each environmental resource section. Each environmental resource section includes a discussion of significance criteria, impacts of the Proposed Action, and impacts of the No Action Alternative, Decreased Mission Alternative and the Maximum Expanded Mission Alternative.

4.1 Impacts to Geology and Soils

This section analyzes the potential impacts of the Proposed Action and alternatives to geology and soils at DPG. The criteria used to evaluate whether these potential impacts are considered significant, mitigation measures that could be implemented to reduce any adverse impacts, and residual impacts are presented. An overview of the geology and soils at DPG is in Section 3.1 Geology and Soils. Impacts to public health and safety under the Proposed Action and alternatives from seismicity, an aspect of the geology resource are discussed in Section 4.12.2.2, Impacts to Public Health and Safety.

4.1.1 Significance Criteria

Impacts must be evaluated with identified criteria to determine whether or not they are significant. Impacts to geology and soils from the Proposed Action or alternatives would be considered significant if they were to:

- Cause substantial soil erosion or compaction such that biotic communities are seriously threatened
- Degrade soil chemical quality such that humans, plants, or animals have the potential to be significantly adversely affected through chemical uptake
- Substantially affect the future ability to use geologic resources
- Cause damage to unique geologic features

4.1.2 Impacts of the Proposed Action

This section evaluates soil and geology impacts with these significance criteria in detail for the Proposed Action. Proposed Action mission and support activities were analyzed for potential impacts to the physical quality and chemical quality of soils, potential impacts to geological features and resources, and compliance with applicable regulations and management plans.

4.1.2.1 Impacts to Soil Physical Quality

Proposed Action mission and support activities that result in ground disturbance from construction, detonations, demolitions, and ground maneuvers, including vehicular traffic, were analyzed for potential impacts to soil physical quality. Impacts to soil physical quality were assessed for soil compaction and soil erosion (soil loss). Soil types and percent slope, which can greatly enhance soil compaction and soil erosion effects, were assessed at the locations of proposed activities.

Because DPG's soils are not considered agriculturally significant, the Proposed Action was not assessed for impacts to agricultural use of soils. Wetland soils or hydric soils are soils that are present in wetland areas. The Saltair soil type has been identified as a hydric soil in the DPG area (ESA, 1994). This soil type is located in the playa or western portion of DPG. While hydric soils could be subjected to deposition of emissions from testing activities, training activities do not occur in this area. It is not expected that the Proposed Action would have significant impacts on hydric soils. Impacts to cryptobiotic soils are discussed in Chapter 4.4.2.1, Impacts to Vegetation.

Soil Compaction – Soil compaction refers to processes which tend to consolidate or decrease the volume of soil. Passage of tracked vehicles disaggregates and/or compacts the soil, crushes herbaceous and woody vegetation, and exposes the soil to the erosive forces of raindrop impact, surface water runoff, and wind (Diersing et al., 1988), and increases hillslope runoff.

Research indicates that soil compaction is the major impact of cross-country vehicular movement on Army installations (Goran et al. 1983).

Compacted soil (or rutted soil) experiences more frost heave than uncompacted (or unrutted) soil (Gatto, 1999) and inhibits vegetative growth. Generally, the degree of soil compaction is in proportion to the level of traffic or surface pressure. Compaction may only be slight if a vehicle passes straight across an area only one time; however, repeated passes in the same area may cause long-term damage. Divots, caused when one track has been stopped or slowed to make a sharp turn, generally have a stronger influence on vegetation and cryptobiotic soils than do straight-line tracks.

Tracked vehicles can be more damaging to soils than wheeled vehicles because of the chopping action of track cleats (Severinghaus and Severinghaus, 1982). Goran et al. (1983) evaluated the ecological impacts of training at several Army installations. The authors found that tracked vehicles cause decreased seed germination and

decreased seedling growth or survivorship, because of changes in soil parameters associated with compaction, disintegration, and removal of pre-existing vegetation. Impacts of soil compaction on vegetation are described in Chapter 4.4.2.1, Impacts to Vegetation.

Soil compaction is an adverse impact expected to occur as a result of ground disturbance caused by various activities required under the Proposed Action. The greatest increase in ground disturbance, including soil compaction and resulting erosion, would result from the increase in active and reserve component training. Active and reserve component training under the Proposed Action includes increasing the number of training exercises, diversifying the types of training conducted, and expanding training areas. The estimated number of tracked vehicles and vehicles of 4,500 kg (5 tons) or greater would increase as identified in Table 2.2-9, Baseline and Proposed Ground Training Activity. The estimated number of troops would substantially increase as identified in Table 2.2-8, Ground Training Activity Levels - Baseline versus Proposed Action. These increases would result in both the lateral extent and degree of soil compaction in already established training areas. The lateral extent of compaction would also increase to new areas proposed for new firing points in the Wig Mountain Training Area and new bivouac sites near the Cedar Mountains and around Granite Peak. Other proposed activities that would result in new routine and recurring use of wheeled and tracked vehicles that result in ground disturbance include Chemical Unit training activities and field training exercises associated with the Fort Leonard Wood Chemical School.

The introduction of the Paladin Weapons System by the Utah NG would contribute substantially to soil compaction.

The Paladin Weapons System weighs 16 percent more than the M109A5, the 155-mm self-propelled howitzer. The Paladin is accompanied by a field artillery ammunition supply vehicle that is 46 percent heavier than the old supply vehicles. Because of its greater weight, this new system would increase the track use in an area and the footprint left by each training exercise should be from 0.2 sq km to 3.1 sq km (94 acres to 1,500 acres) due to the multiple, moving firing points compared to fixed points. This would dramatically increase the amount of soil compaction.

The Paladin Weapon System is heavier than howitzers previously used at DPG.

The increase in detonation/live firing of artillery, mortars, and explosives, including munition-type smokes, obscurants, and illuminants would increase soil compaction. In conjunction with the increased number of tracked vehicles and personnel, other associated ground training activities that would result in an increase in soil compaction include:

- Installing vehicle wash racks at selected DPG range locations
- Constructing and improving roads
- Clearing areas for bivouacs
- Leveling terrain
- Constructing berms
- Installing communication wire
- Performing demolitions
- Excavating
- Establishing new quarry sites

While the proposed increase in active and reserve component training would account for the majority of ground disturbance, other activities are proposed that would also cause ground disturbance and increase soil compaction, such as construction and/or upgrade of facilities, including MAAF and chemical and biological defense testing structures, maintenance of facilities, and infrastructure and road construction and improvement.

It is expected that the Proposed Action would result in significant, long-term, adverse impacts to soil physical quality from increased soil compaction leading to reduced soil productivity. Measures to manage and mitigate soil compaction are recommended in Section 4.1.6, Mitigation Measures.

Soil Erosion – Soil erosion refers to the group of processes (via water, ice, or wind) whereby soil is loosened or dissolved and moved to another location. Soil erosion is

directly related to the biological productivity of a site, and military activities directly and indirectly affect erosion rates.

Soils at DPG are naturally prone to wind erosion, as a consequence of the weak structure of the soil, related to either low levels of organic material or high levels of sodium (NRCS, 1992).

Such soil movement is evidenced by the well-developed dune complexes. Training-induced damage to the fragile vegetative cover at DPG exposes the soil, increasing the damage caused by wind erosion to the sandy soils. Soil loss from wind erosion is a major problem in areas where stabilizing shrubs and grasses are disturbed such as in training areas and impact areas. Stabilizing exposed soil may take years. Thus, adequate vegetative cover for soil protection is critical.

Sand dunes at DPG are susceptible to wind erosion.

At DPG, the loss of understory vegetation in some juniper stands used extensively for training has led to excessive wind erosion and consequent pedestalling of the junipers. Soils most prone to wind erosion are the Berent-Hiko Peak Complex, which occurs on stabilized sand dunes within the Cedar Mountains and White Sage Training Areas, and the Yenrab soil series (all Yenrab map units) which occurs within the Wig Mountain and White Sage Training Areas. The Skumpah, Timpie, and Tooele soil series (all Skumpah, Timpie, and Tooele map units) exhibit moderate wind erosion hazard. These soils occur in the Wig Mountain, White Sage, and West Granite Peak Training Areas. Figure 3.1-3, Soils Map of DPG, shows the locations of soil types at DPG.

Figure 4.1-1, Wind Erosion Hazard for Soils, shows the relationship between wind erosion hazard of soils to the training areas. All training areas other than the Cedar Mountain Training Area are dominated by soils with moderate to severe wind erosion hazard.

Because most of the soils at DPG are well-drained and moderately permeable, water erosion hazard is generally slight to moderate. Evidence of significant overland flow and gullying has not been noted. Soils most prone to water erosion are Amtoft-Rock Outcrop Complex, which occurs on the hillsides of the Wig Mountain and Cedar Mountain Training Areas with slopes of 30 to 70 percent; the Checkett-Rock Outcrop Complex occurring on the hillsides of the Cedar Mountain Training Area and on Granite Peak with slopes of 10 to 40 percent; and the Reywat-Broad-Rock Outcrop Association occurring on the hillsides of the Cedar Mountain Training Area with slopes of 30 to 60 percent. Figure 3.1-3, Soils Map of DPG, shows the locations of soil types at DPG. Figure 4.1-2, Water Erosion Hazard for Soils, shows the relationship between water erosion hazard of soils to the training areas. The hillsides of the Cedar Mountain Training Area are characterized as having a severe water erosion hazard.

Soil erosion is a long-term, significant adverse impact that is expected to occur as a result of ground disturbance caused by activities under the Proposed Action. Activities under the Proposed Action are expected to increase soil compaction and reduce soil productivity as described above. Because compacted soil inhibits vegetative growth and recovery, it can be anticipated that the expected increases in soil compaction would cause an increase in bare ground and in soil erosion. Additionally, the increase in detonation/live firing of artillery, mortars, and explosives, including munition-type smokes, obscurants, and illuminants in these training areas would increase soil disintegration and erosion. Physical disintegration occurs from use of munitions and especially during the active and reserve component training when large and frequent rounds of ammunition are deployed. The expected increase in range fires associated with increased ground training activities would increase bare ground and soil erosion potential as well.

Areas in the Cedar Mountain, Wig Mountain, White Sage, and West Granite Peak Training Areas identified on Figure 4.1-1, Wind Erosion Hazard for Soils, with high to moderate wind erosion hazard are especially prone to increased soil erosion as a result of the Proposed Action. Increase in exposure of buried munitions is a potential indirect impact of soil erosion. Section 4.1.6, Mitigation Measures, recommends measures to manage and mitigate soil erosion.

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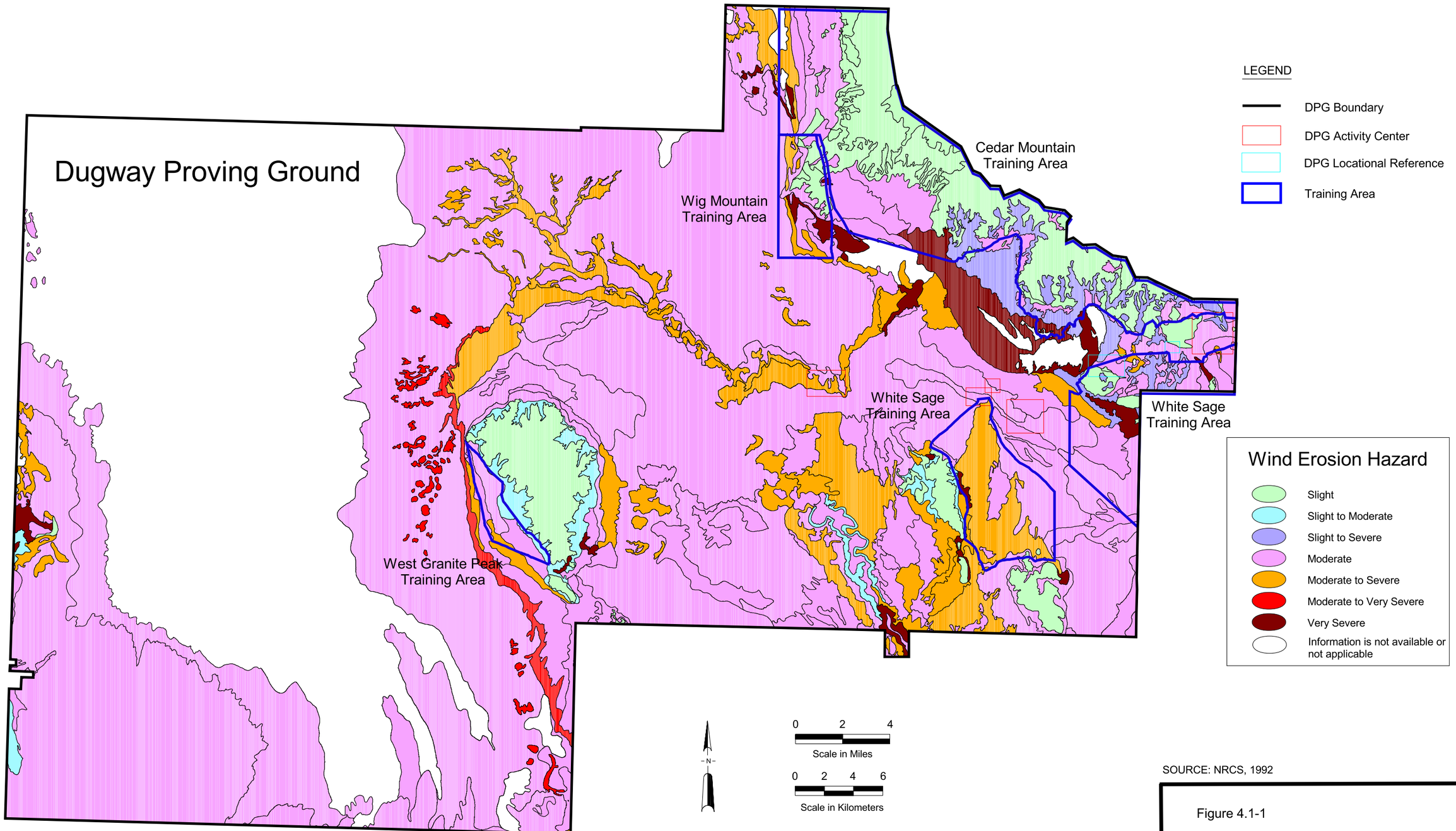

SOURCE: NRCS, 1992

Figure 4.1-1

Wind Erosion Hazard for Soils

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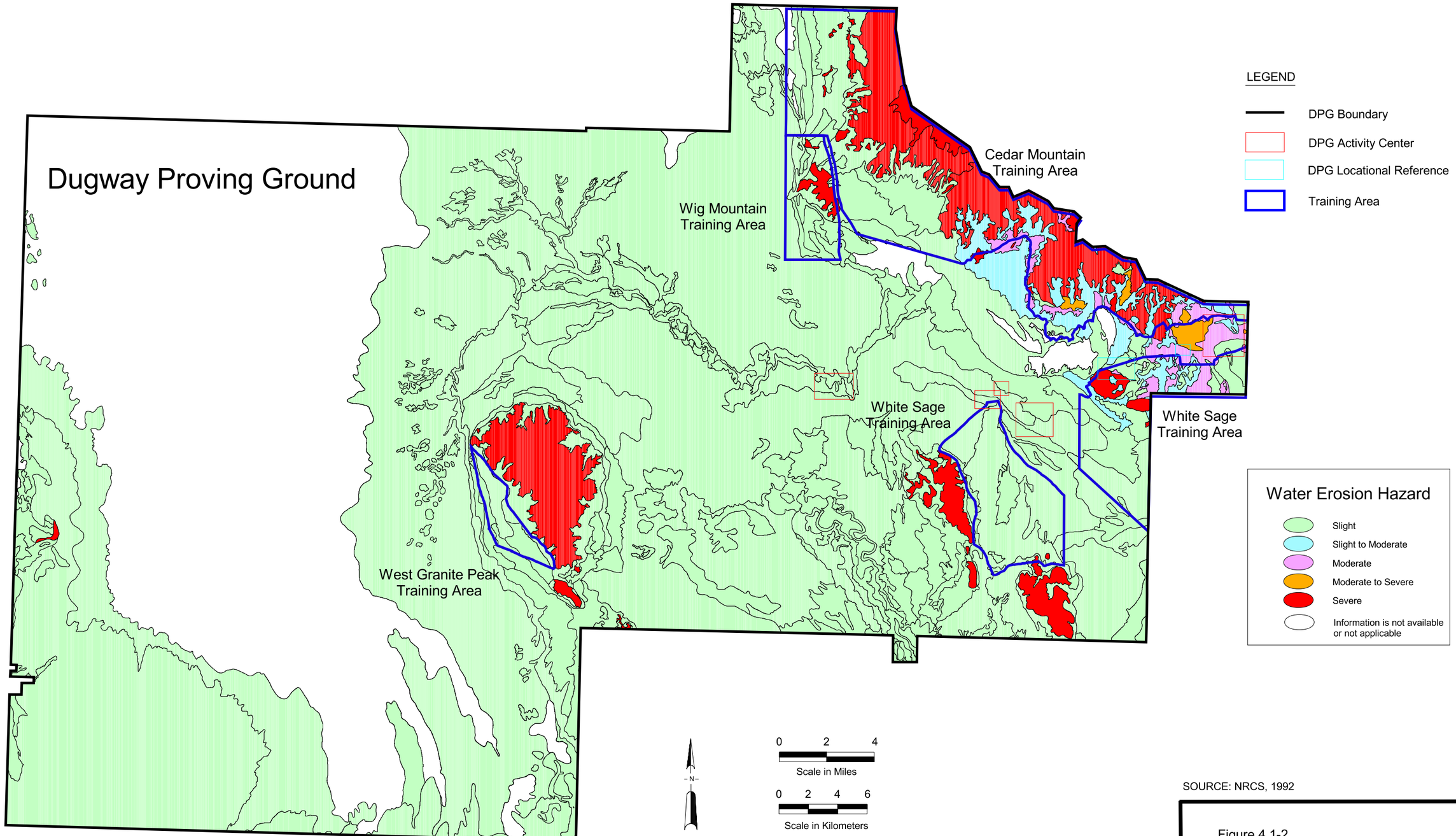

SOURCE: NRCS, 1992

Figure 4.1-2

Water Erosion Hazard for Soils

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4.1.2.2 Impacts to Soil Chemical Quality

This section discusses the release of the following materials under the Proposed Action that are analyzed for potential impacts to soil chemical quality.

Biological and Chemical Simulants – Under the Proposed Action, dissemination of biological and chemical simulants would increase due to increased biological and chemical defense testing and counterterrorism training. No significant impacts to soil are expected from the following.

- *Bacillus subtilus* var. *niger* (BG) – This biological simulant naturally occurs in the soil and is a self-regulating bacterial population.
- Ovalbumin and bovine serum albumin – These biological simulants are broken down by soil fauna.
- *Erwinia herbicola* (EH) – This bacterium lives on the surface of plants and is a self-regulating population.
- Bacteriophage MS2 (MS2) – This biological simulant is a bacteriophage or a virus that only infects bacteria.
- Kaolin dust – This biological simulant is a naturally-occurring clay.

Chemical simulants that are VOCs should not adsorb to DPG soil. Chemical adsorption depends on soil organic content and salinity. DPG's highly saline and low organic soils discourage soil adsorption of chemical simulants that are VOCs.

Many of the SVOCs listed as chemical simulants would be adsorbed by the soil. Environmental impact regarding these adsorbed chemicals would be expected when the rate of deposition exceeded the breakdown rates. Half-lives of these chemical simulants range from 54 minutes to almost 1 year. It is likely that SVOCs would accumulate in the soil at DPG as a result of the Proposed Action. However, data do not exist to determine if accumulation would be significant. Mitigative measures to monitor SVOCs in soil are recommended in Section 4.1.6, Mitigation Measures.

Heavy Metals – Heavy metals would accumulate in the soil from a number of activities associated with the Proposed Action, especially from munitions residues, material spills and exhaust from vehicular traffic. Munition residues would result from OB/OD, conventional munitions testing, and ground training activities. These activities are projected to increase substantially under the Proposed Action. Overflow from undersized wastewater lagoons could also contribute heavy metals to the soil in localized areas.

Data are not available to predict soil chemical quality as a result of the Proposed Action. Many of the activities occurring under the Proposed Action use the same or similar materials as used in the past. Thus, impacts of the Proposed Action to soil chemical quality at DPG were analyzed taking into account baseline soil chemical quality conditions to the extent possible. In 1988, 206 soil samples were collected from "worst-case" locations, the testing and training ranges, and tested for heavy metals. These samples do not indicate gross metal contamination of the soil from DPG's past mission. Impacts of the Proposed Action to chemical soil quality can be assumed to be similar and therefore not significant.

Smokes and Obscurants – Increased use of smokes and obscurants would occur under the Proposed Action. Smokes and obscurants would be released during smoke, obscurant, and illuminant testing and ground training. Research data for effects of smokes and obscurants except fog oil and white phosphorus on soil chemistry do not exist making it impossible to determine their impacts. Impacts for fog oil and white phosphorus follow.

- Fog oil is a commonly available smoke/obscurant material used during training exercises. Although the fog oil cloud routinely extends down to the ground surface, there is no evidence that significant quantities of fog oil deposit from the air onto the surface (Getz et al., 1996). The oil droplets are assumed to be so small, 0.5 to 1.0 micron, that they remain suspended in the air until the oil evaporates. If these assumptions are true, there would be essentially no deposition of fog oil onto the ground. However, if the air contains dust, fog, and other particulates upon which fog oil could aggregate, the resulting larger droplets may deposit on the surface. Rain occurring during the release of fog oil may result in depositing fog oil on the surface. Even when assuming the worst-case scenario where all fog oil droplets deposit on the surface, the predicted concentrations are relatively low. It also has been estimated from mathematical models that 30 to 35 percent of the fog oil film would evaporate within 1 hour and 80 to 90 percent within 1 week (Driver et al. 1992). Thus, significant impacts to the chemical quality of the soil at DPG from using fog oil are not expected.

- White phosphorus is also a commonly used smoke at DPG. White phosphorus has the potential to burn vegetation, thereby increasing soil erosion potential. Mitigation measures are recommended in Section 4.1.6, Mitigation Measures, to control soil erosion.

Tracer Gases – Under the Proposed Action, a slight increase in the release of tracer gases would occur during modeling and assessment testing and counterterrorism

training. Volatile tracer gases should not adsorb to soil. Adsorption depends on soil organic content and salinity. DPG's highly saline and low organic soils discourages soil adsorption of tracer gases. No significant impacts are expected from the use of tracer gases.

Fuel Spills – As discussed in Section 2.2.2.1, Ground Training, tactical refueling is anticipated to occur more frequently under the Proposed Action with new activities such as the Paladin howitzer system, Chemical Units training, and support to the Fort Leonard Wood Chemical School. For some training activities, tactical refueling would occur at individual firing points at DPG. Fuel spills could lead to a significant impact to the chemical quality of the soil at these locations. The potential for a fuel spill cannot be eliminated.

Contamination from Historical Materials – Soil contamination has occurred in some areas of DPG from past waste management practices as discussed in Section 3.1.4.2, Soil Contamination Investigations. Soil contamination at these areas is under investigation, access is restricted, and the Proposed Action is not expected to contribute to the migration or spread of such contamination. Ongoing investigations are studying the nature and extent of potential soil contamination at identified areas within DPG. The status of ongoing soil contamination investigations at the HWMUs and SWMUs is summarized in Appendix E, Solid and Hazardous Waste Management Units at DPG.

4.1.2.3 Impacts to Geological Features and Resources

Impacts to geologic features and resources were analyzed by comparing the locations of such features and resources to the locations of activities under the Proposed Action and assessing the likelihood for interaction. The following geological features and resources were analyzed.

- Metallic mineral resources occur on Granite Peak. Seven small prospects have been identified, including five in which copper, fluorite, lead, and/or silver are the identified commodities and two of which are beryllium vein deposits. Amethyst, beryl, tourmaline, quartz, hematite, and pyrite are also found at Granite Peak. Granite Peak is described as a unique geologic feature in Section 3.1.6.3, Unique Geologic Features. Granite Peak is essentially surrounded by grids, ranges, and impact areas that are used or are proposed for use under the Proposed Action. Future use of these resources would continue to be prohibited due to the presence of UXO and continued use of the area by the Army. The likely presence of UXO virtually in perpetuity at DPG would likely render any drilling or development of geological resources at DPG forever impossible due to

safety considerations. This is a significant non-mitigatable impact from a resource development/use standpoint. However, preventing future use of these resources would help preserve unique geologic features of Granite Peak.

- Nonmetallic mineral resources at DPG include salines, silica and undifferentiated gypsum/silica dune deposits, and sand/gravel deposits. The salines occur in the playa area of the Great Salt Lake Desert, while the silica and undifferentiated gypsum/silica dune deposits and sand/gravel deposits occur in the central portion of DPG as shown in Figure 3.1-14, Known Geologic Resources at DPG. These dunes and sand/gravel deposits are located in areas being used or proposed for activities under the Proposed Action. While the Proposed Action would not impact the dune deposits, the Proposed Action would result in multiple new quarrying operations for sand and gravel at Little Granite, Camels Back Ridge, East Granite Mountain, and Wig Mountain. The increased quarrying activity would be required as part of the ground training activities as described in Section 2.2.2.1, Ground Training. Thus, the increased comsumption of the sand and gravel deposit is a significant, non-mitigatable impact. However, future use of these resources by the public would continue to be prohibited; the likely presence of UXO virtually in perpetuity at DPG would likely render any private sector drilling or development of geological resources at DPG forever impossible due to safety considerations. This is a significant, non-mitigatible impact.

- The Devil's Postpile, described in Section 3.1.6.3, Unique Geologic Features, is located in the Cedar Mountains and within the Cedar Mountain Training Area. Potential impacts to the Devil's Postpile shown on Figure 3.1-14, Known Geologic Resources at DPG, could occur if ground troops trained at the area or used the Devil's Postpile during training exercises. Section 4.1.6, Mitigation Measures, recommends restricting this feature from use by ground troops. The Devil's Postpile is not located near areas used for testing and no adverse impacts from testing activities are expected.

4.1.2.4 Compliance with Regulations and Management Plans

There are no regulations or management plans for assessing geologic or soil impacts. However, DPG is conducting a corrective action investigation at areas of suspected soil contamination known as SWMUs as a condition of their RCRA permit for storing hazardous waste. Also under this permit DPG is required to investigate AOCs when they become permanently inactive. AOCs consist of portions of ranges being used for mission activities. SWMUs are summarized in Appendix E, Solid and Hazardous Waste Management Units at DPG, and Appendix F, Areas of Concern, summarizes the AOCs. DPG is also conducting closure of areas of known soil

contamination known as HWMUs under a Stipulation and Consent Order issued from the UDSHW. Appendix E, Solid and Hazardous Waste Management Units at DPG, summarizes the HWMUs. The Proposed Action would not impact DPG's compliance with its RCRA permit or Consent Order.

4.1.3 Impacts of the No Action Alternative

Under the No Action Alternative, DPG's Proposed Action would not be implemented. Therefore, the significant increases in soil compaction and erosion from increased ground training, use of new areas for training, the Paladin Weapons System, constructing new facilities, and road construction and improvements would not occur. However, DPG would continue to operate under its baseline mission and ground disturbance and fires would still degrade soil physical quality, but to a lesser degree than that expected under the Proposed Action.

Under the No Action Alternative, soil chemical quality would be impacted to a lesser extent as fewer biological and chemical simulants, heavy metals, smokes and obscurants, and tracer gases would be released to the environment during open-air testing compared to the Proposed Action. The potential for diesel fuel spills would also be less because tactical refueling of the Paladin Weapons System would not be conducted at DPG. Under this alternative, the ongoing investigations that are studying the nature and extent of potential soil contamination from historical waste operations at identified areas within DPG would continue.

Under the No Action Alternative, impacts to geological features, particularly restricted access due to the presence of UXO, would remain approximately the same as that of the Proposed Action. Impacts to sand and gravel resources would be less than that of the Proposed Action.

Under the No Action Alternative, DPG would continue to conduct a corrective action investigation at SWMUs as a condition of their RCRA permit for storing hazardous waste. Also under this permit DPG would investigate AOCs when they become permanently inactive. DPG would also continue to conduct closure HWMUs under a Stipulation and Consent Order issued from the UDSHW. The No Action Alternative would not impact DPG's compliance with its RCRA permit or Consent Order.

4.1.4 Impacts of the Decreased Mission Alternative

Under the Decreased Mission Alternative, the number of ground training events would decrease below baseline levels and would be about 10 percent of the level of activity under the Proposed Action. Use of the Paladin Weapons System, construction of new facilities, and road construction and improvements would not

occur. Soil impacts, attributable to ground training activities, would be substantially lower than those under the No Action Alternative or Proposed Action. Soil impacts would still result from training activities but soil impacts would be considerably reduced in the frequency and lateral extent of occurrence. Soil compaction and erosion would still be the dominant soil impacts from activities at DPG.

Under the Decreased Mission Alternative, open-air testing using biological and chemical simulants would still occur, however at minimal levels. Thus, soil chemical quality would be impacted much less than under the No Action Alternative or Proposed Action. Additionally, the potential for diesel fuel spills would also be less because new activities requiring tactical refueling (such as the Paladin Weapons System) would not be conducted at DPG.

Under the Decreased Mission Alternative, impacts to geological features, particularly restricted access due to the presence of UXO, would remain approximately the same as that of the Proposed Action. Impacts to sand and gravel resources would be less than that of the Proposed Action.

Also under DPG's RCRA permit DPG is required to investigate AOCs when they become permanently inactive. DPG would also continue to conduct closure of areas of known soil contamination known as HWMUs under a Stipulation and Consent Order issued from the UDSHW. The Decreased Mission Alternative would not impact DPG's compliance with its RCRA permit or Consent Order.

4.1.5 Impacts of the Maximum Expanded Mission Alternative

Under the Maximum Expanded Mission Alternative, the level of activities would increase over those under the Proposed Action. Ground training, the activity that causes the most impact to soil physical quality, would not increase over levels associated with the Proposed Action. Impacts to soil physical quality expected under the Proposed Action, such as substantial increase in soil compaction and erosion, would be expected to occur from ground training activities, use of new areas for training, the Paladin Weapons System, constructing new facilities, and road construction and improvements under the Maximum Expanded Mission Alternative as well.

Under the Maximum Expanded Mission Alternative, impacts to soil chemical quality would be expected due to increasing biological and chemical defense testing. More open-air testing would probably result in accumulation of chemicals in the soil, especially metals and SVOCs, causing potential degradation such that humans, plants, or animals have the potential to be adversely affected through chemical uptake. Additionally, the potential for impacts to soil chemical quality would likely

increase with an increase in training activities that require tactical refueling at DPG. Under this alternative, the ongoing investigations that are studying the nature and extent of potential soil contamination from historical waste operations at identified areas at DPG would continue.

Under the Maximum Expanded Mission Alternative, impacts to geological features and resources, particularly restricted access due to the presence of UXO, would remain approximately the same as that of the Proposed Action. It is expected that geological resources would be destroyed in some cases due to construction of training facilities.

Under the Maximum Expanded Mission Alternative, DPG would continue to conduct a corrective action investigation at SWMUs as a condition of their RCRA permit for storing hazardous waste. Also under this permit DPG would investigate AOCs when they become permanently inactive. DPG would also continue to conduct closure of HWMUs under a Stipulation and Consent Order issued from the UDSHW. The Maximum Expanded Mission Alternative would not impact DPG's compliance with its RCRA permit or Consent Order.

4.1.6 Mitigation Measures

It is recommended that mitigation measures for addressing soil compaction and erosion continue to be addressed by the Army's ITAM program. As described in Section 3.1.4.3, Integrated Training Area Management Program, the Army has a program at DPG that is designed to monitor and mitigate damage to natural resources caused by military activity. Monitoring is essential to identify trends in rangeland conditions and determine progress in rehabilitation activities. Mitigation addresses sustainable use of military lands by repairing damage to rangelands and improving site conditions for training or testing activities.

Mitigation measures for addressing soil compaction and erosion should focus on restoring vegetative cover. Adequate vegetative cover for soil protection is critical at DPG where exposed soils are naturally prone to wind erosion, as a consequence of the weak structure of the soil, related to low levels of organic material or high levels of sodium (NRCS, 1992). Impacts of the Proposed Action would increase soil exposure and reduce soil productivity. If vegetative loss is excessive, serious soil erosion may occur in a few years, leaving the land gullied and unsuitable for some types of future training exercises.

Additional mitigation for degradation of the physical quality of the soil caused by ground disturbance includes the following measures. Many of these measures are

included within DPGR 350-2 (DPG, 1997a). These measures are also relevant to impacts to biological resources, as discussed in Section 4.4.6, Mitigation Measures.

- When possible, limit track vehicle use and prohibit cross-country use
- When possible, without jeopardizing realistic training, vary the intensity of training and testing seasonally to reduce impact on vegetation and to avoid high fire conditions
- When possible, use only existing roads, or if new roads need to be created, place in areas that will minimize impacts to vegetation. An appropriate level of NEPA review would be conducted for all proposed new roads.
- When feasible, construct new buildings and roads in current built-up areas
- Revegetate training areas and have the training units contribute finances for this effort
- Rotate use of training areas to allow for a 4 to 7 year rest period and to allow for revegetation within acceptable industry standards
- Continue to monitor established photopoints in impact areas for seasonal and yearly comparison of habitat
- Focus ground training in areas with high ground disturbance, such as White Sage Impact Area and Wig Mountain Training Area for training and testing. Other areas that are used should follow compensation guidelines established in the MTAMP and the INRMP.
- Implement management of the Paladin Weapons System as described in the MTAMP
- Manage all fires in accordance with the DPG Fire Management Plan
- Obtain financial compensation from training mission for fire meangement or revegetation according to the MTAMP and the INRMP
- Complete greenstrip firebreaks established by ITAM and test with new and better fire resistant and site adapted species

Mitigation measures to address degradation of soil chemical quality include:

- Continue the IRP to address contaminated soil at HWMUs and SWMUs

- Implement investigations of testing and training ranges in use, designated as AOCs, upon becoming permanently inactive as specified in DPG's RCRA permit
- Include appropriate monitoring for SVOCs in soil

Mitigation measures for impacts to geological features and resources include:

- Continue to prohibit any development and/or use of mineral resources at Granite Peak
- Continue enforcing restrictions in the area in the vicinity of the Devil's Postpile from use by ground troops

4.1.7 Residual Impacts

Impacts to soil physical quality from activities under the Proposed Action would be long-term and significant. Some chemical degradation of the soil quality would remain despite corrective action and clean-up measures. The level of chemical degradation, however, should not be toxic to humans, plants, or animals based on recent studies and observations of the natural environment. Some UXO would remain buried in the soil despite location and removal efforts.

The weak structure of the soil related to low levels of organic material or high levels of sodium (NRCS, 1992) and the arid climate make this a fragile environment requiring substantial time for restoration. Footprints take years to erase in the desert and stabilizing exposed soil with shrubs and grasses may also take years. Thus, with rigorous mitigation efforts, impacts can be managed, however, the ecology of the range at DPG would be impacted while restoration occurs over time.

Due to safety considerations, metallic and nonmetallic resources may be used for military purposes only and would not be available for drilling or development. These resources are small and accessible in nearby areas.

4.2 Impacts to Water Resources

This section analyzes the potential impacts of the Proposed Action and alternatives to surface water and groundwater at DPG. The criteria used to evaluate whether these potential impacts are considered significant, mitigation measures that could be implemented to reduce any adverse impacts, and residual impacts are presented. The baseline surface water and groundwater environments at DPG are described in Section 3.2.2, Surface Water, and Section 3.2.3, Groundwater, respectively.

4.2.1 Significance Criteria

Impacts must be evaluated with criteria to determine whether or not they are significant. Impacts resulting from the Proposed Action or alternatives would be considered significant if they were to:

- Substantially alter surface flow conditions, patterns, or rates where facilities would discharge to "waters of the State" or a scenario causing wetlands to dry up
- Cause substantial flooding or siltation
- Substantially degrade surface water quality with regard to biota either directly or indirectly as a result of bioconcentration or bioaccumulation
- Substantially decrease availability of surface water to wildlife
- Substantially increase the potential to adversely affect groundwater quality
- Cause noncompliance with applicable water quality standards
- Substantially lower an aquifer's water table or potentiometric surface such that aquifer depletion would be a concern
- Substantially alter groundwater recharge to an aquifer

4.2.2 Impacts of the Proposed Action

This section evaluates surface water and groundwater impacts with these significance criteria in detail for the Proposed Action. The following subsections describe the impacts of the Proposed Action to surface water quantity, surface water quality, groundwater quantity, groundwater quality, and compliance with applicable regulations and management plans.

4.2.2.1 Impacts to Surface Water Quantity

Proposed Action mission and support activities were analyzed for potential impacts to surface water quantity at DPG resulting in changes to the following:

- Wastewater Generation
- Natural Surface Water Flows
- Groundwater Usage

Wastewater Generation – DPG operates four wastewater treatment systems consisting of collection lines and treatment lagoons in Baker, Carr, Ditto, and English

Village. All these wastewater treatment systems have been in place since the early 1950s or before and have undergone major reconstruction. Under the Proposed Action, it is anticipated that wastewater generation would increase by 10 percent over the daily baseline rates. The 10 percent increase is assumed to occur across all testing and training programs, thereby not impacting one wastewater treatment system more than another. The Proposed Action's wastewater increase in daily average influent for each wastewater treatment system's lagoon is compared to the lagoon's daily design capacity and baseline influent rate in Table 4.2-1, Projected Lagoon Influent Rates for DPG Wastewater Treatment Systems. Under the Proposed Action, the daily average influent rates for all lagoons would be substantially below the daily design capacity, with the exception of the Baker Lagoon. Additionally, the proposed daily maximum influent for the English Village Wastewater Treatment Facility would also be substantially below the daily design capacity. Daily maximum lagoon influent rate data are not available for Baker, Carr, and Ditto because the metering stations at these lagoons do not operate consistently.

Table 4.2-1. Projected Lagoon Influent Rates for DPG Wastewater Treatment Systems.

Wastewater Treatment Systems	Daily Lagoon Design Capacity[1] (gallons per day)	Daily Average Lagoon Influent Rate (gallons per day)				Daily Maximum Lagoon Influent Rate (gallons per day)			
		Proposed Action	Baseline/No Action Alternative	Decreased Mission Alternative	Maximum Expanded Mission Alternative	Proposed Action	Baseline/No Action Alternative	Decreased Mission Alternative	Maximum Expanded Mission Alternative
Baker	5,000	26,400	24,000	21,600	30,000	*	*	*	*
Carr	5,600	1,460	1,330	1,197	1,663	*	*	*	*
Ditto	60,000	*	*	*	*	*	*	*	*
English Village	225,000	135,302	123,002	110,702	153,753	200,467	182,243	164,018	227,804

* Information is not available.
1 Daily design capacities are per construction permits.

Baker Baker Area
Carr Carr Facility
Ditto Ditto Technical Center

SOURCES: AGEISS, 1999e, Griffin-Albers, 1999b

Because daily design capacities would be sufficient for the Ditto, Carr, and English Village wastewater systems, there would be no need to modify these facilities or construct new facilities to handle the increased Proposed Action wastewater flows. Therefore, these facilities would not produce any changes to surface water quantity at DPG. Because data are not available to evaluate the impact of the daily maximum

lagoon influent for the Baker, Ditto, and Carr wastewater systems, monitoring devices for maximum daily influent are recommended.

The Baker Lagoon receives close to five times its daily design capacity. Increased wastewater flows due to the Proposed Action would increase the amount of wastewater generated. The Proposed Action includes expansion of the Baker Wastewater Treatment Facility to provide sufficient retention capacity for the increased flows. A construction permit from UDWQ was issued to DPG on September 14, 2000 to construct a new lagoon and modify the Old Baker Lagoon (HWMU 33); construction started on October 24, 2000.

An increase in the number or size of man-made surface water bodies would be considered a significant beneficial impact because the lagoons provide an important source of water to local wildlife and migratory birds (ESA, 1994). Based on visual observations from wildlife biologists at DPG, the discharge from the English Village Wastewater Treatment Facility is an important water source for pronghorn, mule deer, horses, and coyotes, and the Baker Lagoon is an important water source for waterfowl. Generation of these water bodies has been and would continue to be a long-term direct, beneficial impact to the environment.

Coyotes and other large mammals at DPG use the overflow pool at the English Village Wastewater Treatment Facility as a water source.

Natural Surface Water Flows – Other than springs that are fed by groundwater discharge, natural surface water flow is ephemeral or intermittent in surface water drainages at DPG. Natural surface water flow conditions are described in Section 3.2.2, Surface Water. Under the Proposed Action, regional or large-scale changes to natural surface water flows are not expected. However, a number of activities associated with testing, training, and support activities would cause ground disturbances resulting in an increased potential for soil erosion and compaction as described in Section 4.1.2.1, Impacts to Soil Physical Quality.

Increased soil erosion and compaction could cause increased surface water runoff and accelerated soil erosion. Increased surface water runoff due to soil erosion and compaction would be localized and specific to the activity and topography in which the activity occurs.

Due to the high evaporation rate at DPG, these impacts are expected to be nonsignificant in the low-lying basin areas where the topography is relatively flat. Areas used for ground training that have topographic relief, such as Cedar Mountains, Five Mile Hill, Little Davis Mountain, Wig Mountain, and Granite Peak, may have increased surface water runoff due to erosion and compaction. Increased surface water runoff could be detrimental to junipers that inhabit the White Sage Training Area as described in Section 4.4.2.1, Impacts to Vegetation. In this training area, erosion and surface water runoff indirectly impact the health of junipers by causing pedestalling. This is a long-term, adverse, indirect impact to junipers in areas of topographic relief used for training, and is further discussed in Section 4.4, Impacts to Biological Resources.

Increased surface water runoff is expected from construction projects identified in the SDP (AGEISS and HBA, 2000). Impacts from this runoff would most likely be nonsignificant because they would be localized and short-term during the construction activity. Due to the expanse of land in relation to developed areas at DPG and the high evaporation rates, there would be no significant impact from increased paving or buildings resulting from the new construction.

The Proposed Action would neither increase nor decrease the likelihood of flooding as described in Section 3.2.2.2, Surface Water Quantity. The DPG facilities at Ditto have had two historic incidents of flooding since 1942. Given the relatively small area that is paved at DPG and the high infiltration and evaporation rates, flooding is controlled by the amount of precipitation or snow melt rather than increased surface water runoff from paved areas.

Groundwater Usage – Groundwater usage requirements under the Proposed Action were analyzed for potential impacts to groundwater recharge of natural DPG surface water bodies, such as springs or wetlands. Proposed increases in groundwater withdrawal rates would be below historic levels, which were not known to impact the quantity of water discharging at the springs or wetland areas in the past, as discussed in the analysis of impacts to groundwater quantity in Section 4.2.2.3, Impacts to Groundwater Quantity. It is not likely that the proposed increases in groundwater withdrawal rates would impact the quantity of water in the springs or wetlands. Surface water occurring in other ephemeral surface water features that depend entirely upon precipitation would also not be impacted by increased groundwater

usage. Increases in groundwater usage would result in increases in wastewater; proposed increases in wastewater and associated impacts are discussed in the Wastewater Generation section.

4.2.2.2 Impacts to Surface Water Quality

Proposed Action mission and support activities were analyzed for potential impacts to the quality of the DPG surface water features. Locations of natural surface water features were analyzed with respect to the Proposed Action activities discussed in Chapter 2.0, Baseline Activities, Proposed Action, and Alternatives. Some of DPG's surface water bodies have been grouped together, as listed below, due to their relative proximity and/or similar site conditions.

- Wastewater Treatment Systems – includes the man-made lagoons located at Baker, Carr, Ditto, and English Village, described in Section 3.2.2.3, Surface Water Quality
- Springs in the Cedar Mountains – includes Cane Springs, Cedar Springs, Mustang Springs, Orr Springs, and Bitter Springs located at the northeast perimeter of DPG
- DPG Playa, Downwind Grid Playa, and the springs near the playas – include any surface water occurring on the DPG and Downwind Grid Playas and the Stagecoach Canyon Springs, Wilson Hot Springs, North Fish Springs, and Redden Springs which are located near the playas
- Black's Pond – a man-made feature located in the eastern part of DPG, northwest of Ditto, identified as "waters of the U.S." and in part a wetland
- Government Creek and the Old River Bed – ephemeral drainages within DPG, Government Creek is in the vicinity of Ditto and Carr, and the Old River Bed is in the southern portion of DPG southwest of Camels Back Ridge

Impacts to surface water quality of Fish Springs National Wildlife Refuge, adjacent to the southern boundary of DPG, were also analyzed due to its proximity to DPG. Figure 3.2-1, Surface Water Features at DPG, identifies the locations of these surface water features.

Existing water quality data for the wastewater treatment lagoons and several DPG springs are presented in Section 3.2.2.3, Surface Water Quality. Water quality data do not exist for on-installation wetlands, playas, and other natural surface water bodies. To determine the potential for surface water degradation, chemical data for the lagoons, visual observations of natural surface water features, and the locations of

surface water features with respect to proposed mission and support activities were analyzed. Surface water features, along with the proposed expansion of the Baker Lagoon, were analyzed. The following figures were used in the analysis:

- Figure 2.1-5, Impact Areas for Air Testing and Training
- Figure 2.1-6, Baseline Locations of Grids, Ranges, and Impact Areas
- Figure 2.1-7, Baseline Locations of Ground Training Activities
- Figure 2.1-9, Baseline Locations of Biological Defense Testing Activities
- Figure 2.1-11, Baseline Locations of Chemical Defense Testing Activities
- Figure 2.1.12, Baseline Locations of Conventional Munitions Testing Activities
- Figure 2.1-13, Baseline Locations of Smoke Obscurant, and Illuminant Testing Activities

Proposed Action mission and support activities were analyzed for potential to degrade the quality of surface water at DPG by resulting in:

- Deposition of mission materials
- Waste generation and disposal
- Soil erosion
- Spills
- Interaction with contamination from historical activities

Deposition of Mission Materials – Locations of surface water features were analyzed to determine the potential for degradation due to deposition of airborne mission materials from testing and training activities.

Stagecoach Canyon Springs, located on the north end of Granite Peak, is the only spring near the playas located within or near ranges used for chemical defense testing, biological defense testing, conventional munitions testing and smoke, obscurant, and illuminant testing. The number of these activities would increase substantially, but the locations of these activities would remain the same under the Proposed Action. Conventional munitions testing and smoke, obscurant, and illuminant testing would also affect portions of the playas. Deposition of materials from these activities could result in long-term adverse impacts to the water quality of these water bodies. Impacts to the other springs near the playas and Fish Springs National Wildlife Refuge from biological and chemical simulants, conventional munitions, and smokes, obscurants, and illuminants would be less likely due to the substantial distance from the activities as well as prevailing wind directions away from these springs.

The springs near the playas, the playas, and Fish Springs National Wildlife Refuge are known to be important water sources for wildlife and migratory birds.

Contamination of these water sources by chemicals from biological and chemical simulants, munitions, and smoke, obscurant, and illuminant testing could indirectly negatively impact the wildlife and migratory birds that use them. Observations of wildlife using the springs near the playas and surface water occurring on the playas and at Fish Springs National Wildlife Refuge do not indicate negative impacts from potential chemical contamination of these surface water bodies. There are no analytical data available to support this observation, and there is not enough information to conclude whether increased use of biological and chemical simulants, munitions, and smokes, obscurant, and illuminants would result in significant impacts to these surface water bodies. However, as discussed in Section 3.2.2.3, Surface Water Quality, the USGS collected a surface water sample from the Stagecoach Canyon Spring in 1998. Analytical results did not exceed any National Primary Drinking Water Standards. Therefore, based on these analytical results, groundwater discharging at this spring does not appear to have been impacted by DPG mission activities.

Government Creek and the Old River Bed are close to or within portions of grids, ranges, and impact areas used for ground training and for testing of conventional munitions and smokes, obscurants, and illuminants. However, impacts to surface water quality from deposition of mission materials are not considered to be significant under the Proposed Action because these drainages are ephemeral and do not serve as water sources for wildlife.

Waste Generation and Disposal – Impacts to the water quality of the springs near the playas, the playas, Black's Pond, the Old River Bed, and Fish Springs National Wildlife Refuge from waste generation and disposal is expected to be negligible because waste generation and disposal operations would not occur near any of these surface water features.

Bivouacking and ground maneuvers associated with ground training in the Cedar Mountain Training Area have the potential to degrade springs in the Cedar Mountains from waste generated and disposed by troops. Use of a new training area at Granite Peak could also result in the potential to degrade Stagecoach Canyon Springs from waste generated and disposed by troops. This impact would be significant and measures to manage and mitigate it are proposed in Section 4.2.6, Mitigation Measures. Similar activities in the White Sage Training Area have the potential to degrade surface water in Government Creek, however the impact would not be significant because Government Creek is an ephemeral drainage within DPG and is not an important water source for wildlife.

The quantity of surface water in the wastewater treatment lagoons is expected to increase as a result of the Proposed Action. The quality of the water in the lagoons is not expected to degrade as a result of waste generation and disposal because no new waste streams are expected, and treatment of the wastewater would remain in place. Expansion of the Baker Lagoon proposed under the Proposed Action would ensure sufficient retention capacity for proper treatment of wastewater. Thus, impacts on the quality of water in the wastewater lagoons from waste generation and disposal are expected to be negligible.

Soil Erosion – Soil erosion from Proposed Action activities, including construction projects proposed in the SDP (AGEISS and HBA, 2000) and implementation of the Paladin Weapons System, could result in physical degradation of surface water due to siltation and chemical degradation of surface water due to deposition of soil. Chemical or physical impacts to wastewater treatment lagoons from soil deposition are expected to be negligible because the lagoons are bermed. Chemical degradation from soil is expected to be negligible for the springs in the Cedar Mountains because they are located outside areas of known soil contamination. Observations of wildlife using the springs do not indicate potential chemical contamination of the springs. Additionally, as discussed in Section 3.2.2.3, Surface Water Quality, the USGS collected a surface water sample from the Cane Springs in 1998. Analytical results did not exceed any National Primary Drinking Water Standards. Therefore, based on these analytical results, groundwater discharging at this spring does not appear to have been impacted by DPG mission activities. However, bivouacking and ground maneuvers in the Cedar Mountain Training Area as well as in the new training area proposed for Granite Peak could cause increased soil erosion and physical degradation of the springs in these areas. Physical degradation would also occur from continued use of the springs in the Cedar Mountains by feral horses. Physical degradation of the springs in the Cedar Mountains and Stagecoach Canyon Springs would be a significant, long-term, adverse impact and mitigation measures are recommended in Section 4.2.6, Mitigation Measures.

For the other springs near the playas, the playas, and Fish Springs National Wildlife Refuge, physical degradation of surface water from training activities and associated soil erosion is expected to be negligible because these springs and the playas would not be accessed by training personnel or troops. Chemical degradation of surface water quality due to contaminated soil is unlikely because these surface water features are located outside AOCs identified in Appendix F, Areas of Concern at DPG, and areas of known or suspected soil contamination shown on Figure 3.1-6, Known or Suspected Areas of Contaminated Soil at DPG.

Bivouacking and ground maneuvers in the White Sage Training Area have the potential to increase soil erosion and cause physical degradation to Government Creek. Because Government Creek is an ephemeral drainage within DPG, the impacts of soil erosion on water quality would not be significant.

Spills – Contamination of the lagoons from potential spills is expected to be negligible because hazardous materials are not handled near the lagoons, and the lagoons are bermed. Because tactical refueling is anticipated to occur more frequently under the Proposed Action with the use of the Paladin howitzer system, Chemical Units training, and exercises associated with the Fort Leonard Wood Chemical School, the potential for spills of diesel fuel at the refueling locations could increase. This could lead to a significant impact to the quality of any nearby surface water body.

Small spills of materials used by troops during bivouacking and ground maneuvers could potentially degrade the springs in the Cedar Mountains, Stagecoach Canyon Springs, and Government Creek. Impact to the springs in the Cedar Mountains and Stagecoach Canyon Springs would be significant, however, impact to Government Creek would not be significant because it is an ephemeral drainage within DPG. Mitigation measures for the springs in the Cedar Mountains and Stagecoach Canyon Springs are recommended in Section 4.2.6, Mitigation Measures. Spills are not likely to degrade the other springs near the playas, the playas, Fish Springs National Wildlife Refuge, Black's Pond, and the Old River Bed because handling of materials does not occur near these areas.

Interaction with Contamination from Historical Activities – As discussed in Section 3.2.2.3, Surface Water Quality, surface water contamination may have occurred at some DPG HWMUs and SWMUs from historic material and waste management practices. Ongoing investigations are studying the nature and extent of the potential surface water contamination at these identified HWMUs and SWMUs. The status of these investigations is summarized in Appendix E, Solid and Hazardous Waste Management Units at DPG. Proposed Action activities would not occur at these HWMUs and SWMUs and are not expected to have an impact on the surface water at these HWMUs and SWMUs.

Groundwater contamination has occurred in some areas of DPG as a result of historical operations such as material storage and waste management practices. Seepage of this contaminated groundwater into surface water could cause surface water contamination. Under the Proposed Action, seepage of contaminated groundwater may be a concern related to the expansion of the Baker Lagoon.

The Baker Lagoon is located at the edge of the DPG Playa where groundwater ranges from 0.9 to 1.8 m (3 to 6 ft) below the ground surface. Groundwater in the saturated layers comes to the surface by capillary action (ESA, 1994) and is known to be contaminated from historic waste disposal practices. The Proposed Action includes a proposal to expand the Baker Lagoon by constructing sufficient retention capacity for wastewater generated in Baker under the Proposed Action. Construction would be in compliance with a state-issued construction permit and would provide significant beneficial impacts, including:

- Minimizing the potential for migration of partially-treated wastewater to the DPG Playa and into the groundwater
- Minimizing the potential for interaction with contaminated groundwater

Contamination of surface water in the springs in the Cedar Mountains, the springs near the playas, the playas, Black's Pond, Government Creek, the Old River Bed, and Fish Springs National Wildlife Refuge by seepage from groundwater is not expected to occur because these features are not located within areas of defined groundwater contamination.

4.2.2.3 Impacts to Groundwater Quantity

Proposed Action mission and support activities were analyzed for potential impacts to groundwater quantity at DPG through their water usage demands on an aquifer or through their disturbance of aquifer recharge areas. This section examines Proposed Action impacts to groundwater quantity due to the following conditions:

- Aquifer Depletion
- Aquifer Recharge

Aquifer Depletion – Annual groundwater withdrawal rates for potable water at DPG are identified in Table 3.2-6, Annual Groundwater Withdrawal from Active Drinking Water Supply Wells at DPG. From this table, the highest annual groundwater withdrawal rate for each well between 1994 and 1998 was selected as the maximum annual baseline water usage rate. A 5-year time frame was used for the baseline water usage rate rather than the EIS standard baseline time frame of 1996 through 1998 because 5 years was considered more representative of baseline water usage rate and because the data were readily available. Based on the proposed increases in activity levels identified under the Proposed Action, it is anticipated that water use would increase by 10 percent over annual baseline use.

The annual baseline and the projected annual Proposed Action groundwater withdrawal rates for each water supply well at DPG are identified in Table 4.2-2, Projected Annual Potable Water Usage at DPG. To determine the impact of a 10 percent increase in groundwater withdrawal on the water table of unconfined aquifers or pressure of the confined aquifers underlying DPG, the projected annual Proposed Action groundwater withdrawal rates were compared to maximum historic withdrawal rates for the time period 1969 to 1989. These dates were used based on data availability and the fact that analysis of groundwater withdrawal and subsequent dewatering of an aquifer require a longer time period to establish a trend. Annual historical withdrawal rates at DPG are identified in Table 3.2-6, Annual Groundwater Withdrawal from Active Drinking Water Supply Wells at DPG.

The comparison in Table 4.2-2, Projected Annual Potable Water Usage at DPG, shows that the projected rates are less than the historic rates for each of the water supply wells. As stated in Section 3.2.3.3, Groundwater Quantity, significant aquifer dewatering has not been reported in the past at DPG, although water levels have decreased in the water supply wells compared to levels noted during drilling. Therefore, a 10 percent increase in water use due to the Proposed Action would impact the aquifers that underlie DPG by continuing to lower the water table of the Skull Valley Aquifer and decreasing the pressure in the mid-level aquifer in the Dugway Valley-Government Creek area. This is a long-term, adverse, direct impact to the aquifers. However, because the 10 percent increase in groundwater withdrawal rates is less than historic rates, the projected impact to the aquifers would be less than impacts from past DPG activities which caused no significant aquifer dewatering. Therefore, impact from Proposed Action water usage is not considered significant to on-installation groundwater quantity.

Table 4.2-2. Projected Annual Potable Water Usage at DPG.

Well Number	Well Location	Maximum Annual Groundwater Withdrawal Rate (million gallons per year)					
		Historical (1969 through 1989)	Baseline (1994 through 1998)	Proposed Action	No Action Alternative	Deceased Mission Alternative	Maximum Expanded Mission Alternative
3	Ditto Technical Center	23.0	13.0	14.3	13.0	11.7	16.3
5	Carr Facility	43.0	4.1	4.5	4.1	3.7	5.1
26	English Village	80.8	22.6	24.9	22.6	20.3	28.3
27	English Village	110.0	17.0	18.7	17.0	15.3	21.3
28	Ditto Technical Center	44.5	10.8	11.9	10.8	9.7	13.5
30	English Village	238.0	40.8	44.9	40.8	36.7	51.0

SOURCES: Higginbotham, 1990; Pinkham et. al., 1982; Prather, 1999a

Aquifer Recharge – Changes to mission and support activities under the Proposed Action including potential land use changes were analyzed for potential impacts to

aquifer recharge areas. As stated in Section 3.2.3.2, Groundwater Flow Systems at DPG, the source of groundwater in Skull Valley is precipitation that falls mainly on the Stansbury and Onaqui Mountains. Therefore, the primary recharge areas for the Skull Valley Aquifer would be found in the vicinity of these mountains, which are located to the east and northeast of DPG. In the Dugway Valley-Government Creek area, the aquifers are recharged by precipitation in the higher valleys and lower mountain slopes above 1,829 m (6,000 ft) and by subsurface inflow from the Sevier Desert drainage basin through the Old River Bed. Based on these elevations, the primary recharge areas for the deeper confined aquifer would be to the south-southeast of DPG in the Simpson Mountains, Sheeprock Mountains, alluvium and colluvium deposits around the flanks of the Simpson Mountains and older alluvium between the Simpson and Sheeprock Mountains. Therefore, impacts to aquifer recharge would not likely occur under the Proposed Action because resulting activities would not impact the primary recharge areas that are located upgradient of DPG.

As discussed in Section 4.7.2.1, Impacts to Established Land Uses and Ownership, no major changes to DPG's existing land uses are likely to occur under the Proposed Action. As a result, it is anticipated that existing land uses within DPG would continue and DPG boundaries would not change. Therefore, no impacts to on-installation and off-installation groundwater quantity would occur from recharge areas under the Proposed Action because resulting activities would not impact these recharge areas.

4.2.2.4 Impacts to Groundwater Quality

Proposed Action mission and support activities were analyzed for potential impacts to groundwater quality at DPG resulting from the following management practices or issues:

- Materials and wastes
- Wastewater treatment lagoons
- Inactive wells
- Interaction with contamination from historical activities

Materials and Wastes – As discussed in Section 4.9.2.4, Impacts to Transportation of Materials and Wastes, it is unlikely that transportation of materials and wastes would increase significantly under the Proposed Action. As discussed in Sections 4.13.2.1, Materials, and 4.13.2.2, Wastes, increases to material handling and waste production under the Proposed Action would not require the construction of any new material or waste storage facilities. DPG follows regulatory requirements for storing,

transporting, and disposing of materials and wastes, as discussed in Section 3.13, Materials and Wastes. All hazardous wastes are stored at state-permitted facilities or state authorized locations. Under the Proposed Action these same regulatory requirements would be followed. Therefore, it is unlikely that any anticipated increases in transportation of dangerous materials, material handling, or waste production under the Proposed Action would directly impact groundwater quality.

DPG monitors groundwater quality in the vicinity of the English Village Landfill and English Village Wastewater Treatment Facility to meet regulatory permit requirements. These monitoring programs would be continued under the Proposed Action. Therefore, any impacts to groundwater quality from materials and wastes management under the Proposed Action would be detected and addressed under the regulatory permit.

Wastewater Treatment Lagoons – Section 4.2.2.1, Impacts to Surface Water Quantity, discusses changes to surface water discharge from the wastewater treatment lagoons under the Proposed Action and states that an increase in wastewater generation is likely due to the Proposed Action. Wastewater treatment lagoons at English Village, Carr, and Ditto have sufficient capacity to accommodate increased wastewater flows due to the Proposed Action while Baker is undersized. However, as discussed in Section 4.2.2.1, Impacts to Surface Water Quantity, a construction permit was issued to DPG on September 14, 2000 to construct a new lagoon and modify the Old Baker Lagoon. Expansion of the Baker Lagoon to accommodate the increased wastewater flows would provide protection of groundwater quality by eliminating the need to discharge partially treated wastewater to the surface in this area, thereby minimizing the potential for migration of partially-treated wastewater into the groundwater. It would be unlikely that groundwater quality would be negatively impacted in the vicinity of the lagoons from an increase in surface water discharge under the Proposed Action.

Inactive Wells – DPG has 20 water supply or test wells that are inactive but have not been abandoned. These wells are identified in Table 3.2-5, Status of Water Supply Wells at DPG. The condition of these wells is unknown. However, if a well is in a deteriorated state or had not been appropriately constructed, it could act as a vertical conduit thereby enhancing the potential for transport of analytes found in soil to groundwater. Therefore, existing and future groundwater quality at DPG could potentially be impacted by any inactive water supply or test well which is in a deteriorated state or which was not appropriately constructed or abandoned as per Administrative Rules for Water Well Drillers, R655-4-11.4. This could be a long-term, adverse, direct impact to the aquifers that underlie DPG. The activities identified under the Proposed Action should not add to this existing potential adverse

impact. Mitigation measures, as a best management practice, that could address potential impacts to groundwater from existing inactive wells are provided in Section 4.2.6, Mitigation Measures.

Based on this analysis the Proposed Action would not add to any existing groundwater quality impacts at DPG. Thus, impacts of the Proposed Action on groundwater quality are not considered significant.

Interaction with Contamination from Historical Activities – As discussed in Section 3.2.3.4, Groundwater Quality, groundwater contamination has occurred in some areas of DPG from historical operations, such as material storage and waste management practices. Ongoing investigations are studying the nature and extent of potential groundwater contamination at identified areas within DPG. Figure 3.2-5, Groundwater Contamination at DPG, identifies the locations of HWMUs and SWMUs that contain contaminated groundwater. Typically, the analytes that have been detected in groundwater at DPG do not form laterally extensive or definable groundwater plumes. Analytes are often detected sporadically in the immediate area of investigation, at low concentrations, or inconsistently as part of the HWMU and SWMU investigations. The status of ongoing groundwater contamination investigations at the HWMUs and SWMUs is summarized in Appendix E, Solid and Hazardous Waste Management Units at DPG.

Groundwater quality at DPG would continue to be impacted by the identified HWMUs and SWMUs due to analytes that are present in soil and groundwater. However, at the conclusion of the ongoing groundwater contamination investigations, groundwater quality would be assessed and mitigation measures would be implemented if it is determined that such measures are necessary. Until this time, groundwater is being monitored semi-annually at select HWMUs to ensure no additional significant adverse change in groundwater quality. The activities identified under the Proposed Action should not add to this historical contamination.

4.2.2.5 Compliance with Regulations and Management Plans

An overview of the regulations that apply to water resources at DPG is provided in Section 3.2.1, Regulatory Overview. Proposed Action mission and support activities would not impact DPG's compliance with the CWA, SDWA, RCRA, or Executive Order 11990. The Proposed Action would not cause DPG's facilities to discharge surface water to "waters of the State;" thus UPDES permits would not be required and DPG would be in compliance with the Utah Water Quality Act enforced by UDWQ.

UDWQ issues groundwater discharge permits independently of the UPDES system. Because the Proposed Action does not include any new discharges to groundwater, no new groundwater discharge permits would be required.

Groundwater data are collected semi-annually to maintain compliance with the groundwater discharge permit for the English Village Wastewater Treatment Facility and indicate no contaminated surface water is being discharged to the ground. Under the Proposed Action, treatment of wastewater is expected to continue with no new treatment requirements.

4.2.3 Impacts of the No Action Alternative

Under the No Action Alternative, DPG's Proposed Action would not be implemented and DPG would continue to operate under its baseline mission. Natural surface water quantity would be the same as baseline conditions and the quantity of wastewater would be that of the baseline conditions as shown in Table 4.2-1, Projected Lagoon Influent Rates for DPG Wastewater Treatment Systems. Operation and maintenance of the sewage lagoons would still be required and would still provide an important water source to wildlife and migratory birds. Expansion of the Baker Lagoon would still be implemented as part of the Baker Lagoon construction permit that was issued on September 14, 2000.

Surface water quality impacts would be similar in type but lower in magnitude than those under the Proposed Action as fewer biological and chemical simulants, munitions, and smokes and obscurants would be released to the environment during open-air testing. The potential for diesel fuel spills would also be less because tactical refueling of the Paladin Weapons System would not be conducted at DPG. Stagecoach Canyon Springs would not be impacted by ground training in the proximity. No new facilities are proposed under the No Action Alternative, so no increase in erosion and associated surface water runoff associated with construction activities would occur.

Under the No Action Alternative, the ongoing investigations that are studying the nature and extent of potential surface water and groundwater contamination from historical waste operations at identified areas within DPG would continue. The No Action Alternative would not impact DPG's compliance with its groundwater discharge permit.

The projected annual groundwater withdrawal rates for each potable water supply well at DPG under the No Action Alternative are identified in Table 4.2-2, Projected Annual Potable Water Usage at DPG. Because no increase in annual groundwater withdrawal rates would occur under this alternative, and baseline withdrawal rates

are not causing significant aquifer dewatering, impact to groundwater quantity from this alternative is not considered significant. While both the No Action Alternative and the Proposed Action would cause no significant impact to the aquifers that underlie DPG, the No Action Alternative would actually result in a lower potential impact because estimated groundwater withdrawal would be less than that projected for the Proposed Action.

DPG activities under the No Action Alternative would not alter the impacts relating to baseline groundwater quality issues discussed in Section 4.2.2.4, Impacts to Groundwater Quality. These existing groundwater quality impacts would continue to occur under the No Action Alternative.

4.2.4 Impacts of the Decreased Mission Alternative

Under the Decreased Mission Alternative, DPG would continue to operate but at a lower level than under baseline conditions. The number of ground training events would decrease substantially from levels in both the No Action Alternative and the Proposed Action. Proposed new training areas, construction of new facilities, and road construction and improvements would not occur with the Decreased Mission Alternative.

Natural surface water quantity would be the same as baseline conditions since natural surface water is not used to support the DPG mission. The quantity of wastewater for the Decreased Mission Alternative would be lower than that of the baseline conditions by 10 percent as shown in Table 4.2-1, Projected Lagoon Influent Rates for DPG Wastewater Treatment Systems. Operation and maintenance of the sewage lagoons would still be required and would still provide an important water source to wildlife and migratory birds. Expansion of the Baker Lagoon would be implemented as part of the Baker Lagoon Construction Permit that was issued on September 14, 2000. Modifications to the Carr and the English Village Wastewater Treatment Facility lagoons would likely be required because decreased influent may not be sufficient to keep the lagoon’s liners wet at all times.

Under the Decreased Mission Alternative, open-air testing using biological and chemical simulants would still occur, however at minimal levels. Surface water quality impacts would be similar in type but lower in magnitude than those under the Proposed Action as fewer biological and chemical simulants, munitions, and smokes and obscurants would be released to the environment during open-air testing and training. The potential for diesel fuel spills would also be less because tactical refueling of the Paladin Weapons System would not be conducted at DPG. Stagecoach Canyon Springs would not be impacted by ground training in the

proximity. No new facilities would be constructed under the Decreased Mission Alternative, so an increase in erosion and associated surface water runoff associated with construction activities would not occur.

As discussed in Section 4.7, Impacts to Land Use and Access, a reduction in activities under the Decreased Mission Alternative could potentially lead to land disposals. As a result, it is anticipated that some existing land uses within DPG would continue; however, DPG boundaries could potentially change. Some surface water sources, such as springs and portions of the playas, could potentially come under other ownership. New ownership would most likely be BLM, which would likely protect the sources of water for use by wildlife. Therefore, the impact of potential land disposals to surface water under the Decreased Mission Alternative is not considered significant.

Under the Decreased Mission Alternative, the ongoing investigations that are studying the nature and extent of potential surface water and groundwater contamination from historical waste operations at identified areas within DPG would continue. The Decreased Mission Alternative would not impact DPG's compliance requirements for its groundwater discharge permit.

Table 4.2-2, Projected Annual Potable Water Usage at DPG, identifies the projected annual groundwater withdrawal rates for each potable water supply well at DPG under the Decreased Mission Alternative. Based on the proposed decreases in activity levels identified under this alternative, it is anticipated that water use would decrease by 10 percent over the maximum annual baseline use.

Because a decrease in annual groundwater withdrawal rates would occur under this alternative and baseline withdrawal rates are not causing significant aquifer dewatering, impact from this alternative is not considered significant. While both the Decreased Mission Alternative and the Proposed Action would cause no significant impact to the aquifers that underlie DPG with regard to aquifer dewatering, the Decreased Mission Alternative would result in a lower potential impact because estimated groundwater withdrawal would be less than that projected for the Proposed Action.

As discussed above, a reduction in activities under the Decreased Mission Alternative could potentially lead to land disposals and DPG boundaries could potentially change. Water supply wells could be constructed immediately upgradient of the new DPG boundaries if land disposals were to occur. However, groundwater quantity should not be impacted on-installation because DPG would have senior groundwater rights. Therefore, impact to on-installation groundwater quantity under the

Decreased Mission Alternative is considered to be nonsignificant as was the case for the Proposed Action.

Changes to DPG activities under the Decreased Mission Alternative would not alter the impacts relating to baseline groundwater quality issues discussed in Section 4.2.2.4, Impacts to Groundwater Quality. These existing groundwater quality impacts would continue to occur under the Decreased Mission Alternative.

4.2.5 Impacts of the Maximum Expanded Mission Alternative

Under the Maximum Expanded Mission Alternative, the level of DPG activities would increase. The number of ground training events would remain the same as the Proposed Action, but biological and chemical defense testing would double over levels in the Proposed Action.

Natural surface water quantity would be essentially the same as baseline conditions since natural surface water is not used to support the DPG mission. The quantity of wastewater for the Maximum Expanded Mission Alternative would increase over that of the baseline conditions by 25 percent as shown in Table 4.2-1, Projected Lagoon Influent Rates for DPG Wastewater Treatment Systems. Operation and maintenance of the sewage lagoons would still be required and would still provide an important water source to wildlife and migratory birds. Expansion of the Baker Lagoon would be implemented, providing sufficient retention capacity at this facility. Additionally, expansion of the English Village Wastewater Treatment Facility would be required to be able to retain the daily maximum influent expected as shown in Table 4.2-1, Projected Lagoon Influent Rates for DPG Wastewater Treatment Systems.

Under the Maximum Expanded Mission Alternative, impacts to surface water quality would be expected due to a doubling of biological and chemical defense testing and use of more biological and chemical simulants which would be released to the environment during open-air testing. The potential for impacts to surface water quality from training activities that require tactical refueling at DPG would be the same as for the Proposed Action. Stagecoach Canyon Springs would be impacted by ground training in the proximity. As new facilities are proposed under the Maximum Expanded Mission Alternative, an increase in erosion and associated surface water runoff from construction activities would occur.

As discussed in Section 4.7, Impacts to Land Use and Access, an increase in activities under the Maximum Expanded Mission Alternative could potentially lead to land acquisitions. As a result, it is anticipated that existing land uses within DPG would continue and DPG boundaries could potentially change. It is likely that such acquisitions would take place in close proximity to DPG and may include additional

surface water sources, such as springs and playas. It is likely that such additional surface water sources would not be impacted any more than surface water sources already located within DPG. However, until potential acquisition areas could be identified, a more complete impact analysis is not possible.

Under the Maximum Expanded Mission Alternative, the ongoing investigations that are studying the nature and extent of potential surface water and groundwater contamination from historical waste operations at identified areas within DPG would continue. The Maximum Expanded Mission Alternative would cause DPG to be out of compliance with its groundwater discharge permit and would cause a modification to the English Village Wastewater Treatment Facility.

Table 4.2-2, Projected Annual Potable Water Usage at DPG, identifies the projected annual groundwater withdrawal rates for each potable water supply well at DPG under the Maximum Expanded Mission Alternative. Based on the proposed increases in activity levels identified under this alternative, it is estimated that water use would increase by 25 percent over the maximum annual baseline use. When comparing the projected groundwater withdrawal rates to historic rates identified in Table 4.2-2, Projected Annual Potable Water Usage at DPG, projected rates are less than the historic rates for each of the potable water supply wells at DPG.

Because the 25 percent increase in groundwater withdrawal rates is less than historic rates, the projected impact to the aquifers would be less than impacts from past DPG activities which caused no significant aquifer dewatering. Therefore, impact from the Maximum Expanded Mission Alternative is not considered significant. While both the Maximum Expanded Mission Alternative and the Proposed Action would cause no significant impact to the aquifers that underlie DPG, the Maximum Expanded Mission Alternative would result in a greater potential impact because estimated groundwater withdrawal would be greater than that projected for the Proposed Action.

As discussed above, an increase in activities under the Maximum Expanded Mission Alternative could potentially lead to land acquisitions and DPG boundaries could potentially change. Impact to on-installation groundwater quantity with regard to aquifer recharge is not considered significant under the Maximum Expanded Mission Alternative as was also the case for the Proposed Action. On-installation there would only be negligible changes to land use and, therefore, this would not impact existing upgradient recharge areas. If there were future DPG land acquisitions, it is likely that such acquisitions would take place in close proximity to existing DPG land holdings. Since recharge areas are located predominantly further upgradient of DPG it is likely the primary recharge areas would not be impacted by any potential land use changes.

However, until potential acquisition areas could be identified, a more complete impact analysis is not possible.

Changes to DPG activities under the Maximum Expanded Mission Alternative would not alter the impacts relating to baseline groundwater quality issues discussed in Section 4.2.2.4, Impacts to Groundwater Quality. These existing groundwater quality impacts would continue to occur under the Maximum Expanded Mission Alternative.

4.2.6 Mitigation Measures

Mitigation measures for significant impacts to surface water quality of the springs in the Cedar Mountains and the Stagecoach Canyon Springs include:

- Enforce restrictions regarding bivouacking and ground training near springs
- Continue use of wildlife guzzlers that DPG has established in the area near the springs to decrease the use of the springs by wildlife and provide additional water sources
- Periodically monitor the water quality of the springs

With these mitigation measures, impacts to the springs in the Cedar Mountains and Stagecoach Canyon Springs can be managed to nonsignificant levels.

The following mitigation measures are recommended for general protection of surface water and for obtaining data to monitor the effects of the Proposed Action:

- Implement best management practices, such as installation of metering devices at all lagoons and periodic calibration and maintenance
- Use silt fences and berms during construction projects to minimize surface water runoff and soil erosion
- Periodically monitor water quality at the springs near the playas, including monitoring support at the Fish Springs National Wildlife Refuge, and at select locations within the playas

Mitigation measures for the one significant impact to groundwater quality include a best management practice to appropriately abandon all nonessential, inactive water supply and test wells at DPG. This mitigation measure would help reduce the potential impact to groundwater quality to a nonsignificant level. Additional mitigation measures for a new drinking water system at Carr include updating the

DWSP Plan, as well as monitoring, testing the pump, and obtaining a permit or registration.

4.2.7 Residual Impacts

Regardless of implementing the recommended mitigation measures for surface water, a residual impact that can be expected is some small chemical and physical impact on surface water quality. This impact is not expected to degrade surface water quality with respect to human health or wildlife or operational requirements of the wastewater treatment facilities. Thus, residual impacts to surface water would be nonsignificant.

Because DPG's mission will continue, there may continue to be impacts to groundwater, but these impacts would not be considered significant. Thus, implementing the recommended mitigation measure for groundwater quality would further reduce any potential residual impacts.

4.3 Impacts to Air Resources

This section analyzes the potential impacts of the Proposed Action and alternatives to air resources at DPG. The criteria used to evaluate whether these potential impacts are considered significant, mitigation measures that could be implemented to reduce any adverse impacts, and residual impacts are also presented. Existing air quality conditions at DPG and in the surrounding area are summarized in Section 3.3, Air Resources.

4.3.1 Significance Criteria

Impacts must be evaluated with criteria to determine whether or not they are significant. Impacts to air resources from the Proposed Action or alternatives would be considered significant if:

- Materials regularly released to air were projected to exceed regulatory criteria established to protect the public or the natural environment. Section 3.3.2.1, Regulatory Overview, describes the regulatory criteria applicable to air resources at DPG.

- Materials such as disease-causing biological organisms or chemical agent are regularly projected to be released to air in excess of the limits prescribed by the CDC or Army surety requirements.

4.3.2 Impacts of the Proposed Action

This section evaluates air resource impacts with these significance criteria in detail for the Proposed Action. Proposed Action mission and support activities were analyzed for potential impacts to air quality and compliance with regulations and management plans.

4.3.2.1 Impacts to Air Quality

Baseline air quality conditions are presented in Section 3.3.2, Air Quality. Impacts to air quality are evaluated by analyzing potential emission increases under the Proposed Action in the following areas:

- Criteria Pollutants and HAPs
- Ozone depleting substances
- Military-specific material
- Wildland fires
- Release of disease-causing biological agents or chemical agents

Military-specific material potentially impacts air quality.

Criteria Pollutants and HAPs – Emissions of the criteria pollutants and HAPs for DPG activities under the Proposed Action are predicted to increase only slightly over baseline. Increased travel on unpaved roads as a result of testing, training and routine mission support would result in a short-term impact on air quality by impacting visibility. Inhaling the increased dust would also be a human health nuisance. The daily operation of a new utility helicopter at DPG would be a new minor source of air emissions. Overall, the impact on air quality from the Proposed Action would not be considered significant based on the criteria presented in Section 4.3.1, Significance Criteria.

Section 3.3.2.2, Air Quality Conditions at DPG, presents the major activities or operations that are the sources of criteria pollutants and HAPs. Air emissions increase directly proportional with activities. For example, when an activity is assumed to double, emissions from that activity would double. PM_{10} is the principal criteria pollutant comprising the emissions associated with the Proposed Action.

The existing AOs and permit described in Section 3.3.2.2, Air Quality Conditions at DPG, include the increased activities projected for the Proposed Action. For example, the proposed increases in chemical or biological agent defense testing would not require any modification of the BMTF, CCTF, or the LSTF permits. Proposed increases in OB/OD activities would not exceed the limits established in the existing AO. The existing smokes and obscurants testing permit requires that any activities that require an EA have supporting dispersion modeling analysis.

In the event that the Proposed Action necessitates applying for new permits or modifying existing air permits, applications for permit modifications would be prepared and submitted to UDAQ. UDAQ would review the new and modified sources under the new source review process and ensure that air quality impacts on the public and the natural environment would not exceed state and Federal air quality standards and that permitted activities would meet all applicable air quality regulations. UDAQ has evaluated baseline activities under the existing permits.

Proposed Action emissions would be within permit limits. Because air emission increases have already been evaluated to ensure regulatory criteria are not exceeded, the impacts due to air emissions increases of criteria pollutants and HAPs are not considered significant.

PM_{10} emissions as fugitive dust from vehicles traveling on unpaved roads would increase. However, these emissions are not subject to UDAQ permit requirements.

Ozone Depleting Substances - DPG uses very small quantities of ozone depleting substances, which include chlorofluorocarbons, halons, and certain hydrochlorofluorocarbons, in a controlled manner for refrigeration and fire suppression. DPG's usage of these substances would not change under the Proposed Action but would continue to be phased out under Title VI of the CAA.

Military-Specific Material - Military-specific materials are used in accordance with the smokes and obscurants testing permit. As required by the permit, any use of a material requiring an EA would also require a dispersion modeling analysis. UDAQ would review new and modified sources of military-specific material as required by the permit and ensure that the public and the natural environment would not be exposed to harmful military-specific pollutants and that the emissions would not

degrade air quality. Therefore, the impact of increased emissions from military-specific material would not be significant.

Wildland Fires – Wildland fires at DPG occur during dry months due to lightning strikes and human activities. In addition, training and testing activities at DPG cause accidental fires on wildlands. As training and testing activities increase, the number of accidental wildland fires could also increase. Fires at DPG would be addressed in accordance with the DPG Fire Management Plan. To the extent that fires at DPG are subject to the Utah Smoke Management Plan, the applicable requirements of the Smoke Management Plan would also be adhered to.

Although total wildland fire activity for the past several years has been tracked, available data do not distinguish between naturally caused fires and accidental fires caused by training and testing activities. The occurrence of naturally and accidentally ignited fires on wildlands is unpredictable from year to year. Locations of fires at DPG from 1994 through 1998 are shown on Figure 3.1-4, Fires Occurring at DPG from 1994 through 1998. Increased wildland fires would result in a short-term impact to air quality as a result of the increased PM_{10}, CO, and VOCs. Increased wildland fires would also result in increased soil erosion and increased fugitive dust emissions. These impacts would not be considered significant based on the criteria presented in Section 4.3.1, Significance Criteria.

Release of Disease-causing Biological Agents or Chemical Agents – Engineering and administrative controls prevent the release of biological and chemical agents during transport and use, under normal operating conditions. The Proposed Action would not alter baseline engineering or administrative controls. Therefore, the Proposed Action would not result in releases of disease-causing biological agents or chemical agents in excess of the limits prescribed by CDC or the Army surety requirements. Therefore, under the Proposed Action, there would be no significant air quality impact.

4.3.2.2 Compliance with Regulations and Management Plans

Proposed Action mission and support activities would not violate regulations or laws because all activities would be executed under the DPG air permit program. The permitting requirements are established to regulate emissions from all subject sources. The DPG permitting program clearly defines all conditions required to maintain compliance with the regulations.

A conformity analysis is not required for this EIS. DPG is in an attainment area for all NAAQS. Section 176 of the CAA, as amended, states that Federal agencies must not engage in, approve, or support in any way, any action that does not conform to an applicable State Implementation Plan for the purpose of attaining NAAQS. EPA has

published its final conformity rules. EPA interprets Section 176 to be applicable only to actions in areas that do not meet EPA's air quality standards or in maintenance areas.

There are no management plans for the air program. Management plans for testing facilities require compliance with the conditions in the DPG permitting program. Compliance with these plans would continue.

4.3.3 Impacts of the No Action Alternative

Emissions of criteria pollutants, HAPs, and military-specific material under baseline conditions have been analyzed for potential impacts to air quality through permitting and regulatory compliance processes. Assuming no change in activities over baseline conditions presented in Section 3.3.2, Air Quality, there would be no additional impact from implementation of the No Action Alternative since this alternative represents baseline conditions. PM_{10} emissions as fugitive dust from vehicles on unpaved roads would remain the same as baseline emissions. The No Action Alternative would not result in the release of disease-causing biological agents or chemical agents. Therefore, the No Action Alternative would not cause significant impacts.

4.3.4 Impacts of the Decreased Mission Alternative

Emissions of criteria pollutants, HAPs, and military-specific material under the Decreased Mission Alternative were analyzed for potential impacts to air quality. Because air emissions under the Decreased Mission Alternative would be less than baseline conditions, there would be a smaller impact to air resources from implementation of this alternative compared to the No Action Alternative and to the Proposed Action. The Decreased Mission Alternative would not affect baseline visibility conditions. The Decreased Mission Alternative would not result in the release of disease-causing biological agents or chemical agents. PM_{10} emissions as fugitive dust from vehicles on unpaved roads would decrease. These emissions are not subject to UDAQ permit requirements. Therefore, the Decreased Mission Alternative would not cause significant impacts.

4.3.5 Impacts of the Maximum Expanded Mission Alternative

Emissions of criteria pollutants, HAPs, and military-specific material under the Maximum Expanded Mission Alternative were analyzed for potential impacts to air quality. PM_{10} emissions as fugitive dust from vehicles on unpaved roads would increase dramatically from the baseline and compared to the Proposed Action. However, these emissions are not subject to UDAQ permit limits. Without modeling

PM_{10} emissions, specific impacts on air quality from these emissions can not be determined.

There would be no activities under the Maximum Expanded Mission Alternative that would result in the release of disease-causing biological agents or chemical agents. All new elements of the Maximum Expanded Mission Alternative would need to be analyzed within the context of baseline permitting processes before these activities could be implemented. Using this criterion, impacts from the Maximum Expanded Mission Alternative would not be considered significant.

4.3.6 Mitigation Measures

Although impacts to air quality from the Proposed Action and alternatives are not considered significant, the following mitigation measures are recommended.

- Evaluate substitutes for military-specific materials that potentially impact air quality such as HC smoke.
- Investigate fugitive dust control methods for military training on unpaved roads and in training areas. Methods of controlling fugitive dust generated by wheeled and tracked vehicles have been evaluated by the U.S. Army Environmental Center (USAEC, 1996). In addition, modeling of fugitive dust generated during training exercises would help to better understand its effects on ambient air quality values. Implement those measures that make sense for DPG given the mission, terrain, and cost.
- Manage all fires in accordance with the DPG Fire Management Plan.
- Obtain financial compensation from training missions for fire management according to the MTAMP and the INRMP.

4.3.7 Residual Impacts

Continued mission activities at DPG would result in continued air emissions. These emissions would continue to be managed within regulatory limits and would not be considered significant.

4.4 Impacts to Biological Resources

This section analyzes the potential impacts of the Proposed Action and alternatives to biological resources at DPG. The criteria used to evaluate whether these potential impacts are considered significant and mitigation measures that could be

implemented to reduce any adverse impacts are presented. Biological resources at DPG are described in Section 3.4, Biological Resources.

4.4.1 Significance Criteria

Impacts must be evaluated with criteria to determine whether or not they are significant. Impacts to biological resources resulting from the Proposed Action or alternatives would be considered significant if one or more of the following occurs:

- Habitat necessary for all or part of a species' life cycle, for example, nesting grounds, fawning areas, migration corridors, or watering areas, is degraded
- Sensitive, threatened, or endangered species are adversely affected
- Unique habitats are lost or severely reduced
- Substantial direct or indirect mortality or displacement occurs
- A local or regional species is lost
- Ecological processes and functions are damaged to the extent that the ecosystem is no longer sustainable or biodiversity is impaired
- Increased contribution to unwanted or unnatural trends, such as fire or exotic annuals, occurs
- Substantial loss or dramatic change in vegetation communities occurs

4.4.2 Impacts of the Proposed Action

Biological resource impacts are evaluated with these significance criteria in detail for the Proposed Action. Under the Proposed Action, an increase in the level of activity at DPG, including an increase in testing, training, and support activities, as well as an increase in personnel, would occur. Biological resources could be affected in numerous ways, both adversely and beneficially, with an increase in activity at DPG. Impacts to vegetation and wildlife are highly interrelated.

4.4.2.1 Impacts to Vegetation

Proposed Action mission and support activities were analyzed for potential impacts to vegetation resulting from the following:

- Ground Disturbance
- Wildland Fire
- Spills
- Air Emissions

Ground Disturbance - Under the Proposed Action, an increase in ground disturbance resulting largely from increased ground training would have the greatest potential to impact vegetation. Ground disturbance is caused by vehicular or troop movement over the landscape and excavation and can have long-term direct and indirect impacts to vegetation. The greatest impact from ground disturbance would be loss of vegetation, which would have many ramifications and related impacts to wildlife, as discussed in Section 4.4.2.2, Impacts to Wildlife. Loss of vegetation decreases the diversity of the structure, composition, distribution, and ground cover of the habitat.

Most desert plant species are very slow growing and may not recover from ground disturbance.

Of greatest concern to changes in the vegetation and vegetation loss is the spread of exotic annuals, hereafter mentioned as weeds, that out-compete the native vegetation. As discussed in Section 3.4.2.6, Annual Grasslands, a significant change in vegetation from Vest's (1962) (Figure 3.4-1, Vegetation Classifications by Vest) original small mammal plots to the present was observed at DPG. Weeds were absent or found in low frequencies in most of the plots in the 1950s, but were found in all of the plots, except pickleweed, in 1996 (AGEISS, 1997b).

Cheatgrass, a weed, now dominates many of the natural vegetation communities at DPG. About 54 percent of DPG training areas are dominated by cheatgrass.

The impact of ground training on the spread of cheatgrass is shown in Figure 4.4-1, Overlay of Cheatgrass and Locations Where Ground Training is Conducted. This indirect impact is significant not only because it increases an unwanted trend, but it decreases the diversity and distribution of vegetation, and precludes the natural vegetation from returning.

Direct and significant impacts of vehicular movement during training have been noted in the training areas when comparing shrub frequency and percent ground disturbance. Comparison of the training area and control area shows a significant change in shrub cover (6.2 percent in training area and 11.1 percent in control area), juniper density, and vertical structure of 62.1 cm (24.4 inches) in training area and 80.5 cm (31.7 inches) in control area. Loss of and change in vegetation due to ground disturbance would be a significant and direct impact to vegetation.

In addition to direct disturbance or destruction of vegetation, ground disturbance could affect vegetation through:

- Soil erosion
- A decrease in the cryptobiotic soil
- An increase in disturbed bare ground

Soil compaction can increase the erosion rate because cryptobiotic soil is lost and it becomes harder for plants to reestablish. In the White Sage Training Area, soil is eroded from the trees leaving only a mound of dirt around the tree like an island. Pedestalling of junipers has been observed where tracked vehicles have cut the soil and the wind continues to aid in the erosion process. Pedestalling is not observed in the Cedar Mountain Training Area because the junipers are at higher elevations than the training area. Juniper stands are limited on DPG and are an important vegetation community, especially for migratory bird species. Loss of vegetation and vegetative communities due to erosion is not a large issue, but if significant decreases in junipers occur, this would be a significant and indirect impact.

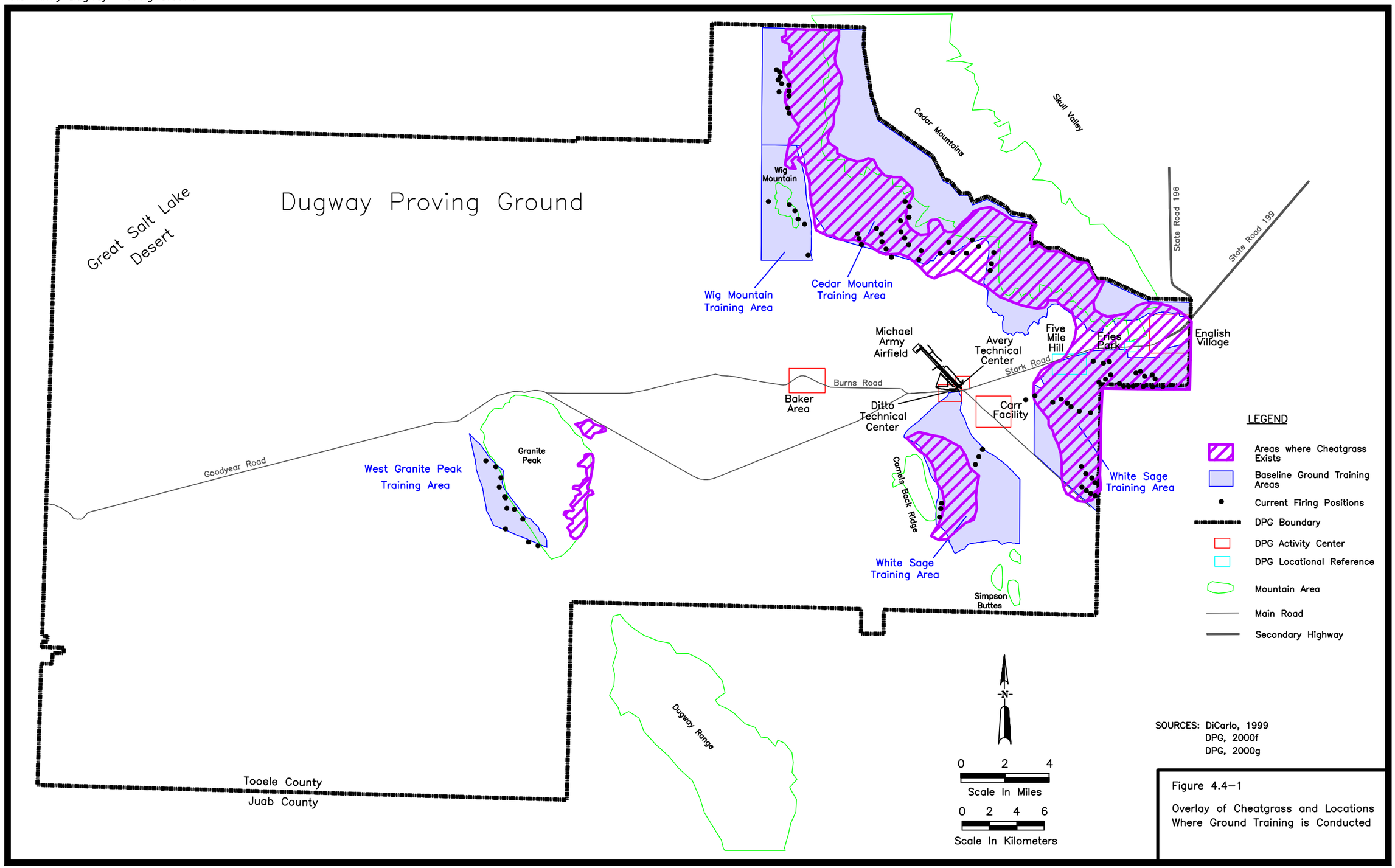

Figure 4.4–1

Overlay of Cheatgrass and Locations Where Ground Training is Conducted

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Bare ground accelerates erosion and increases weed establishment (Wilson, 1988). On the Pinon Canyon Maneuver Site in Colorado, an increase in military traffic led to an increase in bare ground and a decrease in vegetative cover. Pinon Canyon also receives a high amount of precipitation that further accelerates erosion. Species composition changed from the perennial native grasses to annual grasses and forbs (weeds) and a decrease was observed in shrubs and trees (Shaw and Diersing, 1990). Weeds are able to establish in disturbed areas much easier and faster than native vegetation. An increase in weeds on other installations has been correlated to the increase in divots caused by neutral steers from tracked vehicles that can also increase seed dispersal (Turner and Bratton, 1987; Watts, 1998) and decrease species diversity (Young and Evans, 1978). An increase in bare ground would be a direct and significant impact to vegetation.

Increased training would cause the greatest impacts to vegetation from ground disturbance. An increase in the number of tracked vehicles, personnel, and munitions would increase ground disturbance already observed.

A 50 percent increase in the use of tracked vehicles and vehicles greater than 4,500 kg (5 tons) and doubling in the number of troops is expected to occur with an increase to the proposed training levels. In addition, a new weapons system, the Paladin Weapon System, is being proposed for training by the NG. This system weighs 16 percent more than the M109A5 (155-mm self-propelled howitzer) and is accompanied by a field artillery ammunition supply vehicle that is 46 percent heavier than the old supply vehicles. Environmental concern over this new system stems from deployment of the Paladin (Army, 1997b). A shift from fixed firing points, confined within a 250-m (820-ft) radius, to a multiple-point firing “footprint” in a 1 to 3.1 sq km (0.36 to 1.1 sq mi) ellipse is expected. This would dramatically increase the amount of ground disturbed and may have a significant and long-term impact to vegetation.

Vegetational growth may be further inhibited with a decrease in the cryptobiotic soil. Cryptobiotic soil is important in the nutrient cycling of nitrogen and carbon, and a decrease in these two nutrients can decrease ecosystem productivity (Watts, 1998). In addition, cryptobiotic soil prevents soil erosion. An increase in soil erosion favors plant species that can survive on reduced nutrients and moisture (Schlesinger et al., 1990). This indirect, but long-term, impact may be significant if large portions of cryptobiotic soil are lost and soil erosion increases significantly.

Other forms of ground disturbance include physical disintegration and blast overpressure. Physical disintegration occurs from use of munitions and especially during training events when large and frequent rounds of ammunition are deployed.

Ground training is expected to increase substantially in terms of personnel present, equipment, and number of rounds deployed. When added together, all these factors would increase ground disturbance in the areas of training. This could be significant depending on the location of the training. Muzzle blast overpressure accompanies loud impulsive noises and flattens vegetation 15 m (49 ft) from the gun muzzle. Physical disintegration and blast overpressure cause loss of vegetation which leads to other impacts that have been previously described, including changes in vegetation, plant diversity, and biomass. Loss of vegetation would be a direct, significant, and long-term impact. Physical disintegration can also cause soil compaction and erosion which impact vegetation as previously described in this section. A greater use of new and high explosive munitions would greatly increase the ground disturbance, destroy vegetation, and increase soil compaction. Although testing would impact the vegetation, impacts to the vegetation would not be significant if testing is carried out in areas such as the White Sage Impact Area, because this area is already dominated by cheatgrass.

Under the Proposed Action, increased use of DPG by the AF would increase ground disturbance during construction of new bunkers, installation of new concrete pads for cruise missiles and new impact sites, upgrade of existing roads, and replacement of the MAAF runway. Construction of new buildings would also cause ground disturbance. If new roads were needed to access these buildings, an increase in ground disturbance would again occur. Minor, insignificant disturbance would occur if newer buildings are placed near existing ones. Significant impacts to the vegetation would occur from these activities if:

- Unique vegetation was destroyed, such as hopsage, winterfat, and sagebrush
- New roads are developed
- Extreme loss of cryptobiotic soil occurs

In addition, new quarry sites are proposed for training that would significantly disturb vegetation not previously affected and would lead to an increase in disturbance. New firing points are proposed at Wig Mountain, which might allow for a rest rotation of other firing points. Proposed bivouac areas at the Cedar Mountains and Granite Peak (special interest area) may increase disturbance in special habitats (springs) and would have a significant impact to these areas. Measures to manage and mitigate impacts to vegetation caused by ground disturbance are presented in Section 4.4.6, Mitigation Measures.

Wildland Fire – Wildland fires at DPG have been linked to both natural causes and training activities. Under the Proposed Action, an increase in the military presence, new explosives, incendiary devices, and detonation of buried ordnance would

increase the likelihood of man-made fires. On the Snake River Bird of Prey Conservation Area, military-caused fires were found to have different dynamics than natural fires. Usually the fires in the Great Basin were larger with a shorter fire return interval, which in turn, caused "the shrubland to recover more slowly than the rate at which it was lost" (U.S. Department of the Interior, 1996).

Fires also cause fragmentation of vegetation, which increases the distance between shrub patches and makes it harder for plants to regenerate. Section 3.4.2.6, Annual Grasslands, describes recent fires at DPG and Figure 3.1-4, Fires Occurring at DPG from 1994 through 1998, shows the location and acreage of vegetation burned. Similar to ground disturbance, fire does cause increased soil erosion due to loss of cryptobiotic soil and vegetation. In addition, fire can increase the distribution of weeds, such as cheatgrass. Cheatgrass "fuels its own dynamics by providing the accumulation of fire herbage that ignites and carries wildland fires to the widely spaced sagebrush" (Young and Evans, 1978). This destroys more vegetation and allows for the further spread of weeds. This increase in intensity due to cheatgrass fuel, the increased fire frequency, and size of fires have accelerated the degradation of native biotic communities. Fifty-five percent of the total acreage burned on DPG is now dominated by cheatgrass as shown on Figure 4.4-2, Overlay of Cheatgrass and Locations Where Fires Occurred from 1994 through 1998. Fire causes direct, significant, and long-term impacts to vegetation which would likely increase under the Proposed Action. The ITAM program is working on a draft of a DPG Fire Management Plan (Horman et al., 2000) and a Memorandum of Agreement between DPG and BLM for controlling fires. Measures to manage and mitigate impacts to vegetation caused by fires are provided in Section 4.4.6, Mitigation Measures.

Spills – Although large spills could have a direct and significant impact on vegetation through destruction or loss of vegetation, management plans are in place to quickly and effectively clean up spills at DPG. Management plans are also in place for proper materials and waste handling to prevent spills. Some acute vegetation loss may occur during spill clean up, and chemicals may indirectly destroy some available nutrients in the soil that are essential to the vegetation. This loss of nutrients could reduce or change vegetation. No information is available on the effects of spills on DPG vegetation. The management plans would be followed under the Proposed Action, and therefore the likelihood of spills would not increase. Therefore, no long-term, significant impacts to vegetation are expected.

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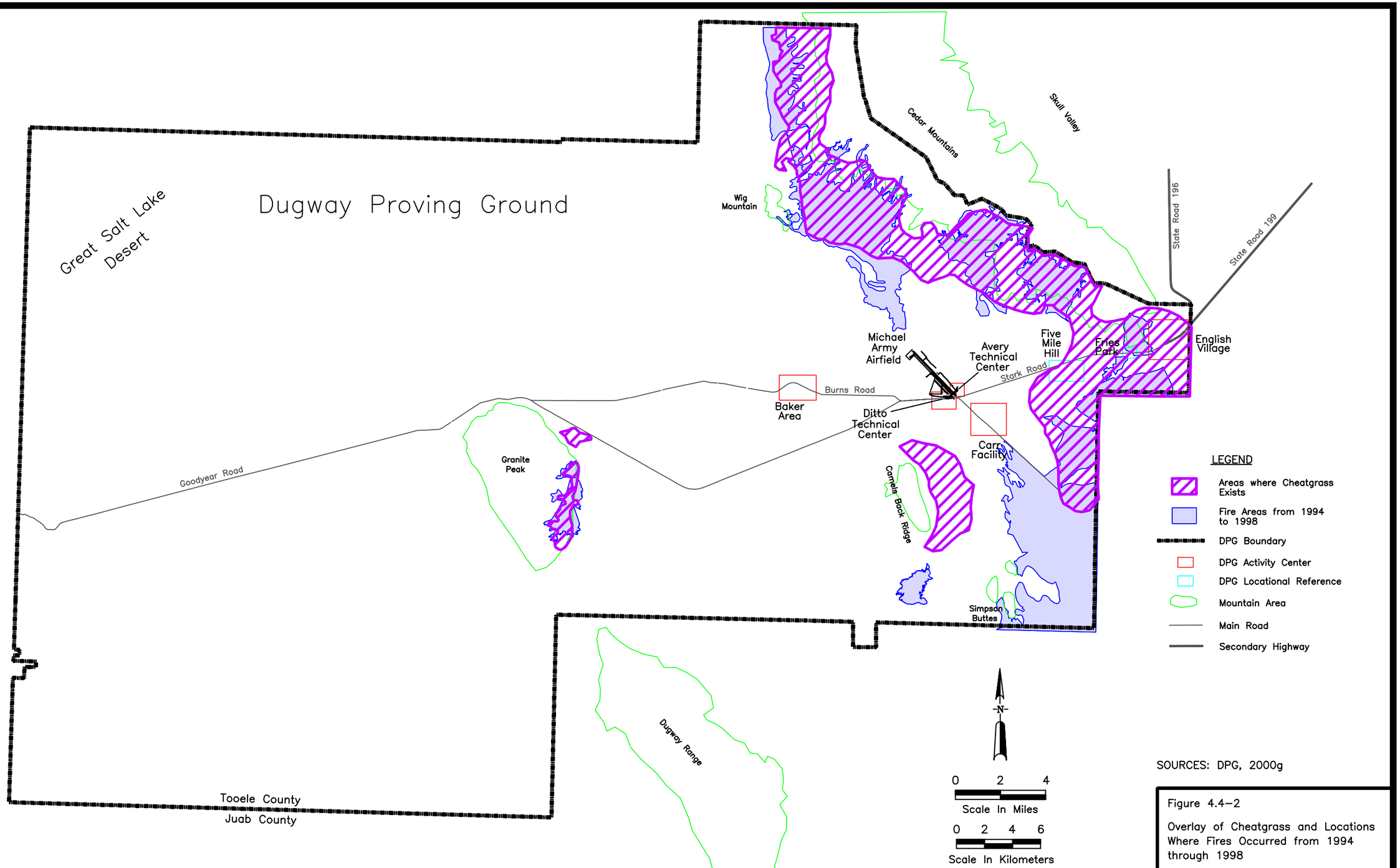

SOURCES: DPG, 2000g

Figure 4.4–2

Overlay of Cheatgrass and Locations Where Fires Occurred from 1994 through 1998

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Air Emissions – Under the Proposed Action, the following air emissions are of most concern for vegetation:

- Smokes and obscurants
- Dust
- Biological and chemical simulants

Smokes and Obscurants – Increased use of smokes and obscurants would likely occur under the Proposed Action. Discussed in this section are those smokes and obscurants that are of public concern and/or are mostly commonly used at DPG. Air emissions from smokes and obscurants can negatively impact vegetation. Preliminary studies by Schaeffer et al. (1986) suggest that plants exposed to smokes are potentially at risk of decreased fertility, change in energy production, decreased survivorship, and an increase in toxic stress. When subjected to chronic exposures of smokes and obscurants, it may take decades for ecological systems to exhibit symptoms of toxic stress (Getz et al., 1996).

Smokes and obscurants include, but are not limited to, brass powder, white phosphorus, and fog oil. Wentsel (1986) found that brass powder, composed of 70 percent copper and 30 percent zinc, reduced seed germination in some acidic and low-organic soils, even though both components of brass powder are essential to plant development and growth in moderation. DPG soils are alkaline and contain low organic matter, which contributes to the slow regeneration of native plants. In addition, brass powder is less toxic to aquatic systems with a basic pH and hard water such as DPG's aquatic systems, than to acidic and soft water systems. Brass powder is not used in large quantities in open-air testing, and DPG's soils are alkaline; therefore, no significant impact is expected to result from the use of brass powder under the Proposed Action.

White phosphorus exposure from unburned particles can cause toxicity symptoms in sagebrush such as leaf tip burn, leaf curl, leaf abscission, wilting, and destruction or dieback (Van Voris et al., 1987). Yon et al. (1983) documented the burning of vegetation from white phosphorus burning munitions and subsequent soil erosion as a short-term, usually reversible impact of white phosphorus. White phosphorus may have significant impacts on DPG's vegetation if it is directly responsible for fires that destroy the vegetation. No impact would occur if white phosphorus fires are contained and extinguished immediately.

Experimental data on the effects of fog oil on naturally occurring plant populations is limited. Several models have been proposed to best reflect environmental impacts. Studies found no evidence that significant quantities of fog oil were deposited on the

ground because the oil droplets are assumed to be so small that they evaporate before reaching the ground. If, however, dust or other particles are also suspended in the air, the fog oil could accumulate on the particles and deposit on the ground (Muhly, 1983; Lijegren, et al., 1988 as cited in Getz et al., 1996; Cataldo et al., 1989; Bowers and White, 1992 as cited in Getz et al., 1996; and Driver et al., 1992). Fog oil concentrations that could potentially be deposited on the ground and water would vary with wind, temperature, humidity, and distance from the source.

Fog oil could affect vegetation by removing its protective wax coating or by coating plants, which may plug the stomata and decrease respiration. Driver et al. (1992) estimated from mathematical models that 80 to 90 percent of the fog oil evaporated within 1 week of deposition. Assuming the worst case scenario of all the fog oil or graphite oil depositing on the vegetation, which is still relatively low in concentration due to dispersion, only some of the vegetation, particularly around the source, would be affected. Assuming that fog oil or graphite oil does deposit on the surface of plants when dust is present, this would be a direct impact that could decrease the survivorship of the vegetation. While impacts to the vegetation are expected to occur, these impacts are not expected to be significant. Section 4.4.6, Mitigation Measures, recommends measures to mitigate destruction of the vegetation by smokes and obscurants.

Dust – Dust is a large contributor on DPG to the PM_{10} pollutants as shown in Appendix H, Air Emissions Data for DPG. The Proposed Action would cause an increase in the amount of vehicular traffic on the dirt roads, and therefore, the amount of dust in the air. Photosynthetic capabilities of plants can be inhibited if leaves are covered with thick layers of dust. This is unlikely to cause a significant impact because afternoon winds during the dry summer months are likely to disperse the dust particles enough to not coat the vegetation. Section 4.4.6, Mitigation Measures, recommends measures to manage and mitigate impacts to vegetation caused by dust at DPG.

Biological and Chemical Simulants – Biological and chemical simulants are expected to increase in use for defense testing and counterterrorism training under the Proposed Action. Biological simulants used in outdoor testing would not impact the vegetation on DPG because:

- MS2 is a virus that infects bacteria and does not affect plants or animals
- BG is a ubiquitous soil organism that has a self-limiting population growth

- Kaolin dust is disseminated in lower concentrations than dust that is distributed during wind storms

- EH is a plant pathogen that is used for agricultural control of apple fireblight and would not affect any plant communities on DPG

The most common chemical simulants used from 1996 through 1998 are discussed for their potential impacts to vegetation communities. Silica and red china clay would have the same affect on vegetation as dust if used in large quantities. No impacts are expected from the use of propylene (low soil absorption), TEP, or methyl salicylate (MeS). No significant impact from the use of the common chemical simulants is expected on DPG's vegetation. Section 4.4.6, Mitigation Measures, recommends measures to insure limited effects of chemical and biological simulants on the native vegetation.

4.4.2.2 Impacts to Wildlife

Proposed Action mission and support activities were analyzed for potential impacts to wildlife resulting from the following:

- Habitat Loss
- Wildland Fire
- Noise
- Overhead Motion
- Spills
- Air Emissions
- Physical Disintegration
- Human Presence

Habitat Loss – As discussed in Section 4.4.2.1, Impacts to Vegetation, ground disturbance, fires, spills, and air emissions can decrease or change vegetation, which indirectly affects wildlife species. Decreased or absent vegetation reduces cover and forage for wildlife species (Watts, 1998). Reduced cover can make some species like small mammals and pronghorn fawns more susceptible to predation. Increased predation on small mammals can, however, be beneficial to raptor species, especially during nesting, as it can increase the survival of young. Reduced forage and cover decreases available food for herbivores, like the pronghorn, feral horses, and small mammals, which can increase competition, stress, and can indirectly decrease the population because fewer animals survive. Other indirect causes of mortality from habitat loss include:

- Physical injury that causes a species' inability to hunt and provide for itself or its young
- Displacement of a species into "less favorable" habitats which decreases survival overall
- Interruption of feeding or nesting that decreases the young's survival
- Respiratory problems from increased dust which can lead to infection and possibly death (if severe)

Nest or den destruction or abandonment are direct forms of mortality of wildlife. Both of these types of mortality are short-term effects because species usually can reproduce the following year provided disturbance does not occur again. A decrease in small mammal species that spend the majority of their time at or below the ground has been shown to occur in areas of long-term tracked vehicle use (Severinghaus et al., 1981). This was attributed to both increased vegetative disturbance and soil compaction that destroyed nests. The loss of the soil and vegetation also decreases the ability of the habitat to buffer temporal variations in climate that affect small mammals (U.S. Department of the Interior, 1996).

A loss of native vegetation can affect individual species. Native shrubs and grassland destruction adversely affected black-tailed jackrabbit distribution and abundance (U.S. Department of the Interior, 1996). Other evidence documents weeds improving habitat for granivores (seed eaters) because of an increase in seed production (Young and Evans, 1978). However, at DPG, small mammal diversity was negatively affected by the increase in weeds (AGEISS, 1997b). There was a significant decrease in whitetail antelope squirrels associated with an increase in bur buttercup (*Ranunculus testiculatus*), and a decrease in Ord's kangaroo rats with an increase in cheatgrass (AGEISS, 1997b). Abundance and diversity of small mammals at DPG have decreased since Vest's studies (1962), most likely due to the spread of weeds and loss of open ground. Souza (1984) found that overall density and diversity of small mammals progressively decrease as annual grasses increase in dominance. Loss of native vegetation and replacement by weeds at DPG has also allowed for an increase in grassland adapted species, such as the horned lark and meadow lark , and a decrease in shrubsteppe-obligate species, such as the Brewer's sparrow. A decrease in shrub density in training area plots compared to control plots was the cause of the observed decline in migratory bird species at DPG (Martin et al., 1999).

Species such as the horned lark have increased at DPG due to loss of native vegetation

Significant impacts to wildlife species would occur from loss of vegetation or a significant change in vegetation type. Some species would be lost if they are specialist in a habitat that is altered, or if generalist species invade the area and out-compete the native species. Under the Proposed Action, NG training and construction activities would increase ground disturbance, as discussed in Section 4.4.2.1, Impacts to Vegetation. Detonating buried charges and testing cratering charges could potentially destroy habitat in areas previously unaffected. Proposed quarry sites could disturb habitats not previously affected. Disturbance of these areas would affect wildlife species in the area, but not significantly affect the entire populations, unless species habitats are destroyed that are vital for nesting, denning, or foraging. New firing points at Wig Mountain and new bivouac areas at the Cedar Mountains and Granite Peak are also proposed. The Cedar Mountains are an important wildlife area for both the pronghorn and the horses, and Granite Peak is an area of special interest. An increase in activity in the Cedar Mountains would adversely affect the wildlife. However, these impacts to wildlife would probably not be significant unless they severely impacted a population. Section 4.4.6, Mitigation Measures, recommends measures to minimize the loss of vegetation and the subsequent effects on the wildlife.

Wildland Fire – Wildland fire can cause fragmentation of vegetation. Fragmentation of habitat caused by fire contributed to the decline of the jackrabbit density. Wildland fire also affected the nesting distribution, home ranges, habitat use, and nest success of golden eagles (U.S. Department of the Interior, 1996). Wildland fires release carbon particles, carbon dioxide (Getz et al., 1996), nitrogen, ozone (Stith, et al., 1981), and hydrocarbons (Rasmussen, 1972 as cited in Getz et al., 1996; Shaw et al., 1983), which can affect respiratory processes and survivorship of wildlife. Smoke, increased temperatures, and wind from wildland fires can stress wildlife populations through confusion and encroachment into neighboring territories from animals fleeing the fires.

Juniper and high desert scrub habitat are the most important habitats at DPG for many bird species. Pronghorn also rely on high desert scrub. In addition to training that occurs in these habitats, they are also heavily impacted by wildland fires. The 1998 summer fires at DPG burned several acres of pronghorn winter habitat, and caused an increased overlap between the pronghorn and feral horse home ranges which likely increased competition between the two species (AGEISS, 1999d). Pronghorn and feral horse research ended prior to the fawning season of 1999, and it is unknown whether the fires of the previous summer had an impact on the pronghorn population. It was expected that the destruction of the winter habitat and increased competition with the feral horses for available forage would impact the pronghorn reproductive rates because females would be in poorer condition. Wildland fire causes direct and significant impacts on DPG's wildlife by decreasing available forage, decreasing protective forage, decreasing nesting habitat, and increasing weeds. While impacts to the wildlife are expected to be significant, individual assessment of each species is needed to determine the level of effect fire has on each. Measures to minimize the loss of species and to manage wildland fire are provided in Section 4.4.6, Mitigation Measures.

Noise – Noise is defined as "sound that is undesired or that constitutes an unwarranted disturbance; it can alter animal behavior or normal functioning" (Delaney et al., 1999). Noise can affect wildlife at many different scales. Manci et al. (1988) describe the effect of noise on wildlife in three categories:

- Direct physical auditory changes when a species is unable to hear auditory cues for mating, prey detection, or predator detection
- Indirect non-auditory effects that cause an increase in stress and behavioral changes, such as interference with mating, or the ability to obtain food and water
- Direct results of the first two categories that decrease populations, destroy important habitat, or cause species extinction (Manci et at, 1988)

No data are available to determine the specific impacts of noise and blast overpressure or their significance on DPG's wildlife species. Under the Proposed Action, certain sources of noise such as detonations, helicopter use, artillery, construction/demolition, and vehicle use would increase as described in Section 4.11, Noise Impacts. However, the greatest source of noise at DPG is AF air testing and training activities which are not part of the Proposed Action, but are discussed in Section 5.1.1, Utah Test and Training Range Air Training and Testing Activities.

Overhead Motion – Overhead motion from low flying aircraft including helicopters can increase the stress on wildlife species, interrupt nesting or denning, cause nest or den abandonment, or displacement of a species. Each of these factors can indirectly cause a decrease in the population of a species from indirect mortality (stress) or lack of recruitment into a population. Recruitment is the addition of young each year into the population.

Response to overflights can vary from no response, to habituation, to a variety of adverse effects. Several ungulate researchers have documented the following negative responses elicited by aircraft disturbance:

- Decreased foraging efficiency (Stockwell et al., 1991)
- Panic run (Calef et al., 1976)
- Changes in habitat use or movement from the disturbed area by mountain goats (Cote, 1996) and mountain sheep (Krausman and Hervert, 1983; Krausman et al., 1986; Bleich et al., 1990, 1994)
- Increased heart rate in mule deer (MacArthur et al., 1979, 1982; Krausman et al., 1998; Weisenberger et al., 1996)
- Decreased frequency of nursing and survival of caribou (Gunn et al., 1985)
- Increased energy expenditure and a decrease in fat reserves (Cote, 1996; Murphy et al., 1998)
- Decreased survival and reproduction (Calef et al., 1976; Harrington and Veitch, 1991)

Wildlife responses to overflights have not been documented on DPG, therefore, predicting reactions is difficult. Species' reaction to overflights is not believed to be a significant impact because it would not cause a decrease in the entire population. Overflight would likely only affect a few animals at DPG. The effects would vary between species and depend on the frequency and type of aircraft and the altitude of the aircraft. Under the Proposed Action, the levels of ground training at DPG involving air support would double but significant impacts to wildlife would be unlikely.

Spills – Chemical spills are often toxic to wildlife. Mortality, both direct and indirect, can occur with chemical spills. Direct mortality occurs when wildlife come in direct contact with the chemical and immediate death occurs. A decrease in

reproductive fitness can also occur with a chemical spill. Biological cycles can be disrupted if the chemicals affect hormone balance or the overall health of the individual. Indirect mortality can occur from a physical injury or respiratory problem, not immediately life threatening, that later affects the species ability to survive by hunting or escaping predators.

The effects of heavy metals and chemical agents on wildlife species are usually of most concern. VX and several heavy metals, such as cadmium, zinc, copper, lead, mercury, and iron, have the potential to bioaccumulate in the food chain. ITAM soil samples from training areas found no indication of soil contamination from heavy metals. It is unlikely, then that wildlife species have ingested toxic heavy metal concentrations, although data are not available to collaborate this. Toxic residues that are persistent in the soil can be accumulated in vegetation and then in wildlife. VX was found to be persistent in alfalfa in a controlled environment after 100 days when 80 to 94 percent of the chemical was still detected (Deseret Test Center, 1970). Ideally, background levels for acetylcholinesterase and heavy metals for several wildlife species are necessary before comparisons to baseline levels can be meaningful. Background data for acetylcholinesterase were obtained for jack rabbits, however, no current data are available. Acetylcholinesterase and heavy metals have not been tested in any of DPG's wildlife population. It is unknown, therefore, what impacts heavy metal and chemical contaminants have had on wildlife because no data are available. VX is not used in outdoor testing and has not been since the 1960s.

Spill management plans are in place at DPG to enact immediate clean-up and prevent any significant impacts to wildlife. Management plans for proper materials and waste handling are also in place. The management plans would be followed under the Proposed Action, and therefore the likelihood of spills would not increase. Some indirect and nonsignificant impacts to wildlife, including mortality, could occur to smaller species in the clean-up area or after the initial spill. These impacts are not expected to bring about the decline of a species' population and are, therefore, not considered significant. Measures to manage and mitigate impacts to wildlife caused by spills are provided in Section 4.4.6, Mitigation Measures.

Air Emissions – Under the Proposed Action, the following air emissions are of most concern for wildlife:

- Emissions from cars, military vehicles, and aircraft
- Smokes and obscurants
- Biological and chemical simulants

Emissions – Activities under the Proposed Action would lead to increased emissions from cars and military vehicles, which would increase the particulates found in the air. Increased traffic on unpaved roads would also increase the amount of dust that is released into the air. Emissions from aircraft would continue under the Proposed Action, but levels are not likely to increase. The major impact of increased emissions on wildlife would be respiratory problems that could lead to mortality if infection resulted. Increased dust may cause respiratory problems for pronghorn, feral horses, and any other wildlife around the road areas. This effect would not be significant because it would not cause a decrease in the entire population if a few individuals were affected. Measures to manage and mitigate impacts to wildlife caused by emissions are described in Section 4.4.6, Mitigation Measures.

Smokes and Obscurants – Increased use of smokes and obscurants would likely occur under the Proposed Action. Brass powder and HC are smokes and obscurants that are of concern to the public or are used in large quantities on DPG. Emissions of smokes and obscurants decrease vegetation through burning of vegetation caused by white phosphorus, a decrease in seed germination and survival caused by brass powder and HC, and potential smothering caused by fog oil. Decreased vegetation indirectly affects the wildlife populations that rely on plants. An increase in the emission of smoke could increase the possibility of wildlife respiratory diseases and infections. In addition, smoke and even dust, could cause confusion among the wildlife and impair their vision. Gese et al. (1989) documented that coyote mortality increased during military maneuvers because animals became confused. Smokes and obscurants can be potentially detrimental and toxic to wildlife. Some compounds in smokes and obscurants are mutagenic, carcinogenic, or neurological/renal toxins and others which are similar to those found in smokes, such as heavy metals and hydrocarbons, are known to cause damage to wildlife (Schaeffer et al., 1986). Smokes and obscurants can have a significant effect on the wildlife population if habitat for forage or nesting/denning are destroyed, or if the testing occurs in the spring during critical reproductive times.

The components of dye-colored smoke, bensanthrone and dispersal red 9, have been found to be mutagenic and possibly carcinogenic (Cichowicz and Wentsel, 1983). The toxicity related to the use of HC is the breakdown of zinc chloride. Although zinc is essential for cell growth and differentiation, excess zinc can be toxic to animals. Birds can concentrate ingested materials into eggs, which can affect the sensitive avian embryos (Cichowicz, 1983). Phosphorus is a limiting, naturally occurring nutrient in most systems. Elevated phosphorus levels in aquatic systems increase algae blooms and can decrease oxygen content and eventually lead to the extinction of other organisms. The irritation of wildlife species from smoke clouds

of white phosphorus is usually a short-term reversible impact (Yon et al., 1983). HC can significantly impact the bird populations if used at critical nesting times and in areas of high nest production. White phosphorus would not significantly impact the wildlife unless wildland fires occurring from the testing are not controlled. If wildland fires are allowed to burn critical habitat, than the impacts would be similar to those discussed in the wildland fire section.

Wildlife species can be affected by fog oil either through ingestion or inhalation. Respiratory rates for birds and mammals differ. Although mammals retain a small quantity of air after every breath in their lungs, and anything that comes in with the air, birds move air through their lungs faster. Adverse effects of fog oil were found in experimental studies using high concentrations for long durations which were more extensive than a typical training exercise (Liss-Suter and Villaume, 1978 as cited in Getz et al., 1996; Palmer, 1990 as cited in Getz et al., 1996; Muhly, 1983; Aranyi et al., 1992). Wildlife would be directly affected, but probably not significantly, if they were in the fog oil cloud for extended periods. Ingestion of fog oil can occur from directly eating covered vegetation or other animal species, or in preening. Hartung and Hunt (1966) determined that some birds and mammals were tolerant of a daily consumption of fog oil of 20 to 24 mL/kg of body weight. Ingesting fog oil is an indirect impact, which could be significant if several species or individuals of a population were affected. Fog oil may also indirectly impact wildlife by:

- Coating eggs which can affect hatchability or survivorship (Kopischke, 1972; Driver et al., 1992)
- Disrupting mating and nesting
- Increasing predation from animals fleeing test areas and invading other territories
- Decreasing insect populations because oils can act as pesticides which would in turn affect the bird and reptile species (Getz et al., 1996)

Fog oil would only significantly affect the wildlife in the immediate vicinity of the source, and only if they become saturated in oil. Most smoke and obscurant testing occurs in areas of low wildlife populations, and therefore, would not likely be significant. Mitigation measures for impacts to wildlife from smokes and obscurants are discussed in Section 4.4.6, Mitigation Measures.

Biological and Chemical Simulants – Controlled release of biological simulants, mainly BG and EH, occurs during biological defense testing. BG is a common, spore-forming bacteria found in the soil that acts as a decomposer in the nutrient

cycle. The release of BG into the soil would cause a short-term elevation in the population normally found there. With changes in season and levels of organic matter, population number would change, but is highly unlikely to imbalance the environment (Shipley et al., 1998). EH is the other common biological simulant and is a plant pathogen regulated by USDA to control apple fireblight. EH does not affect DPG's plant population, and would, therefore, not have a significant affect on the wildlife population. No impact to the wildlife is expected from the release of the other biological simulants such as ovalbumin, bovine serum albumin, kaolin dust, and MS2.

Silica and red china clay used as chemical simulants may affect respiratory systems in wildlife populations in the immediate vicinity of their release, no significant or long-term effects are expected. Other chemical simulants used are not toxic to wildlife, and are therefore, not expected to impact the wildlife populations. While impacts to the wildlife are not expected to be significant, Section 4.4.6, Mitigation Measures, recommends measures to minimize the effects of biological and chemical simulants on the wildlife.

Physical Disintegration – Physical disintegration causes loss of vegetation as described in Section 4.4.2.1, Impacts to Vegetation. Loss of vegetation indirectly affects wildlife through increase stress from competition for limited resources, interrupted nesting and denning, and nest or den abandonment or even destruction. Direct impacts to wildlife from physical disintegration include increased mortality of wildlife and destruction of nests in the impacted area. However, these impacts can be beneficial to raptor species who can increase their foraging efficiency by hunting in areas where rodents are disturbed by bombing. Fragmentation of habitat in areas that are widely disturbed can prevent the natural movement of wildlife, especially small mammals. Physical disintegration can destroy geological formations important to wildlife, such as caves. A cave in the Wig Mountain Training Area is used as a summer roost for bats (AGEISS, 1997b). Physical disintegration of this cave would have a direct and significant impact on DPG's bat population. Also, destruction of kit fox denning areas in the Wig Mountain Training Area would directly impact the already small kit fox population. This impact could be significant if the kit fox in the area are reproductive.

Physical disintegration impacts to wildlife include potential destruction of kit fox denning areas.

Under the Proposed Action, a new explosive program, the use of high explosives, and mine clearing would increase physical disintegration in the areas where they occur. Testing of explosives occurs in the impact areas and would not significantly impact the wildlife. If testing occurs in the late winter when pronghorn and feral horse herds winter in the White Sage Impact Area, these groups could be affected, which could significantly impact the pronghorn population. Measures to manage and mitigate impacts to wildlife from physical disintegration are provided in Section 4.4.6, Mitigation Measures.

Human Presence – The effects of human presence on wildlife are well documented; although wildlife response to human presence varies. One extreme response is movement to marginal habitats from normal winter foraging areas [bald eagles: Stalmaster and Kaiser, 1997)] or calf rearing areas (Kuck et al., 1985). Resident animals often restrict their activities to areas outside the disturbance (Van Dyke et al., 1986) or use larger areas (Kuck et al., 1985). A few studies have specifically addressed the effects of military movement on wildlife species. In the Pinon Canyon Maneuver Area, coyotes with high vegetation cover contracted their ranges, while coyotes with low vegetative cover expanded their ranges (Gese et al., 1989). The major source of mortality for coyotes was collision with military vehicles due to confusion created by the dust, noise, and blackout conditions. Mule deer in the area increased their home ranges in response to military activity, which can lead to a decrease in reproductive capacity (Stephenson et al., 1996). Military training can also affect foraging efficiency of raptors, by reducing jackrabbit habitat. An increase in pressure from opportunistic predators attracted to an area by increased disturbance can stress native predator populations. Bivouacs have caused a temporary shift in raptor distribution by lowering occupancy and productivity of prairie falcons, especially in food-stressed years (U.S. Department of the Interior, 1996).

Human disturbed areas can also have positive effects on some wildlife species by:

- Producing new nesting, foraging, and roosting habitats
- Creating artificial nests or perches
- Increasing prey density, diversity, or vulnerability
- Producing behavioral adaptations (Murphy et. al, 1998)

The Proposed Action would cause an increase in human presence, both in numbers of personnel and activity. For example, the NG predicts a 65 percent increase in personnel and establishment of new bivouac areas to accommodate the increase in personnel.

Bivouac areas would have a direct, and possibly significant, impact to wildlife if they were located in areas previously undisturbed. Increased personnel would impact areas already affected by the NG presence by a slower rebounding of the biological resources. Increased activity on the range would cause impacts due to ground disturbance, as described in Section 4.4.2.1, Impacts to Vegetation.

Potentially the most significant impact related to an increase in human presence and vehicular traffic would be increased stress to wildlife and increased mortality. An increase in vehicle use by the engineer training and artillery training is expected under the Proposed Action. The increased traffic in areas not heavily traveled could increase stress in wildlife, which could decrease reproductive success if denning or nesting is interrupted and cause displacement as species find areas that are not disturbed by humans.

The leading cause of mortality for DPG's pronghorn population is vehicular collisions. In 1998, four pronghorn were reported killed by vehicles, and in 1999, two pronghorn, two deer, and one badger were killed. These data reflect only the number of vehicular collisions reported and are underestimates. An increase in traffic would increase this impact. Indirect mortality can also occur from human presence if wildlife are injured and unable to hunt on their own. DPG's mule deer population is relatively small, and an increase in vehicular collisions would significantly impact this population where it is unlikely to affect the pronghorn population. Migratory birds who nest on DPG or use the area as a resting point, are also likely to be significantly affected from the increase in human presence during critical reproductive times.

SDP proposals suggest placing a security fence around the perimeter of LSTF. Depending on the definition of the perimeter, it could include some of the surrounding water sources and therefore, this fence could impact wildlife species using buildings as refuges and the LSTF water sources.

Section 4.4.6, Mitigation Measures, provides measures to manage and mitigate impacts to wildlife due to human presence.

4.4.2.3 Impacts to Special Status Species and Important Habitats

Impacts from the Proposed Action to special status species and important habitats warrant special consideration. As discussed in Section 3.4.5, Special Status Species, DPG does not have resident Federal threatened and endangered species, although a few state threatened and endangered species and species of special concern are found within DPG's boundaries. Two threatened and endangered plant species, the Ute ladies tresses and the dune fourwing saltbrush, have the potential to occur on DPG, although they have not been documented. Preventing any ground disturbance to the areas around the springs and the stable dunes would eliminate any potential threat to the possible existence of these species. Two raptor species, the ferruginous hawk (state threatened) and the burrowing owl (state species of concern) have both been found to nest on DPG. Burrowing owls often rest and nest in burrows in the roads, and may, be subjected to vehicular collisions. Increased vehicular traffic would significantly impact this species. No current nests for ferruginous hawks have been documented, and it appears that generalist species such as the red-tailed hawk are replacing the specialist species like the ferruginous hawk. Bald eagles and peregrine falcons are transient species on DPG, and although there may be behavioral adjustments due to the Proposed Action, these birds will move on and would not be impacted. Bat species of concern that may potentially roost on DPG may use the old abandoned mines on Granite Peak and the Wig Mountain Cave. Preventing the destruction of these sites is important for protection of these species. No significant impact is expected.

Important habitats and biological resource areas are identified in Section 3.4.6, Important Habitats or Biological Resource Areas. Maintaining these habitats in their pristine condition is possible by eliminating any potential training or testing in these areas. The springs are highly important habitats and should not be used as areas for bivouacking or testing which could degrade the vegetation or contaminate the water. Granite Peak harbors one of the few pure juniper stands important to many species of wildlife. New quarry sites and construction for the NG headquarters in the area could significantly impact the important habitat on Granite Peak depending on the placement. The last remnant patches of the winter fat gray molly vegetation community at DPG are found south of Camels Back Ridge and along Rough Haul Road, and are important for two state species of concern: gray vireo and the black-throated warbler.

4.4.2.4 Compliance with Regulations and Management Plans

Management of DPG's wildlife and habitat is regulated mainly through AR 200-3 and other Federal and state laws defined in Section 3.4.1, Regulatory Overview. AR 200-3 describes the requirements and procedures for managing biological resources on military lands. Certain species are additionally regulated under other Federal laws, such as threatened and endangered species under the ESA, feral horses under the Wild-Free Roaming Horses and Burro Act, and migratory birds under the Migratory Bird Treaty Act, as previously described.

Training activities under the Proposed Action are likely to conflict with regulations. DPG is not recognized as a training installation, and therefore, does not receive full funding for its ITAM program. Insufficient funds have made it difficult for DPG to comply with the Sikes Act, AR 200-3, and AR 200-5 to mitigate damage to the ranges. When the Paladin system is employed, this problem is likely to be compounded. Compliance with rehabilitating the habitat for biological resources, as well as additional training, cannot occur without funding.

4.4.3 Impacts of the No Action Alternative

Under the No Action Alternative, impacts to biological resources would be lower than those reported for the Proposed Action. Types of impacts to biological resources would be similar because activities would still occur. No new facilities would be constructed under the No Action Alternative, so an increase in the ground disturbance and human presence associated with construction activities would not occur. Ground disturbance and fires due to training would still cause the major impacts to biological resources. Vegetation would have a better chance of recovery with the lower level of impact under the No Action Alternative.

4.4.4 Impacts of the Decreased Mission Alternative

Under the Decreased Mission Alternative, impacts to biological resources would be lower with a decrease in the DPG mission compared to the No Action Alternative and to the Proposed Action. The types of impacts described for the Proposed Action would still apply as long as there is any kind of military or developmental activity on DPG. However, recovery of the resources would be quicker with a decrease in disturbance under this alternative.

4.4.5 Impacts of the Maximum Expanded Mission Alternative

Under the Maximum Expanded Mission Alternative, the level of activities would increase over the Proposed Action. A significant increase in ground and human disturbance would result, as would a greater potential for an increase in wildland

fires. Increased use of conventional munitions would increase the impact to the resources previously discussed. Goran et al. (1983) documented that on a military installation where there was repeated to constant use, overall biomass of flora and fauna decreased. In addition, degradation of the soil leads to a stripped landscape that can only support seasonal populations of flora and fauna that are tolerant of disturbance (Goran et al., 1983). Impacts would be significant without additional mitigation.

4.4.6 Mitigation Measures

DPG's ITAM program, as summarized in Section 3.1.4.3, Integrated Training Area Management Program, includes many elements that serve to reduce or avoid adverse impacts. Mitigation for impacts to vegetation includes the following measures. Many of these measures are included within DPGR 350-2. These measures are also relevant to mitigation of impacts to soils, as discussed in Section 4.1.6, Mitigation Measures.

- Seek increased funding for DPG's ITAM program
- Educate users of DPG's terrain on protecting, preventing damage to, and mitigating damage to natural resources
- When possible, limit track vehicle use and prohibit cross-country use
- When possible, without jeopardizing realistic training, vary the intensity of training and testing seasonally to reduce impact on vegetation and to avoid high fire conditions
- When possible, use only existing roads, or if new roads need to be created, place in areas that will minimize impacts to vegetation. Additional NEPA review would be conducted for new roads.
- When feasible, construct new buildings and roads in current build-up areas
- Obtain financial compensation from training missions for fire management or revegetation according to the MTAMP and the INRMP
- Rotate use of training areas to allow for a 4 to 7 year rest period and to allow for revegetation within expectable industry standards
- Avoid training in shrub and juniper areas as defined in DPGR 350-2

- Establish more permanent vegetation plots in the training areas to study change in vegetation, expansion of weeds, and percent disturbance
- Minimize the spread of weeds through noxious and nuisance weed management
- Continue to monitor established photopoints in impact areas for seasonal and yearly comparison of habitat
- Depending on need, maintain and use existing quarry sites, and permanently close others
- Focus ground training in areas with high ground disturbance, such as White Sage Impact Area and Wig Mountain Training Area. Other areas that are used should follow compensation guidelines established in the MTAMP and the INRMP.
- Manage all fires in accordance with the DPG Fire Management Plan
- Complete greenstrip firebreaks established by ITAM and test with new and better fire resistant and site adapted species
- Clean up spills immediately and monitor the site
- As part of the test-specific plan and where appropriate, monitor dispersion clouds to validate models and monitor biological resources
- Limit use of fog oil on extremely windy days when large dust particles may be present

Mitigation measures for impacts to wildlife include:

- Use temporary closures, to avoid training and testing in areas of high wildlife population concentrations, nesting sites, or wintering ranges
- Minimize ground disturbance as specified in the INRMP
- Manage all fires in accordance with the DPG Fire Management Plan
- Clean up spills immediately and monitor the site
- Implement biomonitoring program at the landscape level
- Avoid using ordnance or testing near permanent surface water sources

- As part of the test-specific plan and where appropriate, monitor dispersion clouds to validate models and monitor biological resources
- Limit use of fog oil on extremely windy days when large dust particles may be present
- Minimize vehicular caused animal deaths by enforcing speed limits
- Investigate fugitive dust control methods for military training on unpaved roads and in training areas. Methods of controlling fugitive dust generated by wheeled and tracked vehicles have been evaluated by the U.S. Army Environmental Center (USAEC, 1996). In addition, modeling of fugitive dust generated during training exercises would help to better understand its effects on ambient air quality values. Implement those measures that make sense for DPG given the mission, terrain, and cost.
- Report all injured and dead large animals

Mitigation measures for impacts to special status species and important habitats include:

- Enforce restrictions regarding bivouacking and ground training near springs and stable dunes.
- Continue to protect Wig Mountain Cave and the abandoned mines on Granite Peak
- Protect Granite Peak and the winterfat-gray molly vegetation community

In addition to these mitigation measures, biological inventories and monitoring should be conducted. Several wildlife inventories have been conducted on DPG as well as studies that specifically address the effects of military training on breeding bird communities (AGEISS, 1996g; TRIES, 1998). Additional surveys should be conducted to determine the herptofauna (reptiles and amphibians) on DPG.

Lancia et al. (1996) suggest that monitoring plans should include a sampling design and analytical methods based on biological and statistical criteria for detecting changes. In addition, the U.S. Department of the Interior (1996) suggests monitoring at two levels:

- Local scale to evaluate the effects of a specific land use or management action. Local scale monitoring involves conducting adaptive management experiments to assess effects of incremental changes on vegetation, prey, and predators.

- Landscape scale monitoring, to evaluate overall conditions and trends on a installation-wide scale, involves:
  - Creating a new vegetation map every 5 years, to monitor vegetation changes, shrub loss or recovery, rate of spread of weeds, and rate of shrub fragmentation
  - Quantitatively assessing vegetation using permanent sample plots
  - Monitoring shrubland-obligate bird species by grouping bird species into guilds to determine affected groups

4.4.7 Residual Impacts

Direct impacts to vegetation are long-term and vegetation would be slow to recover even with the proposed mitigation measures. With rigorous mitigation efforts, impacts can be managed; however, the effects of some events, such as from wildland fires can be long lasting. Desert environments rebound very slowly from disturbances. Areas that are revegetated would need constant attention to prevent weeds from invading and out-competing the reseeded species. If wildlife populations become extremely depressed, more management practices after the initial mitigation measures would be necessary for an extended period to allow the population to fully recover. This may include restricting access to nesting or denning areas, or increasing protection of the species.

4.5 Socioeconomic Impacts

This section analyzes the potential impacts of the Proposed Action and alternatives to socioeconomic resources in the socioeconomic study area. Tooele County, UT is the socioeconomic study area for this EIS. The criteria used to evaluate whether these potential impacts are considered significant and mitigation measures that could be implemented to reduce any adverse impacts are presented. Baseline socioeconomic conditions in the study area are described in Section 3.5, Socioeconomics.

4.5.1 Significance Criteria

Impacts must be evaluated with criteria to determine whether or not they are significant. Impacts to socioeconomic resources from the Proposed Action or alternatives would be considered significant if one or more of the following occurs:

- Substantial gains or losses in population and/or employment

- Disequilibrium in the housing market such as severe housing shortages or surpluses resulting in substantial property value changes during the period covered by the Future Programs EIS

- Project-related demands on public infrastructure or services triggering the need for expanded capacity or resulting in discernible reductions in the level of service provided

- Activities or operational aspects substantially altering lifestyles or quality-of-life of DPG employees, their families, and civilian households living near DPG

4.5.2 Impacts of the Proposed Action

This section evaluates socioeconomic impacts with these significance criteria in detail for the Proposed Action. Since its establishment in 1942, DPG has been an integral and important component of Tooele County's economy. Historically, the expansion or contraction of DPG's mission and activity levels, along with those at the former Tooele Army Depot rippled through the local economy. Increases in military activity and spending helped bring prosperity while cutbacks created economic dislocation. In recent times, Tooele County's proximity and accessibility to Salt Lake City, UT and the Wasatch Front provided the key stimulus for growth and cutbacks in defense spending reduced the county's economic dependency on the military. As a result, Tooele County is increasingly a suburban bedroom community of residents commuting to work in the Salt Lake City area. From a socioeconomic perspective the principal impact of the Proposed Action is that it delineates a continuing stable mission for DPG into the foreseeable future rather than signaling a substantial decline in activity. Impacts from the Proposed Action do not represent an economic boom, or raise concerns regarding impacts from growth and development.

Proposed Action mission and support activities were analyzed for potential impacts to the following socioeconomic resources:

- Employment and the Economy
- Population
- Public Services and Infrastructure
- Housing and Lifestyle

4.5.2.1 Impacts to Employment and the Economy

Under the Proposed Action the size of DPG's work force is expected to increase about 10 to 15 percent over the time period covered by this Future Programs EIS. Expected decreases in installation operations staffing would be offset by increases in

mission related training and testing employment within the WDTC programs and in counterterrorism training. DPG would continue to be a major source of employment within Tooele County.

The number of people working at, or assigned to, DPG on an interim or temporary basis is expected to climb substantially with the Proposed Action.

Contributing to the increases would be workers associated with facility maintenance and construction, including a new Life Sciences Administration Building, wind tunnel, and improvements to MAAF. Another component of the temporary population would be military personnel engaged in training, particularly ground training. Under the Proposed Action, the number of troops training at DPG per year would increase substantially. Specialized testing activities would bring technicians, scientists, and support personnel to DPG for various periods of time.

The duration of these activities would range from 1 day or weekend events, to more lengthy multi-month temporary duty assignments. Given the vast physical area and the array of facilities at DPG, multiple activities may occur simultaneously. While the temporary personnel at DPG at any one time would average about 100, the foreseeable maximum is up to 3,500 troops over a 2-week period during a global-scale military training exercise.

An increase in military ground training would occur under the Proposed Action

These employment impacts represent an important “next chapter” in DPG’s history. They signal at least a temporary pause in the recent trend of employment declines. From a local or regional economic perspective, however, the changes are not significant. While DPG employment is expected to remain within 10 to 15 percent of its baseline level, the Utah Governor’s Office of Planning and Budget projects employment in Tooele County, UT to increase by nearly 3,800 jobs, to more than 19,000 total jobs, between the years 2000 and 2010, as discussed in Section 3.5.3, Economic Activity.

The increase in DPG's testing and training activities would provide an added, but limited, stimulus to the local and regional economies. The expanded DPG technical work force and major construction activities would raise the total annual personal income earned in Tooele County, UT. A portion of the added income would support the local economy, primarily businesses in Tooele, UT. Benefits would also accrue to the Salt Lake City metropolitan economy. Local and regional procurement of supplies, materials, and construction services would increase to support the expanded mission. Increasing the numbers of visitors and individuals on temporary duty assignment would support Tooele's local hospitality and retail industries.

4.5.2.2 Impacts to Population

Little permanent population change would occur at DPG or in Tooele County, UT as a direct result of the Proposed Action. The primary changes in DPG-related employment would be in the numbers of visitors, construction workers, personnel on temporary duty assignment, and personnel engaged in training.

Consequently, the impetus for population growth would come about indirectly from higher local consumer spending and government procurements, rather than changes due to higher full-time employment. Data to support detailed projections of population impacts are not available but general economic and demographic data for DPG and Tooele County, UT suggest an impact of fewer than 100 people. This change would occur against a projected population change of more than 11,000 persons in Tooele County, UT between 2000 and 2010.

4.5.2.3 Impacts to Public Services and Infrastructure

The limited employment and population impacts from the Proposed Action limit the magnitude and severity of potential impacts to public services and infrastructure. At DPG, the demand for mission critical installation support functions, for instance, water system operations and fire protection, is dictated by regulations and the demands associated with the test and training missions more than by residential demands. No major changes in those demands are anticipated under the Proposed Action. Community welfare and recreation functions must continue to meet the needs of personnel and family members residing on the installation.

The lack of identifiable impacts to public services and infrastructure from the Proposed Action extends beyond DPG's boundaries. With little change in the size or distribution of the DPG-related population, little or no added demand would be placed on public infrastructure and services such as public schools, law enforcement and fire protection, or other state and local governmental services. No significant impacts to public services and infrastructure would occur under the Proposed Action.

4.5.2.4 Impacts to Housing and Lifestyle

Family housing operations and community welfare and recreation services in English Village would be maintained under the Proposed Action. Planned improvements as described in the SDP would improve the quality of DPG's community resources and support an increased sense of community within English Village. These changes would also reduce the perception of isolation within English Village, particularly experienced by families with children.

Over time, however, further reductions in the number of employees and families residing on the installation could occur. Occupancy rates of family housing would decline and potentially trigger further demolition and cutbacks in community welfare and recreation services. The cycle may perpetuate itself. If this cycle were to happen, the resulting socioeconomic impacts would be more severe and include the following.

- DPG workers and family would experience social dislocation and adverse impacts on quality of life.
- Households relocating from DPG would establish residency elsewhere, contributing to new demands on public infrastructure and services.
- Declining on-installation residency could affect future decisions about the viability of family housing at English Village.

If a decision to close family housing resulted, it would precipitate cutbacks in the work force, along with the attendant declines in income and economic stimulus into the local and regional economies. These impacts would potentially be significant.

4.5.3 Impacts of the No Action Alternative

Under the No Action Alternative, little change would occur in the existing socioeconomic relationships between DPG and the socioeconomic study area. The number of Federal and civilian workers employed at DPG would remain at baseline levels. Both testing and training activities would continue, with little change in the type, scale, or scope of activities. The numbers of visitors, persons on temporary duty assignments, and personnel engaged in training would not change significantly from baseline levels. There would be little change in the income and population effects related to DPG.

Basic facility maintenance and some minor construction would occur under the No Action Alternative. The scope and timing of this activity depends on priorities established in the SDP and the availability of funding. However, no new major

facilities would be built. The impacts on employment, income and indirect/induced economic stimulus that are characteristic of construction projects would be smaller under the No Action Alternative than for the Proposed Action.

As with the Proposed Action family and unaccompanied personnel housing at English Village would remain available throughout the time period covered by the Future Programs EIS. Many workers and their dependents would continue to reside on-installation, requiring continued functioning of installation support activities such as the commissary, Post Exchange, day-care center, library, and schools. In the event that the family housing is closed, the potential socioeconomic impacts would potentially be significant.

Despite the housing opportunities afforded at English Village, many other DPG workers would commute to communities in Tooele County, UT and elsewhere along the Wasatch Front. However, commuting represents a continuation of a well-established pattern such that no new socioeconomic impacts arise from its occurrence.

4.5.4 Impacts of the Decreased Mission Alternative

The Decreased Mission Alternative would likely result in cutbacks in DPG's technical work force, particularly that associated with testing activities. Installation operations and the installation support functions would possibly be affected. These changes would reduce the total personal income earned in Tooele County, UT and reduce the indirect and induced stimulus pumped by DPG into the local and regional economies.

The loss of testing and installation support jobs would result in population declines on installation and for Tooele County, UT, depending on the specific circumstances of the workers involved. However, any such loss would have limited socioeconomic impacts beyond DPG because the size of the affected population is small relative to the total population of Tooele County, UT and the Salt Lake City metropolitan area. Affected employees who were residents of English Village would most likely relocate somewhere other than Tooele County, UT. Increased availability of housing at DPG may be a recruitment incentive for those persons who do not want to commute or who cannot afford off-post housing.

Under the Decreased Mission Alternative, enrollments at the Tooele County School District schools at DPG would probably decline. Depending on the timing and magnitude of the declines, the impacts on the schools could be significant. Potential impacts include a scaled back secondary curriculum, discontinuation of some extra-curricular programs, and possibly, school closures. If this were to occur, remaining

students from DPG would be bussed to other schools in the district, for example, Grantsville or Tooele, UT. It is not clear, however, that these changes would adversely impact the school district's financial health. Depending on the numbers of students involved the added transportation costs could be offset by reductions in administration, staffing, and facility operating budgets.

If the employment cutbacks were sufficiently severe, they could prompt a reassessment of the economic viability of family housing at DPG. A decision to close the family housing would cause more severe employment and income reductions, and a larger population out-migration. Some family housing units could be converted to additional unaccompanied personnel housing and any remaining surplus housing could be demolished. Even if family housing remains, the Decreased Mission Alternative may cause social dislocations among DPG workers and families.

DPG staff and dependent family members are bound together by the unique, challenging, sometimes classified, work being done and a sense of purpose and commitment to support national defense. Working and living at DPG engenders pride and special sense of community. For many, this sense of purpose allows them to endure the isolation or insulation at DPG, or separation from families. Past downsizing and reductions in community support have begun to undermine the sense of community and commitment. Further job losses, residential relocations and other changes caused by the Decreased Mission Alternative would further strain the social fabric at DPG and decrease the quality of life. At some point, individuals would reevaluate their residency choices and more may decide to reside off-installation. Such decisions could precipitate the same types of adjustments and impacts as a decision to close family housing, reshaping the relationships between DPG and the economic, social, and political structures in Tooele County, UT.

4.5.5 Impacts of the Maximum Expanded Mission Alternative

The Maximum Expanded Mission Alternative assumes the successful mission expansion and diversification of DPG, thereby achieving substantially higher levels of testing. New facilities would be built to support the mission. More jobs would be created at DPG and the numbers of visitors and personnel on temporary duty assignments would increase as compared to the Proposed Action. Direct procurements of supplies and materials to support installation operations would also rise. Along with higher payrolls and consumer expenditures, the rise in procurements would provide an economic stimulus to the local and regional economies.

An increase in direct employment of up to 300 jobs is foreseeable for the Maximum Expanded Mission. Such an increase could indirectly support another 200 to 250

jobs in Tooele County, UT and the Wasatch Front. Many of the jobs added in Tooele County would be in the construction, retail, and hospitality industries.

Work force expansion of this magnitude at DPG would reverse the recent pattern of declines in the DPG-related population. New employees assigned or recruited to DPG could choose to reside on the installation, elsewhere in Tooele County, UT or along the Wasatch Front. These employees, their families, and members of the households supported indirectly by the mission expansion alternative would generate incremental population growth of up to 2,000 persons in Tooele County, UT and across the Wasatch Front. The growth would be geographically dispersed. Except at DPG, the incremental growth would not be significant in numbers or the impacts to housing, public services, or lifestyles.

The potential population change at DPG would be significant relative to the existing population residing at DPG. However, it would not be significant from a broader socioeconomic perspective as foreseeable growth would fall short of achieving an on-installation population approaching historical levels or the service delivery capacities of existing facilities and infrastructure. For example, the existing schools at DPG have capacity for nearly double the existing enrollment.

The availability of on-installation housing is perhaps the single area of concern, and then, only if there is a strong renewed interest in residing on the installation. Such interest could promote reopening vacant units or reconverting units from unaccompanied personnel housing to family housing. If the sense that the mission expansion is long-term, it is even possible that new family housing could be built to meet needs.

Implementing the Maximum Expanded Mission Alternative would impact the quality of life for DPG employees. The alternative would bring a renewed sense of purpose and optimism after years of cutbacks and restructuring. Those residing at DPG would also experience an increase in the community life at the installation. Generally, these impacts would be perceived by many persons as beneficial.

4.5.6 Mitigation Measures

There is community and regional interest regarding DPG's future mission and its contributions to the economic and social well being of Tooele County, UT. Thus, DPG's Public Affairs Office should maintain close contacts with elected officials, public administrators, the media, and community leaders in Tooele County, UT, informing them of important events and activities as they relate to DPG and its relationship with the community. For example, public information announcements can be made regarding the scheduling of special tests or large-scale training exercises

that may affect the public. Timely and accurate information dissemination would also be important in the event of a decision to change the housing at English Village or to implement the Decreased Mission Alternative.

Another mitigation measure is the expansion of essential community support functions at DPG. These functions include the commissary, post office, day-care, library, recreation, and health care services. Past cutbacks have reduced many of these functions to critical levels, such that baseline levels are necessary to maintain a minimally acceptable quality of life for residents at DPG and avert the departure of many families from DPG.

4.5.7 Residual Impacts

Significant socioeconomic impacts are not anticipated in connection with the Proposed Action. DPG is well established in the economic, social, and political environment of Tooele County, UT. DPG-related demands on public services and facilities are part of the existing environment and little change is expected in the underlying relationships between DPG and local public and private interests off the installation. Overall, the infrastructure at DPG would be improved and community stability would increase with the Proposed Action. Impacts under the Maximum Expanded Mission Alternative may be significant, but would be necessary to achieve the expanded mission goals given by DOD and Congress.

4.6 Environmental Justice Impacts

The need to conduct an environmental justice analysis for this Future Programs EIS is described in Section 3.6, Environmental Justice. Section 3.6.3, Environmental Justice Analysis, identifies the Skull Valley Reservation, the Confederated Tribes of the Goshute Reservation, and the Ibapah-Gold Hill area as having minority and/or low-income population components. This section of the EIS assesses whether these populations might be disproportionately affected by the Proposed Action or alternatives.

4.6.1 Significance Criteria

Potential environmental justice impacts would be judged as significant if the Proposed Action or alternatives were to cause a disproportionately high and adverse impact to identified minority or low-income populations. Disproportionately high and adverse environmental or human health impacts would be considered to occur if there would be substantial impacts affecting a minority or low-income population which appreciably exceed those of the general population in and around DPG.

4.6.2 Impacts of the Proposed Action

Analysis in this EIS shows there would be continuing and new impacts associated with operation of DPG under the Proposed Action over the 7-year time period of this Future Programs EIS. These continuing and new impacts are described in the various sections within Chapter 4.0, Impacts of the Proposed Action and Alternatives.

Although there are impacts, DPG's mission and associated testing, training, and other activities are directed by the Army through Congress and DOD, as summarized in Section 2.1.1, Mission Description and Organization. The existence of DPG as a major DOD testing and training facility and DPG's major mission components would continue under any of the alternatives in the EIS. The potential alternative of discontinuing DPG's mission and closing the installation has been eliminated from evaluation in this EIS, as summarized in Section 2.4, Alternatives Eliminated from Detailed Evaluation.

Therefore, many of the identified impacts from the Proposed Action cannot be avoided, but they can be mitigated and controlled. There would be few identifiable impacts projected to occur to off-installation populations as a direct or indirect result of DPG's Proposed Action.

4.6.2.1 Disproportionate Impacts to Minority and/or Low-Income Populations

Based on the results of the impact analysis summarized in Chapter 4.0, Impacts of the Proposed Action and Alternatives, and other available information, it can be concluded that those persons who reside in and around DPG, including minority and/or low-income persons, would bear some adverse effects by the continued operation of DPG. However, any identified environmental or health impacts from the continued operation of DPG would not be localized or placed primarily on the identified minority and/or low-income population components.

The identified minority and/or low-income populations would not be disproportionately affected compared to other segments of the general population in similar geographic locations such as English Village.

4.6.2.2 Compliance with Regulations and Management Plans

EO 12898 requires identifying and addressing disproportionately high and adverse human health or environmental impacts of Federal programs, policies, and activities on minority and low-income populations. The identified minority and/or low-income populations of the Skull Valley Reservation, the Confederated Tribes of the Goshute Reservation, the Ibapah-Gold Hill area would not be disproportionately affected

compared to the general population under the Proposed Action. Therefore, the Proposed Action would be in compliance with EO 12898.

4.6.3 Impacts of the No Action Alternative

Under the No Action Alternative, DPG's Proposed Action would not be implemented. Therefore, any potential health or environmental impacts associated with the Proposed Action would not occur. However, DPG would continue to operate under its baseline mission with the No Action Alternative. Persons who reside in and around DPG would continue to bear some adverse effects under the No Action Alternative. However, any identified environmental or health impacts from the continued operation of DPG would not be localized or placed primarily upon the identified minority and/or low-income population components.

4.6.4 Impacts of the Decreased Mission Alternative

Under the Decreased Mission Alternative, DPG would continue to operate but at a lower level compared to baseline conditions. Health and environmental impacts as summarized in Chapter 4.0, Impacts of the Proposed Action and Alternatives, would continue to occur with the Decreased Mission Alternative. However, any identified environmental or health impacts from the continued operation of DPG with the Decreased Mission Alternative would not be localized or placed primarily upon the identified minority and/or low-income population components.

4.6.5 Impacts of the Maximum Expanded Mission Alternative

Under the Maximum Expanded Mission Alternative, DPG would continue to operate but at a greater level than any other alternative. Health and environmental impacts as summarized in Chapter 4.0, Impacts of the Proposed Action and Alternatives, would continue to occur with this alternative. The magnitude and frequency of impact would be highest for the Maximum Expanded Mission Alternative. However, any identified environmental or health impacts from the continued operation of DPG with the Maximum Expanded Mission Alternative would not be localized or placed primarily upon the identified minority and/or low-income population components.

4.6.6 Mitigation Measures

Even though the affected minority and/or low-income populations have not been identified as being likely to have disproportionate impacts compared to the general population in and around DPG, these minority and low-income populations have been invited to become active participants in this EIS process. An integral part of scoping was to identify any environmental justice issues associated with DPG's continuing operation. This effort has helped to identify noise and cultural resource

issues that are important to these affected population components. These noise and cultural resource impacts are discussed in Sections 5.2.11, Cumulative Noise Impacts, and 4.8, Impacts to Cultural Resources.

The DOD, Army, and DPG are committed to fair and equitable treatment of all persons. DPG would consider the locations of the identified minority and low-income populations when locating new facilities and activities to ensure that these populations are not disproportionately affected.

4.6.7 Residual Impacts

With mitigation measures, environmental justice issues and impacts are projected to be nonsignificant, and the Proposed Action would be in compliance with EO 12898.

4.7 Impacts to Land Use and Access

This section analyzes the potential impacts of the Proposed Action and alternatives on land use at DPG and surrounding areas. The criteria used to evaluate whether these potential impacts are considered significant and mitigation measures that could be implemented to reduce any identified adverse impacts are presented. Section 3.7, Land Use and Access, describes DPG and regional land uses.

4.7.1 Significance Criteria

Impacts must be evaluated with criteria to determine whether or not they are significant. Land use impacts resulting from the Proposed Action or alternatives would be considered significant if they were to:

- Cause substantial changes in established land uses
- Cause considerable land ownership changes
- Substantially reduce or degrade the quality of land
- Result in loss of important or unique land resources or features
- Cause substantial changes in access to DPG and its facilities
- Conflict with adopted local or regional land use plans

4.7.2 Impacts of the Proposed Action

This section evaluates land use impacts with these significance criteria in detail for the Proposed Action. Land use impacts tend to occur when activities are not compatible with installation or surrounding land uses. The following subsections describe the impacts of the Proposed Action to land use and ownership, land quality, land access, and compliance with applicable regulations and management plans.

Impacts from construction and demolition of buildings and facilities at DPG are also summarized in this section.

4.7.2.1 Impacts to Established Land Uses and Ownership

Activities were analyzed under the Proposed Action that could impact regional land uses and DPG designated land uses and ownership by preventing established land uses from occurring, interfering with the quality of these land uses, or resulting in land acquisitions or withdrawals.

Impacts to Regional Land Use – Much of the land around DPG is used for agriculture, ranching, farming, grazing, and recreation on public lands. Section 3.7.2, Regional Land Uses, discusses the allocation and use of land within Tooele County, UT. The limited infrastructure, population, and services in the area adjacent to DPG are not supportive of growth in commercial or industrial land uses. Due to the limited development of the land surrounding DPG, it is unlikely that the proposed level of activities at DPG would cause any changes to established land uses of the area. However, some impacts from Proposed Action activities, such as wildland fire, noise, and invasive weeds, would significantly affect the quality of established land uses, such as recreation and agriculture, on public lands directly bordering DPG.

Increased ground training activities could result in more wildland fires from these activities spreading into surrounding public lands. As described in Section 4.4, Impacts to Biological Resources, an indirect impact of these uncontrolled fires is they can increase the distribution of invasive weeds such as cheatgrass, and adversely affect grazing, farming, ranching, and wildlife habitat land uses. This would indirectly affect the quality of established land uses such as recreation and tourism for people who want to experience these areas in their natural state.

Public reactions to DPG's activities and their impacts would be different for different people. For example, persons knowledgeable about DPG's missions or connected to DPG operations may be more accepting of the impacts on the quality of land uses contiguous to DPG. Other persons not associated with or not supportive of DPG may view these impacts in a negative way. Section 4.7.6, Mitigation Measures, describes measures to manage and mitigate these significant impacts to regional land uses to nonsignificant levels.

Impacts to DPG Land Use – The use of DPG land is directed by the installation's functions, which are the testing and evaluation of military equipment and material, and training of military personnel. Section 2.1.1.1, DPG's Mission Statement, describes DPG's mission in more detail. DPG's land-use management philosophy is that of "dominant use," which ensures that the military's mission has ultimate priority

over all other uses. Dominant use allows for multiple uses of the installation, while assuring that the primary mission of military use drives all other programs.

While the Proposed Action does involve an increase in testing and training activities and the construction of some facilities to support these activities, there would be no change in DPG land holdings and only minor changes in established land uses, such as new firing points and a new training area at Granite Peak.

The Proposed Action would not cause significant direct or indirect impacts to established land uses or the quality of these land uses within DPG boundaries.

Impacts to Land Ownership – Major landowners and/or land managers in the vicinity of DPG are shown on Figure 3.7-1, Regional Land Use and Ownership, and include:

- BLM
- U.S. Fish and Wildlife Service
- State of Utah
- Native American Reservations
- Private entities

The Bureau of Land Management is a major landowner in the vicinity of DPG.

No proposed land acquisitions or land disposals that would change DPG land holdings or boundaries are associated with this Future Programs EIS. All the proposed testing and training activities would occur on military land already owned and/or controlled by DOD and would not have an impact on ownership or control of lands administered by other Federal agencies, the State of Utah, Native American Reservations, or private entities. Therefore, the Proposed Action would not cause direct or indirect changes in land ownership.

4.7.2.2 Impacts to Land Quality

Activities were analyzed under the Proposed Action that could degrade the quality of land and limit future land uses within and surrounding DPG due to:

- Wildland fires
- Ground disturbance
- Damage to natural areas and special features
- Contamination of soils and water

Impacts to soils are discussed in Section 4.1, Impacts to Geology and Soils, and, impacts to groundwater and surface water are discussed in Section 4.2, Impacts to Water Resources.

Wildland Fires – Public comments have noted that frequent fires initiated from ground training on DPG spread onto adjacent BLM land without being fought. Uncontrolled wildland fires significantly affect the quality of land by destroying native vegetation and wildlife habitat. This is a significant and adverse impact to the quality of land both within DPG and adjacent BLM areas. Section 4.4, Impacts to Biological Resources, describes the impacts of fire on biological resources and measures to manage and mitigate significant impacts caused by fires to nonsignificant levels.

Ground Disturbance – Past activities at DPG have caused damage to the land from ground disturbance. An increase in certain ground training activities such as vehicular movement and excavation would result in increased ground disturbance to land within DPG. Additionally, ground has been disturbed through the presence of UXO on certain areas within DPG. Although controls are in place to minimize UXO, continuing LATs, other conventional munitions testing, and ground training activities would likely generate additional UXO in the future. These activities result in a significant adverse impact to the quality of land within DPG. Section 4.4, Impacts to Biological Resources, describes the impacts of ground disturbance to vegetation and wildlife habitat and provides appropriate mitigation measures.

Damage to Natural Areas and Special Features – Many natural areas and special features have been identified at DPG by The Nature Conservancy based on certain biological and geophysical criteria. Section 3.7.3.4, Potential Land Use Constraints, describes The Nature Conservancy's inventory. Nearly all areas and features are located between designated grids, impact areas, activity centers, facilities, and training areas. The locations of these areas are identified in Figure 3.7-3, Locations of Natural Areas and Special Features at DPG. Use of environmentally sensitive

areas is restricted, but not prohibited. Mostly, the restrictions impose vehicular and access limitations. A continuation of DPG activities in these areas would likely cause damage to these unique natural resources over time.

One of DPG's proposed activities would be to maintain or upgrade the AF telemetry site on Granite Peak. A new training area near Granite Peak would also be established. Granite Peak is the highest priority area on The Nature Conservancy inventory, which characterized the mountain as geologically unique. The North Wig Mountain Dunefield, also on the inventory, may be damaged by proposed quarrying operations on Wig Mountain, and the use of tracked vehicles in the Wig Mountain Training Area. If these features were substantially degraded by these future activities, impacts would be significant.

4.7.2.3 Impacts to Access to DPG Facilities

Because there would be no land acquisitions or disposals under the Proposed Action, DPG property boundaries and the location of the entrance gate would remain the same. Maintaining and upgrading existing roads and constructing new roads to allow military access to DPG facilities and testing/training areas would be considered a beneficial impact to DPG access. Real property security improvements from the Proposed Action would further limit unwanted access and would be considered a beneficial impact to DPG access. Impacts from Proposed Action activities, such as soil erosion or compaction and increased traffic, could cause indirect impacts to access to DPG facilities. Since the resulting impacts to access would be short-term, they are considered nonsignificant.

4.7.2.4 Impacts from Construction and Demolition of Buildings and Facilities at DPG

The Proposed Action includes construction and demolition of various buildings and facilities on DPG lands. These construction and demolition activities are identified as part of Section 2.2, Proposed Action. While specific locations of new construction activities cannot be fully identified, locations would be chosen with consideration of topography, soils, drainage, water, vegetation, cultural resource locations, access, and utilities.

The proposed construction projects would generally consist of standard buildings and structures. Specialized engineering controls may be necessary for some of these structures. These construction projects would be small compared to typical urban construction projects. For these DPG construction projects, commercial trucks would transport the necessary materials, supplies, and equipment not already present at DPG via existing public or DPG roads. These roads are described in Section 3.9, Traffic

and Transportation. With the existing growth underway in Tooele County, UT, especially in Tooele Valley, construction of new buildings is commonplace. Construction materials, supplies, personnel, and contractor companies are generally available from sources within Tooele County, UT or within DPG itself. The existing roads within DPG would generally provide adequate access to the activity areas where construction would occur. No new major roads are planned in association with construction activities, although new access roads to specific new structures may be needed.

Environmental impacts associated with construction activities would generally be very localized. Impacts would involve minor changes in land use, drainage patterns, noise, and dust.

The existing DPG land use patterns would not be substantially altered by any proposed construction activities associated with the Proposed Action. Provision of adequate site drainage is a standard part of the planning and construction processes, and no substantial adverse drainage effects would be expected with the new construction. Noise levels associated with excavation procedures such as bulldozing are an unavoidable result of construction projects. Dust would be created by excavation activity and vehicular traffic. Other environmental resources such as biological resources and water resources would receive only minimal disruption with the construction associated with the Proposed Action.

Demolition activities would also result in minor land use changes, noise, and dust, which are unavoidable localized impacts. One demolition concern would be the proper handling of asbestos, which must be removed, packaged, and disposed of before buildings or structures are demolished. Demolition activities would strictly comply with OSHA regulations, and procedures would include enclosing the work area with barriers, installing air filters, using shower/decontamination facilities, and assuring that workers and others in the vicinity are fully protected from asbestos.

Overall, impacts from proposed DPG construction and demolition activities would be short-term with localized effects. Impacts are not considered significant.

4.7.2.5 Compliance with Regulations and Management Plans

The activities included in the Proposed Action would conform with the SDP provisions of AR-210, Master Planning for Army Installations, and with the Tooele County General Plan, which is discussed in Section 3.7.2, Regional Land Uses.

Although the Proposed Action would cause no impacts to land ownership, DPG's operations could indirectly conflict with some regional land owners' or land

managers' plans, objectives, or goals as described in Section 4.7.2.1, Impacts to Established Land Uses and Ownership, and Section 4.7.2.2, Impacts to Land Quality.

4.7.3 Impacts of the No Action Alternative

Under the No Action Alternative, DPG would continue its baseline operations and activities with no major changes to activity levels, locations of activities, and infrastructure. The uses, ownership, and quality of land would remain the same as baseline conditions. Since the No Action Alternative activities occur at reduced levels from the Proposed Action, the magnitude of No Action Alternative impacts would not be as large as the Proposed Action impacts.

4.7.4 Impacts of the Decreased Mission Alternative

Under the Decreased Mission Alternative, the level of activity at DPG would decrease. There would be no major additions to infrastructure and the amount of land used for DPG activities would remain the same or decrease. There could potentially be a reduction in DPG land holdings due to the reduction in DPG activities. Changes in DPG boundaries due to land disposals would cause direct and indirect impacts to existing local and regional land use plans, land ownership, and access to DPG facilities.

The type and scope of impacts to the quality of land and its use identified under the Proposed Action would also occur under the Decreased Mission Alternative. However, because Decreased Mission Alternative activities would be occurring at a lower level of intensity than under the Proposed Action, the resulting impacts would not be as large as those projected for the No Action Alternative or for the Proposed Action.

4.7.5 Impacts of the Maximum Expanded Mission Alternative

Under the Maximum Expanded Mission Alternative, the level of activity at DPG would likely increase substantially due to chemical and/or biological defense testing and increased chemical and biological incident counterterrorism training activities. The impacts to the quality of land and its use identified under the Proposed Action would occur at increased levels under the Maximum Expanded Mission Alternative. Under this alternative, impacts could occur in new locations and in unique natural areas. Therefore, the impacts from the Maximum Expanded Mission Alternative could be of much higher magnitude than those from the Proposed Action and are potentially significant without additional mitigation.

4.7.6 Mitigation Measures

Because testing and training activities are primary components of the DPG mission, land use impacts within and around the installation cannot be entirely avoided. To reduce adverse impacts to the quality of regional land use, DPG should consider coordinating with the BLM regarding the effects of DPG ground training, wildland fire management, and the spread of invasive plants such as cheatgrass. DPG should continue to coordinate with the U.S. Fish and Wildlife Service on Fish Springs National Wildlife Refuge issues and impacts.

Mitigation measures to reduce the adverse impacts to the quality of land within DPG boundaries could include:

- Adopt and protect the natural areas and special features on DPG land identified by The Nature Conservancy
- Continue support for the ITAM program as described in Section 3.1.4.3, Integrated Training Area Management Program, to the extent possible
- Implement a range management program for the rehabilitation of the desert environment in and around DPG
- Implement the mitigation measures for fire and the spread of invasive plants such as cheatgrass, as described in the mitigation discussion in Section 4.4, Impacts to Biological Resources

4.7.7 Residual Impacts

DPG's mission-related activities are in support of its "dominant use" land management philosophy, which ensures that military-related land uses at DPG have ultimate priority over all other potential land uses. DPG's military-related land uses meet the Army's congressionally mandated goals, but also result in long-term adverse impacts to the quality of land and its use. Residual impacts after mitigation are unavoidable, but nonsignificant given mission requirement and objectives.

4.8 Impacts to Cultural Resources

This section analyzes the potential impacts of the Proposed Action and alternatives to cultural resources at DPG. The criteria used to evaluate whether these potential impacts are considered significant and mitigation measures that could be implemented to reduce any adverse impacts are presented. Section 3.8, Cultural Resources, describes the cultural resource environment at DPG.

This section also identifies how potential impacts of the Proposed Action and alternatives to cultural resources at DPG would be managed through continued implementation of the DPG ICRMP. This plan is summarized in Section 2.1.3.3, Management Plans. DPG's ICRMP includes a planning and management approach that considers the value of a cultural resource within the entire context of land features, natural resources, and DPG's mission and support activities (DPG, 2001). The ICRMP identifies mitigation measures for future projects that could impact cultural resources and provides standard operating procedures to assist DPG personnel with cultural resource management decisions and guidance on regulatory compliance with cultural resource management laws and regulations.

Impacts could occur to unsurveyed cultural resources, however some cultural resources sites have been surveyed and new surveys are implemented each year.

4.8.1 Significance Criteria

Impacts must be evaluated with criteria to determine whether or not they are significant. Impacts to cultural resources from the Proposed Action or alternatives would be considered significant if they were to:

- Cause substantial disturbance to or adversely affect unsurveyed cultural resource sites
- Adversely affect NRHP-eligible resources
- Disturb or adversely affect sacred Native American sites
- Cause considerable changes in access to cultural resources
- Result in noncompliance with cultural resource regulations

4.8.2 Impacts of the Proposed Action

This section evaluates cultural resource impacts with these significance criteria in detail for the Proposed Action. Impacts to cultural resources under the Proposed Action could potentially occur if DPG mission activities and day-to-day installation operations were to disturb historic buildings and structures or substantially alter

potential cultural resource areas where the integrity of an artifact would be compromised. DPG mission and support activities have the potential to impact cultural resources through ground disturbance and vandalism. While the public has very limited access to cultural resources at DPG, there is still evidence of vandalism and theft. However, ground disturbance has the greatest potential to impact cultural resources at DPG and occurs from various activities which result in different potential impacts as described in Table 4.8-1, Potential Impacts to Unsurveyed Cultural Resources from DPG Activities.

Table 4.8-1. Potential Impacts to Unsurveyed Cultural Resources from DPG Activities.

Potential Impacts	Description of Activity Actions	Activity
• Damage to cultural resource sites on or near the ground surface and that are located in shallow soils or bedrock outcrops • Detectable marks left in the soil which have adverse effects on buried cultural resource deposits	Use of tracked vehicles, including proposed new activities such as the Paladin Weapons System, Chemical Units training, and support to the Fort Leonard Wood Chemical School	Ground Training
• Damage to cultural resource sites on or near the ground surface • Damage to cultural resource sites buried in deeper soils, particularly during wet weather	Use of wheeled vehicles	• Biological Defense Testing • Chemical Defense Testing • Conventional Munitions Testing • Ground Training • Smoke, Obscurant, and Illuminant Testing
Minimal damage to cultural resource sites because ordnance impacts tend to be highly localized near designated target areas	Use of impacting ordnance or other projectiles	• Conventional Munitions Testing • Ground Training • Smoke, Obscurant, and Illuminant Testing
Damage to cultural resource sites located in undisturbed areas which are vulnerable to new construction projects	Construction of facilities	Any activity including installation and mission support activities

SOURCE: DPG, 2001

In this analysis, Proposed Action activities that would occur in established indoor locations or facilities and therefore, have no potential to cause ground disturbance are not relevant to cultural resources impact analysis. These activities include cosmic ray research, and ECRT testing. Construction activities planned to occur in already disturbed areas, such as DPG's existing activity centers, were also not analyzed because they would cause negligible impacts. The majority of construction activities planned under the Proposed Action would be in such locations. However, some

construction activities could occur in undisturbed areas and potential impacts from these activities were considered.

4.8.2.1 Impacts to Paleontologic Resources

Paleontologic resources are likely to exist at Little Davis Mountain, Simpson Buttes, Camels Back Ridge, Cedar Mountains, Wig Mountain, and in various Quaternary deposits across the installation. Testing and training activities under the Proposed Action would occur in these locations. Various Proposed Action activities, such as detonations, terrain leveling, and berm construction, would cause ground disturbance and could disturb or destroy some of the paleontologic resources that occur at DPG. While the impact to paleontologic resources is not expected to be significant since the paleontologic resources found at DPG are not known to be unique, Section 4.8.6, Mitigation Measures, recommends measures to minimize destruction of paleontologic resources.

4.8.2.2 Impacts to Unsurveyed Cultural Resource Sites

The amount of land that has been surveyed and the number of cultural resource sites that have been identified are discussed in Section 3.8.8, Summary of Cultural Resources Surveys and Findings at DPG. Outdoor testing and training activities under the Proposed Action would continue to occur in the established locations described in Section 2.1.4.3, Primary Outdoor Facilities. These activities would occur in unsurveyed areas that are likely to contain cultural resources. The approximate areas that have been explored for cultural resources as well as unsurveyed areas which have a medium or high probability of containing cultural resources Are shown in Figure 3.8-2, Areas with Probability to Contain Cultural Resources. Unsurveyed areas which have a medium or high probability of containing cultural resources and the activities under the Proposed Action that would occur in these areas that could cause impacts due to ground disturbance are listed in Table 4.8-2, Unsurveyed Cultural Resource Areas Potentially Impacted by Proposed Action Activities.

Ground training activities have the most potential to impact unsurveyed cultural resources since their training maneuvers result in the greatest use of tracked and wheeled vehicles. These vehicles cause ground disturbance by contributing to soil compaction, which compromises the integrity of a buried cultural resource. The Paladin Weapons System, which is being proposed for training by the Utah NG, would cause a substantial increase in soil compaction. The Paladin Weapons System weighs 16 percent more than the M109A5, the 155-mm self-propelled howitzer. A FAASV that is 46 percent heavier than the old supply vehicles accompanies the Paladin. Because of its greater weight, this new system would increase the track use

in an area and the footprint left by each training exercise from 0.2 sq km to 3.1 sq km (94 acres to 1,500 acres) due to the multiple, moving firing points compared to the fixed points. Other new sources of disturbance from ground training include Chemical Unit exercises and support to the Fort Leonard Wood Chemical School. These activities would result in additional routine and recurring use of wheeled and tracked vehicles. These new ground training activities would dramatically contribute to ground disturbance and could have an impact on cultural resources. The locations where ground training activities overlap with cultural resource areas are shown on Figure 4.8-1, Overlay of Cultural Resource Areas and Locations Where Ground Training is Conducted.

Table 4.8-2. Unsurveyed Cultural Resource Areas Potentially Impacted by Proposed Action Activities.

Cultural Resource Area	Proposed Action Activity				
	Biological Defense Testing	Chemical Defense Testing	Conventional Munitions Testing	Ground Training	Smoke, Obscurant, and Illuminant Testing
HP01			•		
HP07				•	
HP08				•	
HP09				•	
HP10				•	
HP11	•	•	•	•	•
HP12				•	
HP13				•	
HP16				•	
HP17				•	
MP01			•		
MP03	•	•	•	•	•
MP04	•	•	•	•	•
MP05			•	•	•
MP06				•	•
MP07				•	
MP08					•
MP09					•

HP High Probability Cultural Resource Area
MP Medium Probability Cultural Resource Area

Construction activities in undisturbed areas also have the potential to impact cultural resources through ground disturbance. The ICRMP would help prevent significant impacts from Proposed Action activities to unsurveyed areas that have a moderate to high probability for cultural resources. By assigning priority rankings, the ICRMP ensures that surveys and inventories are conducted in areas with a high potential for cultural resources followed by medium probability areas being used for DPG activities. The CRMO can then evaluate cultural resources for NRHP eligibility and

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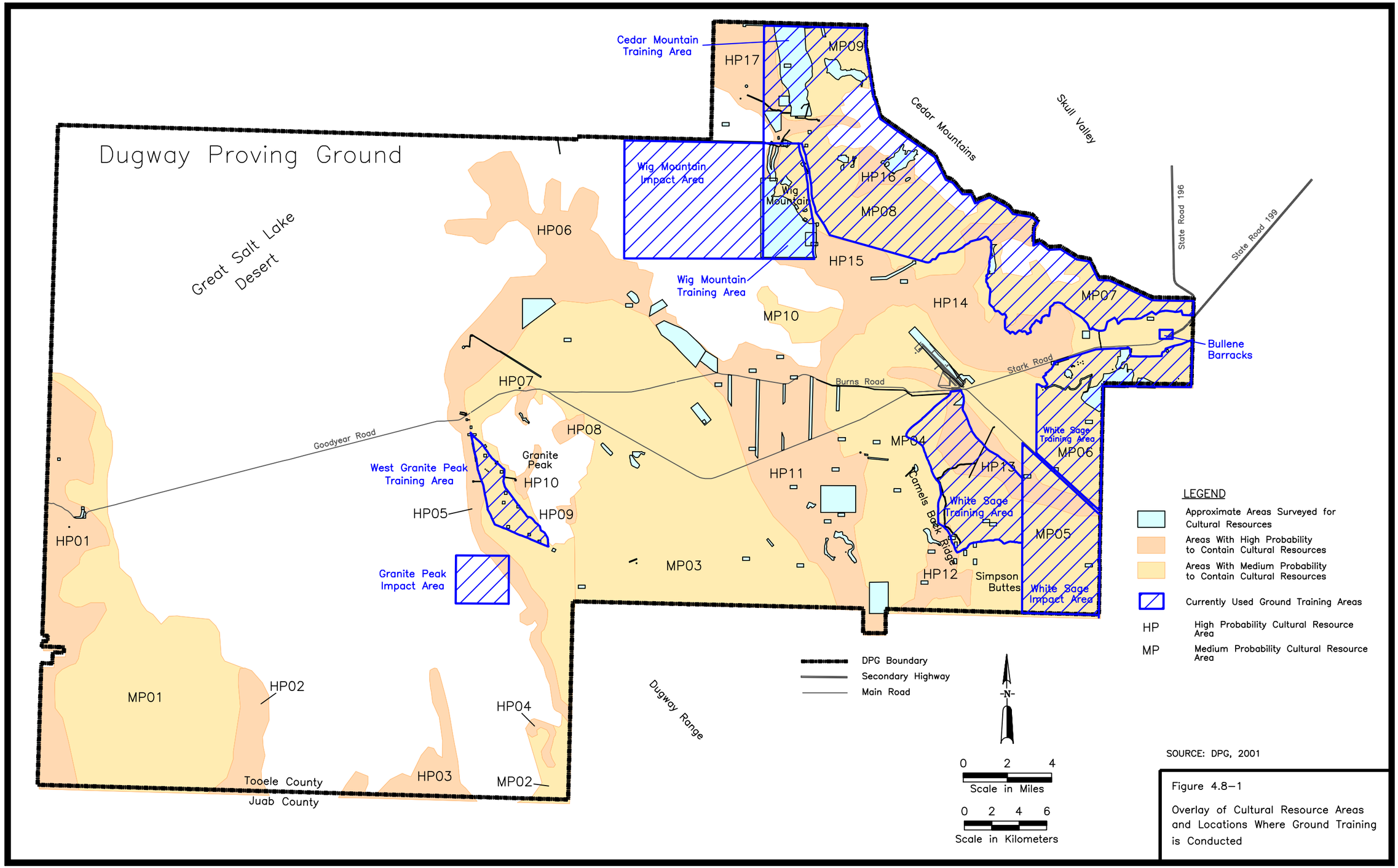

Figure 4.8–1

Overlay of Cultural Resource Areas and Locations Where Ground Training is Conducted

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determine if the proposed activity would cause adverse impacts (DPG, 2001). Section 4.8.6, Mitigation Measures, describes priority rankings.

By following the guidelines and standard operating procedures stated in the ICRMP, significant direct impacts to unsurveyed cultural resource areas from the Proposed Action would not be likely. Ground disturbance from Proposed Action activities could result in indirect impacts, such as soil erosion and compaction and changes in surface water flow patterns, in unsurveyed cultural resource areas. Implementing the ICRMP minimizes these indirect impacts by reducing the probability of ground disturbance. Proposed Action activities could also cause fires that result in soil erosion in unsurveyed cultural resource areas. Section 4.4, Impacts to Biological Resources, describes measures to manage and mitigate impacts resulting from wildland fires. Therefore, by implementing the ICRMP and fire mitigation measures, the potential for Proposed Action activities to substantially disturb or adversely affect unsurveyed cultural resource sites is low and impacts to these sites are not considered significant.

4.8.2.3 Impacts to NRHP-Eligible Cultural Resources

The prehistoric and historic properties at DPG, some of which may be eligible for the NRHP, are discussed in Section 3.8.8, Summary of Cultural Resources Surveys and Findings at DPG. The locations of these properties are shown in Figure 3.8-1, Locations of Historical Cultural Resources Potentially Eligible for NRHP Listing. Some Proposed Action testing and training activities would occur in or near these areas. Historical sites that could be impacted by activities under the Proposed Action are listed in Table 4.8-3, DPG Historical Properties Potentially Impacted by Proposed Action Activities. The Proposed Action activities indicated on this table could potentially impact these properties through their direct use of these facilities.

Table 4.8-3. DPG Historical Properties Potentially Impacted by Proposed Action Activities.

Historical Property	Proposed Action Activity				
	Biological Defense Testing	Chemical Defense Testing	Conventional Munitions Testing	Ground Training	Smoke, Obscurant, and Illuminant Testing
V Grid				•	
Horizontal Grid					•
West Vertical Grid	•	•			•
Downwind Grid	•	•	•		•
Hazardous Building	•				
Baker Test Facility	•				

Table 4.8-3. DPG Historical Properties Potentially Impacted by Proposed Action Activities.

Historical Property	Proposed Action Activity				
	Biological Defense Testing	Chemical Defense Testing	Conventional Munitions Testing	Ground Training	Smoke, Obscurant, and Illuminant Testing
German Village	•	•		•	•
Tower Grid	•	•	•		•
Gold Mine				•	
Copper Mine				•	

There may be times when the importance of a DPG mission activity under the Proposed Action exceeds the significance of a cultural resource site eligible for the NRHP, and direct impacts may result. DPG can conduct activities at any NRHP-eligible military facility on the installation as long as it follows the NHPA Section 106 review process. Section 106 directs Federal agencies to consider the effects of their activities on historic properties which are listed or eligible for listing in the NRHP, as described in Section 3.8.1, Regulatory Overview. If it is determined that an activity would have adverse effects on the property, then the Federal agency is required to consult with the SHPO and other interested parties to identify mitigation measures. For ongoing activities, a treatment plan is developed and a memorandum of agreement is established, which identifies specific measures an agency would undertake to mitigate harm to historic resources (DPG, 2001). DPG has included a standard operating procedure in the ICRMP for determining if a resource is eligible for the NRHP. The ICRMP also provides guidelines for complying with the NHPA and a protection plan if it is determined that impacts are unavoidable.

Continued compliance with the guidelines and procedures in the ICRMP would prevent significant impacts from occurring to potential NRHP-eligible properties under the Proposed Action.

Any potential NRHP sites that have not been identified would be protected in a similar manner as cultural resources discussed in Section 4.8.2.2, Impacts to Unsurveyed Cultural Resource Sites. Ground disturbance from Proposed Action activities could result in indirect impacts to potential NRHP sites from soil erosion and compaction and changes in surface water flow patterns. Procedures and guidelines within the ICRMP minimize these indirect impacts by reducing the probability of ground disturbance. Proposed Action activities could also cause wildland fires or noise that affect the physical integrity of these properties. Measures to manage and mitigate impacts resulting from wildland fires are described in Section 4.4, Impacts to Biological Resources. Section 4.11, Noise Impacts, discusses how

noise can adversely affect structures and describes measures to manage and mitigate these impacts.

With continued implementation of the ICRMP and by implementing wildland fire and noise mitigation measures, the potential for Proposed Action activities to adversely affect NRHP-eligible resources is low and impacts to these resources are not considered significant.

4.8.2.4 Impacts to Sacred Native American Sites

Proposed Action activities would occur in unsurveyed areas as described in Section 4.8.2.2, Impacts to Unsurveyed Cultural Resource Sites. Some of these unsurveyed areas may contain sacred Native American sites. DPG's CRMO interacts with local Native American tribes regarding traditional cultural properties on the installation. While DPG has little information on these types of cultural resources, under the Proposed Action DPG would continue to communicate with representatives from local tribes to identify the locations of sacred sites for management purposes and for facilitating access (DPG, 2001). Tribes are given the opportunity to review and comment on DPG's ICRMP, which addresses the identification and protection of Native American sites.

Because the ICRMP also includes cultural resource inventories as a priority action and provides guidelines to protect those resources that have yet to be identified and evaluated, significant impacts to uninventoried sacred sites would be minimized. Once traditional cultural properties or sacred sites are identified and recorded, they would be protected according to the guidelines stated in the ICRMP and other applicable laws and regulations, including NHPA, NAGPRA, and the AIRFA. If a DPG mission activity under the Proposed Action cannot avoid impacting a sacred Native American site, the ICRMP requires consultation with representatives from local tribes and other interested groups to determine the extent and degree of the impact and appropriate mitigation measures.

Therefore, procedures and guidelines within the ICRMP reduce the potential for Proposed Action activities to disturb or adversely affect sacred Native American sites and impacts to these sites are not considered significant.

4.8.2.5 Impacts to Access to Cultural Resources

Access to cultural resources can be viewed as both damaging and beneficial. Because DPG is a military installation, the public has limited access to cultural resource sites, thus minimizing the potential for vandalism and theft. However, DPG employees, contractors, and official visitors have access to these sites, so protection

from vandalism and theft is necessary and direct access to cultural resources can be viewed as potentially damaging to the site. Access to Native American sacred sites must be provided according to AIRFA. This law provides for access to sites on Federal lands for ceremonial uses and requires avoidance of adverse effects to such sacred sites (DPG, 2001).

Proposed Action activities include the construction of additional facilities and an increase in the number of personnel and vehicles for ground training events. Activities such as these may occur in or near cultural resource areas, and could cause changes in access to cultural resources. Indirect impacts to access from surface water generation and changes in surface water flow patterns, traffic, and wildland fire may also occur. Direct and indirect impacts from the Proposed Action to access to cultural resources could be significant, and effects could potentially be long term. For adverse impacts to access to sites that are not sacred Native American sites, the ICRMP has identified physical protection measures which include fencing, berming, and burying to make sites inaccessible. Section 4.8.2.4, Impacts to Sacred Native American Sites, explains how adverse impacts to sacred Native American sites are addressed through consultation efforts. In addition, the ICRMP includes as a priority action the education of military and civilian personnel about historic preservation efforts at DPG (DPG, 2001).

Therefore, although Proposed Action activities have the potential to change access to cultural resources, ICRMP procedures and guidelines reduce impacts to access to nonsignificant levels.

4.8.2.6 Compliance with Regulations and Management Plans

DPG is required to comply with the following when managing its cultural resources:

- NEPA of 1969
- NHPA of 1966
- AIRFA of 1978
- NAGPRA of 1990
- ARPA of 1979
- Antiquities Act of 1906
- EO 13007
- AR 200-4
- ICRMP

These laws and regulations are described in Section 3.8.1, Regulatory Overview. The ICRMP is described in Section 2.1.3.3, Management Plans. AR 200-4 and the

ICRMP include specific guidelines to ensure that DPG complies with specific legal and regulatory requirements. Some activities under the Proposed Action would likely occur in areas that contain or potentially contain cultural resources. As a result, DPG would continue to follow the procedures stated in the ICRMP to ensure that cultural resource management is coordinated with DPG activities, and that laws and regulations are followed. Impacts from the Proposed Action on compliance with regulations and management plans would not likely occur.

4.8.3 Impacts of the No Action Alternative

Under the No Action Alternative, DPG would continue its baseline operations and activities with no major changes in activity levels, locations of activities, and infrastructure. Therefore, the potential for impacts from this alternative to cultural resources would be less than under the Proposed Action. As with the Proposed Action, if the guidelines and standard operating procedures stated in the ICRMP are followed, activities would not likely disrupt or adversely affect potential cultural resource areas or identified sites, and would also not affect compliance with laws and regulations. In addition, substantial changes of access to cultural resources would not occur.

4.8.4 Impacts of the Decreased Mission Alternative

Under the Decreased Mission Alternative, the level of activity at DPG would decrease. Impacts from the Decreased Mission Alternative to cultural resources and compliance with laws and regulations would be less likely to occur than under the Proposed Action or No Action Alternative due to the decrease in activity and the likelihood of a lesser amount of disturbed lands. Direct and indirect impacts from this alternative on cultural resources would not be significant.

4.8.5 Impacts of the Maximum Expanded Mission Alternative

Under the Maximum Expanded Mission Alternative, the level of activity at DPG would increase substantially, and it is likely that some activities would take place in locations that have not been disturbed by previous activities. Cultural resources would be more susceptible to adverse impacts from DPG activities under the Maximum Expanded Mission Alternative than the Proposed Action.

Procedures and guidelines within the ICRMP would help prevent significant impacts to cultural resources. However, activities and operations occurring under the Maximum Expanded Mission Alternative may be viewed as more important or critical than a potential cultural resource or an NRHP-eligible site, and it may not be

possible to avoid direct impacts or to fully comply with the ICRMP. Therefore, impacts from this alternative may be considered long-term, adverse, and significant.

4.8.6 Mitigation Measures

To lessen the potential for impacts to paleontologic resources, notification to the DEP regarding discovery of any observable major paleontologic resource, such as a fossil, prior to continuing work in the area should be required. Another important mitigation measure, which has also been identified as a priority action in the ICRMP, is to conduct cultural resource inventories on unsurveyed land based on a priority ranking. Because vast tracts of land at DPG have not been surveyed for cultural resources, it is important for DPG to survey those areas that are likely to contain cultural resources which would likely be used in the near future for military activities. Presently, until actual inventories are conducted, the ICRMP has determined the following priority areas by overlaying cultural and natural resource location maps with locations of military testing and training areas (DPG, 2001):

- High Priority Areas – approximately 71 sq km (17,500 acres) with high potential for cultural resources which are being used for DPG activities
- Medium-High Priority Areas – approximately 530 sq km (132,200 acres) with high and/or medium potential for cultural resources that are either:
  - Medium probability areas being used for DPG activities
  - High probability areas adjacent to areas being used for DPG activities
  - High probability areas likely to be used in the near future for DPG activities
- Medium-Low Priority Areas – approximately 390 sq km (97,270 acres) with medium potential for cultural resources that are not being used for DPG activities and are not likely to be used in the near future
- Low Priority Areas – approximately 450 sq km (112,200 acres) with medium potential for cultural resources that are not being used for DPG activities
- Other Areas – remaining areas of DPG that include the following:
  - Areas with a low probability for cultural resources that are not being used for DPG activities and are also not likely to be used in the near future
  - Areas that have previously undergone a cultural resource inventory

- Areas, such as the White Sage and Wig Mountain Impact Areas, which represent approximately 6 percent of DPG's property and are excluded from further inventories since field inspections pose significant risks to human life due to UXO

Although this overlay analysis approach helps DPG to manage cultural resources, conducting inventories would help to ensure effective management of cultural resources.

Avoidance is usually the preferred method for mitigation of potential impacts to cultural resources. In the majority of cases, the most effective and cost-effective way to protect NRHP-eligible sites is through avoidance. In the event that avoidance is not possible, the recommended mitigation measure is to implement the protection plan outlined in the ICRMP, which includes specific treatment alternatives and associated procedures for the types of cultural resources listed in Table 4.8-4, Cultural Resource Treatment Alternatives (DPG, 2001).

Table 4.8-4. Cultural Resource Treatment Alternatives.

Type of Cultural Resource	Treatment Alternatives
Potential National Register of Historic Places-eligible Properties	• Maintenance • Preservation • Rehabilitation • Documentation
Prehistoric and Historic Sites	• Avoidance • Physical protection of individual sites and monitoring the effectiveness of protection measures • Data recovery
Sacred Native American Sites	• Avoidance • Physical protection

Because DPG is operating under terms of the ICRMP and would continue to do so under the Proposed Action and alternatives, no additional mitigation measures are necessary.

4.8.7 Residual Impacts

The cultural resource management program at DPG serves to protect many types of cultural resources. In some situations, protecting a cultural resource may not be possible. If a prehistoric or historic cultural resource site cannot be protected, then data recovery should be conducted to compensate for the site's loss of integrity and potential information. While the physical loss of the site would be a residual impact of DPG's future activities, a data recovery plan would retrieve a representative sample of the information that justified the site's significance and NRHP status (DPG, 2001).

If a DPG activity would have an adverse effect on an NRHP-listed or eligible building or structure, for example, German Village, such that the effects cannot be mitigated via maintenance, repair, restoration, avoidance, or other means, then knowledge of the lost building or structure could only be preserved through documentation (DPG, 2001). While the physical loss of this cultural resource would be a residual impact of DPG's future activities, the following procedure would preserve knowledge of the lost building or structure:

- Compile measured drawings, photographs, histories, inventory cards, or other media that depict the property
- Prepare documentation by an architectural historian who meets the requirement of AR 200-4, and who is supported by the appropriate personnel and equipment
- Adequately explain and illustrate what is significant or valuable about the historic site, structure, or object being documented
- Use the appropriate level of documentation depending on the type of impact and the significance of the resource

Cultural resources that are determined not eligible for the NRHP and that are not Native American sacred sites or traditional cultural places are not afforded further protection within the scope of the ICRMP (DPG, 2001). The residual impact of DPG's future activities would be physical loss of cultural resources.

4.9 Impacts to Traffic and Transportation

This section analyzes the potential impacts of the Proposed Action and alternatives to traffic and transportation at DPG. The criteria used to evaluate whether these potential impacts are considered significant and mitigation measures that could be implemented to reduce any adverse impacts are presented. The transportation network serving DPG and the surrounding region is described in Section 3.9, Traffic and Transportation.

4.9.1 Significance Criteria

Impacts must be evaluated with criteria to determine whether or not they are significant. Impacts to transportation resources resulting from the Proposed Action or alternatives would be considered significant if one or more of the following occurs:

- Future travel demands require major roadway capacity enhancements or would result in substantially higher levels of highway maintenance

- Training or testing activity requires major investment in nonhighway transportation infrastructure
- Transportation requirements for DPG's mission generate widespread and recurrent congestion for the traveling public or result in other disruptions or inconvenience to off-installation civilian travel and shipment of goods
- Transportation of materials and wastes requires new or changed management procedures, infrastructure, equipment, or routes

4.9.2 Impacts of the Proposed Action

This section evaluates traffic and transportation impacts with these significance criteria in detail for the Proposed Action. Proposed Action mission and support activities were analyzed for potential impacts to the following transportation facilities and activities:

- Roadways
- Airports and Airspace
- Railroads
- Transportation of Materials and Wastes

4.9.2.1 Impacts to Roadways

Due to its remote location, DPG is dependent on a network of roadways within and surrounding DPG for the success of its mission. Much of its work force commutes to and from DPG on a daily basis. Vital supplies and materials associated with the mission must be trucked to DPG and military and civilian personnel training at DPG use the network to access the installation and to transport equipment. Impacts to both DPG roadways and regional roadways were analyzed.

DPG Roadways – Under the Proposed Action, the size of the full time work force at DPG would increase about 10 to 15 percent from baseline levels. The number of tests conducted at DPG would increase, as would the level of training conducted. These changes would increase the number of visitors, such as technicians, scientists, and observers to DPG and the number of personnel training at DPG. Construction and maintenance activities at DPG would temporarily expand the installation's work force at various times in the future.

As a result of these increases, traffic volume on DPG's paved and unpaved roadway network would increase. Changes in traffic would not be uniform across the entire installation or over time. Differences in traffic levels would depend on the location, anticipated activity levels at each activity center, the scheduling and timing of

specific tests, and the type, duration, and level of participation in training missions. Long-term increases in traffic volume would be smaller than the temporary increases associated with certain testing and training activities.

Detailed traffic projections are not available, but foreseeable increases in long-term average daily traffic are less than 200 vehicles per day. Within DPG, much of the increase in daily traffic would occur on Stark Road, between the main gate and Ditto. Stark Road is a paved, well-maintained, two-lane road that functions as the central arterial for DPG. Most vehicular travel between major activity centers at DPG use this road for some portion of each trip. Even during the peak commuting times, anticipated traffic volume on Stark Road would be well below the typical design capacity of 500 to 600 vehicles per hour for two-lane roads.

Traffic volume impacts to paved roads serving other DPG activity centers would be lower, as only a portion of the total increase in traffic would be to and from each center. Although these roads are generally narrower, less maintained, and have lower capacity, future traffic levels on these roads would remain below capacity.

Temporary increases in traffic would occur on DPG's road network in conjunction with special testing and training activities that bring visitors and participants onto the installation. The duration, timing, and magnitude of traffic impacts would vary by event, with some training exercises effectively doubling the daytime population at DPG. Although these events may involve a large number of troops, most of the actual training activity occurs away from the activity centers, in areas served by unpaved roads, thereby limiting the impact to paved roads. Because future traffic levels on DPG roadways would remain below capacity, no significant impacts to DPG roadways are expected.

Increased traffic would increase the need for road maintenance. DPG is responsible for road maintenance within its boundaries. However, Army or NG engineers often conduct road maintenance as part of training exercises. Real property roadway maintenance and repairs under the Proposed Action would further serve to improve roadway conditions. Consequently, on-installation maintenance impacts would not be significant.

Regional Roadways – The Proposed Action would also affect traffic volumes on highways beyond the installation's boundaries, principally SR 196 and SR 199. These paved, two-lane roads are the primary highway access to DPG. The Utah Department of Transportation maintains both roads. Traffic volumes on these roads are low, 255 and 775 vehicles per day as of 1999, respectively, and have exhibited little change in recent years.

Under the Proposed Action, a modest increase in traffic on regional roadways is expected as a result of increased work force commuting and the rise in the number of visitors to DPG. However, these increases would have little or no effect on public travel on these routes given the relative magnitude of the increases in comparison to baseline traffic volumes and roadway capacities.

Both SR 196 and SR 199 eventually intersect with more regionally important highways, specifically Interstate I-80 and U.S. 36, beyond the immediate vicinity of DPG. Traffic volumes and capacities on these highways are substantially above those of the roads in the vicinity of DPG. The incremental traffic associated with the Proposed Action would, therefore, not generate or contribute to significant impacts.

Increased training would also increase traffic on the off-installation road network near DPG. Even though the training activity occurs within DPG, regional highways are affected by mobilization and deployment activities. In some instances this may involve individuals or small groups arriving via light-duty vehicles. In other cases, large-scale mobilization occurs with convoys of construction, communications, supply, and command vehicles converging at DPG. Individuals and small groups generate little in the way of transportation impacts. The scale of the events is limited. Many of the events occur on weekends when most DPG administrative and test activities are closed, and they involve little special equipment. The large-scale mobilizations can cause some motorist delays and congestion. These are, however, of short duration and affect only a small portion of the network. In addition, larger convoys commonly include lead and trailing escort vehicles with flashing lights, signs, and pennants to alert motorists to the convoy's presence and movement. Therefore, increased training would not significantly impact regional highways.

4.9.2.2 Impacts to Airports and Airspace

Aviation resources include both the physical airport facilities at DPG and within the region and the airspace above DPG. Impacts of the Proposed Action to aviation resources would be limited and isolated in scope, duration, and location.

Under the Proposed Action, substantial capital investment would occur at MAAF. Upgrading MAAF would be a significant and beneficial impact to transportation resources. However, it may result in indirect adverse impacts to biological resources as described in Section 4.4, Impacts to Biological Resources.

Other aviation resources would be largely unaffected by the Proposed Action. DPG operations in the airspace between Granite Peak and Five Mile Hill would not change appreciably. Airspace and MAAF use priorities, scheduling, and approval would not change under the Proposed Action. Airspace control would continue to be provided

by the 299th Range Control Squadron at HAFB. Existing restrictions on public use of the airspace over DPG would remain the same. Impacts of continuing UTTR operations are discussed in Chapter 5.0, Cumulative Impacts.

Under the Proposed Action, daily use of a utility helicopter at DPG would be implemented. The helicopter would be managed within the existing airspace control systems. Impacts would not be significant.

4.9.2.3 Impacts to Railroads

Activities at DPG generate little demand for rail service and no rail lines serve DPG directly. Sidings located within the region are used to meet the occasional need, with trucks or other motorized means of transport used for the final leg of the shipment to and from DPG.

Under the Proposed Action, expansion of DPG's training mission could increase the need for rail service. For example, an expansion of desert training for artillery could trigger an increase in rail use. However, such needs would be infrequent and involve a small number of train movements. The existing rail network has the capacity to accommodate these demands with no expansion and no significant impacts to railroads would occur.

4.9.2.4 Impacts to Transportation of Materials and Wastes

The activities associated with the Proposed Action would increase the quantity of many types of materials and wastes shipped to or from DPG. The changes in materials and wastes quantities may require a relatively small increase in the number of shipments in some program areas.

The Proposed Action would not result in major changes to the routes used for ground shipment of materials and wastes, mode of transport, and procedures used to manage these shipments.

Transportation of materials and wastes is as described in Section 3.9.5, Transportation of Materials and Wastes. Ground shipment using commercial carriers would continue to be the primary mode of shipment for most materials and wastes. Impacts to transportation of materials and wastes would not be significant under the Proposed Action.

4.9.2.5 Compliance with Regulations and Management Plans

Proposed Action mission and support activities involving transportation of materials and wastes to and from DPG would not violate existing regulations or laws. All

activities would continue to be conducted in accordance with an extensive regulatory framework including Army regulations and U.S. Department of Transportation requirements.

Existing DPG material and waste transportation procedures would not need to be changed with implementation of Proposed Action activities. As discussed in Section 2.1.3.3, Management Plans, DPG has implemented a variety of management plans to ensure compliance with applicable Federal and state laws and regulations, and to provide adequate facilities and safeguards for DPG personnel and the DPG community. Existing management plans would not need to be changed with regard to transportation of materials and wastes under the Proposed Action.

Appendix A, List of Environmental Laws, Permits, and Management Plans, includes a list of applicable transportation laws, permits and management plans that are applicable to DPG operations.

4.9.3 Impacts of the No Action Alternative

Under the No Action Alternative, little change would occur in the existing relationships between DPG's mission and the on- and off-installation transportation facilities. On-installation paved and unpaved roads provide adequate capacity to meet existing testing and training needs and DPG would continue to maintain those facilities based on the level of use, road conditions, and funding available for that purpose. DPG-related demand on the nearby off-installation highway network is projected to remain below 1,000 vehicles per day. These levels of demand are substantially below capacity of these roadways and would not generate road maintenance burdens.

MAAF would continue operations in support of various air transportation needs for both the testing and training missions, but it would remain primarily an emergency recovery airfield supporting air training at the UTTR. Major capital investments in MAAF would not occur, restricting its potential use for other missions. Civilian aviation traffic and operations at nearby civilian airports would continue to face restrictions on the use of airspace over DPG and occasional operational restrictions related to air training or other special events at DPG or the UTTR.

4.9.4 Impacts of the Decreased Mission Alternative

The Decreased Mission Alternative could result in cutbacks in the technical work force at DPG, which in turn could reduce the installation's resident population. If of sufficient magnitude, these declines could trigger additional loss of family housing and other cutbacks in the installation operations work force. At some undetermined

threshold, decreases in DPG's mission could even bring about the closure of all family housing at English Village, with accompanying implications for the on-installation schools, community and recreation facilities, and other ancillary functions.

Under this alternative, the most noticeable change for transportation resources would be decreases in highway traffic generated at DPG, as well as on the external highway network. With traffic on these highways already substantially below capacity, the decreases would be of little consequence to the traveling public. Maintenance requirements for the Utah Department of Transportation could decline with the traffic reduction. A reduction in the level of ground training would cut the already infrequent incidence of DPG-related travel delays and inconvenience experienced by the general public on the regional highway network.

The Decreased Mission Alternative would not include a reduction in DPG's support of air training. Because the UTTR airspace is one of the largest and most important settings for air training in the continental U.S., airspace designations and the restrictions on civilian flights over DPG would likely remain unchanged.

4.9.5 Impacts of the Maximum Expanded Mission Alternative

Under the Maximum Expanded Mission Alternative, substantial increases in DPG activity levels would occur and new facilities would be constructed. Both the permanent and construction work forces would expand, raising the level of daily commuting to and from DPG. Additional shipments of supplies and materials would be required, particularly in conjunction with facility construction. All of these factors would contribute to increased highway traffic on on-installation and nearby off-installation roads.

However, any foreseeable level of expansion falls within the limits of activity previously supported by DPG within the past several decades. Since the transportation requirements associated with those previous activity levels are largely responsible for defining the established highway network, it is reasonable to conclude that this alternative would not result in significant capital construction needs for expanded highway capacity. Even with a substantial increase in traffic volumes, no noticeable congestion impacts would be anticipated because of the existing capacity and the limited amount of development elsewhere along SR 196 and SR 199. Higher traffic volumes may necessitate additional highway maintenance expenditures.

Additional capital investment in airfield repairs and modernization could also occur. However, no new major aviation facilities are envisioned. Airspace restrictions and

the need for ongoing coordination between DPG, HAFB, and air traffic control of civilian flights in the general proximity of DPG would continue.

The Maximum Expanded Mission Alternative would not result in major impacts on the railroad system. As with the Proposed Action, increased training could result in additional use of the rail system for transporting artillery, construction and other motorized equipment and materiel, but the need to build a rail spur to DPG is not foreseen.

4.9.6 Mitigation Measures

The major upgrade of MAAF is the only identified significant impact to transportation resources or activities. This impact is considered beneficial to transportation resources and does not require mitigation measures. Existing and foreseeable demands on other transportation resources are within established use and capacity parameters because the existing systems evolved to serve DPG when activity levels were substantially higher than baseline levels. Protocols are in place for ongoing communication and coordination with local law enforcement, regional air traffic control, and other interested parties regarding transportation-related matters. Regulations are also in place governing specific transportation requirements. For instance, all shipments via commercial carrier must carry placards identifying explosive, flammable, or hazardous cargo. Also, convoy movements on public highways have lead and trailing vehicles with flashing lights and signs advising motorists of the convoy, as well as other mitigation measures. Therefore, no additional mitigation measures for traffic and transportation impacts are necessary.

4.9.7 Residual Impacts

The transportation impacts associated with the Proposed Action and alternatives simply reflect changes in the use of existing facilities, including relatively infrequent and temporary demands on transportation networks and systems designed to be flexible and dynamic. In many instances, the capacity to handle any anticipated future transportation demands have already been demonstrated in the past when DPG had a substantially larger work force and a larger resident population. Residual impacts to traffic and transportation are not significant.

4.10 Impacts to Visual Resources

The Proposed Action and alternatives would result in impacts to the visual resources summarized in Section 3.10, Visual Resources. However, these impacts to visual resources would be necessary to carry out DPG's missions and are not considered significant.

4.10.1 Significance Criteria

Impacts must be evaluated with criteria to determine whether or not they are significant. Potential impacts to visual resources would be considered significant if the Proposed Action or alternatives were to substantially degrade the natural or constructed physical features at DPG that provide the DPG landscape its character and value as an environmental resource.

4.10.2 Impacts of the Proposed Action

Primary among the factors considered in the evaluation of visual resource impact is the issue of how visible the changes are from viewpoints both on-installation and off-installation. The magnitude of impact would be primarily determined by:

- Number of viewers affected
- Viewer sensitivity to these changes
- Distance and atmospheric conditions of viewing
- Compatibility with existing land uses

4.10.2.1 Impacts to the Quality of Visual Resources

Any activity that introduces new or changed forms, lines, colors, and textures to the environment would have an impact on the visual character and quality of the area. Intrusions into the natural visual environment from DPG activities as discussed in Section 3.10.4, Regional Visual Resources, would continue with the Proposed Action. These activities include security lighting, smoke, and obscurant, and illuminant testing, and dust generation from vehicles and some training exercises. Except for security lighting, these activities would occur at increased frequencies and/or intensities under the Proposed Action. Intrusions may be visible on the installation and from certain viewpoints off-installation. Although those seeking a wilderness experience, hiking, backpacking, or camping in these areas may be distracted or annoyed by the security lighting and illuminants testing at night, the remoteness, existing land uses of the region, and distance from DPG limit the number of users that could be affected.

Impacts from testing activities would be minimized because many of these activities can only be conducted under certain prescribed meteorological conditions such as specified atmospheric stability, wind direction, wind speed, and cloud cover. Smoke, obscurant, and illuminant tests are designed to ensure that hazardous conditions do not extend beyond DPG boundaries. DPG performs modeling prior to tests that would use new materials or new release conditions and tests occur on designated test ranges. Releases of smokes and obscurants must be at least 2 km (1.2 mi) from the

DPG boundary (UDAQ, 1989). Therefore, no major clouds of smoke would be expected to pass outside the installation's boundaries.

Dust is generated at DPG through activities such as vehicle movement on dirt roads, ground training exercises, and construction/demolition activities. Visibility can be defined as the degree to which air pollutants obscure a person's ability to see a given reference point through the atmosphere. The more a reference point is obscured, the poorer the visibility. Depending upon climatic conditions, DPG-related dust would generally be short-term, localized to a relatively small area, and intermittent in nature. Reduction in visibility from dust is also a natural occurring event because of the arid nature of much of DPG's land. As discussed in Section 4.3, Impacts to Air Resources, DPG's activities generate fine particulate matter, which contributes to local and regional visibility impairment. The amount of impairment that results is estimated to be slight and is not considered a significant impact to visual resources.

Any new facilities or buildings constructed at DPG as part of the Proposed Action may have visual and aesthetic impacts. As noted in Section 3.10.3, Constructed Modifications to the Natural Setting, facilities at DPG are designed for their safety and functionality, not for their visual appeal. However, new facilities would normally be constructed in or near the various DPG activity centers, away from the installation boundaries and would therefore only be visible to DPG personnel or others who understand and accept the purpose of DPG. Therefore, the visual effects of new facilities would be negligible.

Under the Proposed Action, daily use of a utility helicopter would be implemented. This helicopter could be visible to persons within or adjacent to DPG. While daily helicopter use would represent a new visual intrusion into the natural environment, it would be consistent with DPG's mission and activities.

All of the above activities occurring as part of the Proposed Action that have potential visual resource impacts are compatible with DPG's existing land uses. These land uses are discussed in Section 3.7, Land Use and Access.

Both the large installation area where these activities can occur and DPG's remoteness reduce the number of viewers affected by these activities and the number of viewing locations where these activities can be observed.

Therefore, the primary viewers of the visual impacts resulting from these activities are DPG personnel who are familiar with the purpose and process of these activities. As a result, these individuals tend to have reduced sensitivities to these potential visual impacts. Therefore, the Proposed Action would not substantially degrade the

quality of visual resources at DPG and visual resource impacts are not considered significant.

4.10.2.2 Compliance with Regulations and Management Plans

There are no regulatory requirements, plans, or processes for measuring impacts to visual resources at DPG. However, as summarized in Section 3.10.5, Comparing DPG Lands to BLM's Visual Resources Management System Classifications, BLM's VRMS can be used to assess whether it would be acceptable to conduct Proposed Action activities within the land class assigned by VRMS. There is no regulatory requirement for DPG to conform to the BLM's VRMS. This information is presented only as a way of estimating potential impacts.

DPG's lands were evaluated to be similar to Class III and IV lands according to the BLM VRMS as discussed in Section 3.10.5, Comparing DPG Lands to BLM's Visual Resources Management System Classifications. Most of DPG's land holdings would be identified as Class IV land, which allows for major modifications to the existing character of the landscape.

The types and magnitude of impacts to visual resources identified in Section 4.10.2.1, Impacts to the Quality of Visual Resources, would be consistent with allowed modifications with Class IV lands. Therefore, DPG's Proposed Action would be in conformance with BLM's VRMS if this visual impact assessment system were to apply to DPG lands.

4.10.3 Impacts of the No Action Alternative

Under the No Action Alternative, DPG's Proposed Action would not be implemented. Therefore, any potential changes to the visual environment associated with the Proposed Action would not occur. However, DPG would continue to operate under its baseline mission with this alternative, and baseline visual conditions including DPG's baseline activities would continue to exist.

4.10.4 Impacts of the Decreased Mission Alternative

Under the Decreased Mission Alternative, visual impacts would still result from the various DPG and tenant activities, but the scope and magnitude of impacts to visual resources would be lower than those associated with the Proposed Action. Evidence of human presence in and around DPG would still result in both short-term and long-term changes to the visual environment.

4.10.5 Impacts of the Maximum Expanded Mission Alternative

Under the Maximum Expanded Mission Alternative, impacts to visual resources would occur at a higher rate and magnitude than any other alternative. However, these impacts would be necessary to implement the expanded mission, and impacts to visual resources would still be considered as nonsignificant.

4.10.6 Mitigation Measures

The visual resource impacts associated with implementation of DPG's mission cannot be avoided. However, the large amount of DPG land holdings and the existing land use framework within and adjacent to DPG serve to limit the number of people who are affected by visual impacts. An Installation Design Guide was prepared as part of the SDP. The Installation Design Guide allows consideration of visual resources in construction and maintenance of DPG facilities and landscaping. Therefore, no mitigation measures are proposed.

4.10.7 Residual Impacts

DPG's continued mission would lead to a variety of impacts to visual resources in and around DPG. However, the existing environment for visual resources would not be substantially altered by DPG's continued operation under the Proposed Action, and the panoramic, scenic, open and expansive nature of DPG's setting would be retained. Those visual resource impacts that cannot be avoided are a necessary implication of carrying out DPG's mission. Residual impacts to visual resources in and around DPG are generally short-term and intermittent, and are not considered significant.

Many persons residing or working in and around DPG would support the continued presence of DPG and understand the associated visual impacts. Persons who are not supportive of DPG's continued presence may be annoyed by the resulting visual impacts.

4.11 Noise Impacts

This section analyzes the potential noise impacts of the Proposed Action and alternatives. The criteria used to evaluate whether these potential impacts are considered significant and mitigation measures that could be implemented to reduce any adverse impacts are presented. The baseline noise environment at DPG is described in Section 3.11, Noise. Noise impacts would continue to occur at DPG through implementation of the mission and support activities associated with the Proposed Action and the various alternatives. Noise impacts from these mission and

support activities cannot be eliminated, but can be managed and mitigated to nonsignificant levels.

The noise sources at DPG characterized in Section 3.11, Noise, include the following:

- Aircraft noise
- Detonations from conventional munitions, ECRT, and other testing activities; ground training activities; and EOD activities
- Artillery firing from conventional munitions and smoke, obscurant, and illuminant testing activities, and ground training activities
- Demolition and construction activities

Aircraft noise and sonic booms are impacts from UTTR operations conducted by the AF, and are discussed in Chapter 5.0, Cumulative Impacts. Demolition and construction activities are discussed in Section 4.7.2.5, Impacts from Construction and Demolition of Buildings and Facilities at DPG. Impacts from the other noise sources identified above are summarized below.

4.11.1 Significance Criteria

Impacts must be evaluated with criteria to determine whether or not they are significant. Noise impacts resulting from the Proposed Action or alternatives would be considered significant if they were to cause:

- Substantial impacts to people, including health impacts and changes to the human social and cultural environment
- Substantial economic impacts
- Substantial impacts to structures
- Substantial impacts to wildlife
- Substantial noncompliance with applicable noise regulations or guidelines

4.11.2 Impacts of the Proposed Action

This section evaluates noise impacts with these significance criteria in detail for the Proposed Action. Noise impacts result from the relationships among the noise source, the pathway of the noise, and the locations of the noise receptor(s) such as

people living or working in and around DPG. Noise from artillery firing associated with ground training would continue at DPG. Under the Proposed Action, these activities would increase as described in Section 2.2.2.1, Ground Training. Noise impacts from artillery firing are difficult to quantify due to sound focusing. Focusing of an acoustic shock wave is caused by variations of the speed of sound in the atmosphere. These variations are primarily caused by two meteorological parameters, temperature and wind. As with artillery firing, changes in weather, topography, and other factors can greatly influence noise levels associated with detonations. Detonations occurring near or on the ground produce a pressure wave that propagates radially in all directions. The magnitude of the wave is influenced by the amount of explosives and distance the charge was above or below the surface. As the pressure wave radiates from the detonation site, it is influenced by atmospheric conditions which may cause the sound to bend upward or downward. For some atmospheric conditions there are areas where there is a shadow and the sound levels are low, while at farther distances, where sound waves are bent down, sound levels are higher. DPG models potential large noise events from detonations and considers meteorological conditions in estimating noise impacts.

DPG's ICUZ analysis indicated that high-amplitude blast noise contours extend approximately 1 km (0.6 mi) from the firing points on DPG (DPG, 1987a). The DEEPLOOK EA noted that although some high-explosive bombs, which probably have a noise contour beyond 1 km (0.6 mi), would be detonated during DEEPLOOK, all firing areas would be located a minimum of 3 km (1.8 mi) from any residential, church, school, and military office areas. The EA concluded that this distance would preclude any significant noise impacts due to the exercise (Environmental Resource Management, 1996). DEEPLOOK is an example of a global training exercise and is described in Section 2.1.6.1, Ground Training.

The detonations associated with ground training, conventional munitions and ECRT testing activities, and EOD would also continue to result in identifiable noise impacts at DPG. Under the Proposed Action, these activities would substantially increase, resulting in an increase in the frequency of noise impacts. The magnitude of noise from detonations is not expected to change appreciably from baseline conditions. Noise from detonations or ground training exercises would rarely be heard in areas off-installation.

A new mobile source of noise at DPG would be the proposed use of a utility helicopter. Use of the helicopter would occur on a daily basis and could occur throughout DPG. Depending on flight patterns and uses, the utility helicopter could be heard by many persons working or residing at DPG.

Noise from activities at DPG occurs on an irregular basis. There is no regular pattern of noise events, although noise from aircraft occurs most frequently compared to other noise sources.

It is possible that a noise receptor may experience "combined" noise events, in which noise is heard by a person from two or more sources at or near the same time. While the location and magnitude of these combined events cannot be predicted because of the irregular nature of noise events and patterns, it is likely that one of the noise sources in any combined noise event would include aircraft noise and/or sonic booms from AF activities at the UTTR. In these situations, the aircraft noise/sonic booms would likely be the dominant noise source. Any combined noise events would be short-term and generally only occur on-installation.

Noise from aircraft (including the new utility helicopter), artillery firing, detonations, and demolition and construction activities could potentially impact the following:

- People
- Economics
- Structures
- Wildlife

4.11.2.1 Impacts to People

Noise can be a public health hazard, causing hearing impairment and undue psychological stress. Extreme noise environments sometimes include direct effects where people are subjected to very loud impulsive noise events, such as closed-room detonations, or high noise levels over extended periods of time, such as from a riveting machine or pneumatic hammer operations. These loud impulsive events can have a severe effect on auditory capabilities and the health of the ear. Federal workplace standards for hearing protection allow a time-averaged sound level of 90 dBA over an 8-hour working period, which is the equivalent of an average of 85 dBA over a 24-hour period. This equates to a DNL value of 76 dBA. DPG's noise environment would be below this threshold in most locations. As shown by the Environmental Noise Monitoring Data presented in Section 3.11.3, DPG Noise Sources and Characterization, none of the eight sites measured at DPG exceeded 76 dBA and the average was 60.9 dBA. Hearing conservation programs are in place at DPG that govern safe practices in all areas close to noise generating activities (DPG, 1987a). Therefore, noise-induced health effects are minimal.

The level of annoyance is a measure of adverse reactions to noise. As described in Table 3.11-1, Relationship of Noise Zone and Noise Limits, less than 15 percent of

people are highly annoyed by noise resulting from activities that has an ADNL less than 65 dBA. Less than 15 percent of people are highly annoyed by impulsive noise, such as detonations, that has a CDNL of less than 62 dBC. DPG activities are below these thresholds at which significant adverse impact would occur.

Also, the more familiar people are with the details of training and testing activities at DPG, including their design, equipment, and goals, the more likely they are to be interested in all aspects of an activity, rather than reacting specifically to its noise. Nonetheless, the unique characteristics of individuals make it virtually impossible to accurately predict how any one person would react to a noise event. Noise impacts to people from the Proposed Action are not considered significant. Mitigation measures to manage noise impacts and reduce their effects are discussed in Section 4.11.6, Mitigation Measures.

4.11.2.2 Economic Impacts

Noise could have potential indirect impacts on the local and/or regional economy by making an area undesirable for certain land uses. These concerns would generally occur only in heavily populated areas around airports or large military sites that are characterized by substantial numbers of daily aircraft operations. Overall, in the largely undeveloped environment of DPG and its environs, economic impacts from noise are not significant.

4.11.2.3 Impacts to Structures

Noise events can cause structural vibrations and the secondary rattle of hanging pictures and other possessions. These events are not atypical in and around DPG, and would continue with the Proposed Action. After an initial experience with these effects, affected persons may fear damage to these items. On-installation personnel would tend to be more accepting of the noise-induced vibrations and rattling associated with DPG activities compared to persons off-installation. Noise-induced structural vibrations may also damage aged structural materials in historical structures. Impacts to structures from DPG's Proposed Action would not be significant.

4.11.2.4 Impacts to Wildlife

Noise from DPG activities would be heard by wildlife. The startle effect, in particular, is likely to be experienced by wildlife. Further effects on wildlife are likely because their hearing range is different from that of humans and diverse across different species. In addition, wildlife are typically exposed to other environmental stressors, particularly during reproductive and overwintering periods, that may act

cumulatively with noise impacts. More information on the noise effects on wildlife is provided in Section 4.4, Impacts to Biological Resources.

4.11.2.5 Compliance with Regulations and Management Plans

The Army satisfies its Federal regulatory responsibilities for noise at DPG through implementation of the ENMP. This ENMP is outdated and does not consider noise sources from all DPG activities. There are no State of Utah or local noise controls applicable to DPG activities on- or off-installation. Under the Proposed Action, DPG and UTTR operations would generally continue to be consistent with existing noise control measures and plans.

4.11.3 Impacts of the No Action Alternative

Under the No Action Alternative, DPG's Proposed Action would not be implemented. Therefore, any potential increases in noise associated with the Proposed Action would not occur. However, DPG would continue to operate under its baseline mission with this alternative, and baseline noise conditions including those from DPG's baseline activities would continue to exist.

4.11.4 Impacts of the Decreased Mission Alternative

Under the Decreased Mission Alternative, noise impacts would be lower than those with the Proposed Action. Noise impacts would still result from the various DPG and tenant activities, but noise events would be reduced in the frequency of occurrence. However, the magnitude of individual noise events would probably be the same as that of the Proposed Action.

4.11.5 Impacts of the Maximum Expanded Mission Alternative

Under the Maximum Expanded Mission Alternative, the frequency of occurrence of noise impacts resulting from DPG's future activities would be higher compared to the other alternatives. However, the magnitude of individual noise events would probably be the same as that of the other alternatives.

4.11.6 Mitigation Measures

Because training and testing would continue to be a part of the DPG mission, noise from artillery firing and detonations would continue to be a part of the environment in and around DPG. While the impacts associated with these noise sources cannot be eliminated, they can be managed and mitigated so that their effects are reduced.

Mitigation measures to better understand and manage noise impacts at DPG include:

- Update the ENMP to reflect the current status of DPG missions, programs, activities, and facilities
- Model and monitor noise for testing and training activities that could result in major noise impacts
- Notify the public in advance of DPG activities that could result in major atypical noise impacts

4.11.7 Residual Impacts

The levels of noise generated from DPG and UTTR activities would mirror the level of the activity generating the noise. For example, if noise-generating activity increases, the frequency of these noise events would also increase. While there could be a few new noise sources such as the utility helicopter and an increase in artillery firing and detonations, the primary source of noise in and around DPG would continue to be air training and testing. Air training and testing activities are conducted by the AF, and are not a part of DPG's Proposed Action. Noise impacts from AF air training and testing activities are discussed in Chapter 5.0, Cumulative Impacts.

4.12 Impacts to Health and Safety

This section analyzes the potential impacts of the Proposed Action and alternatives to health and safety at DPG and the surrounding areas. The criteria used to evaluate whether these potential impacts are considered significant and mitigation measures that could be implemented to reduce any adverse impacts are presented. Existing health and safety conditions at DPG are summarized in Section 3.12, Health and Safety.

4.12.1 Significance Criteria

Impacts must be evaluated with criteria to determine whether or not they are significant. Impacts to health and safety would be considered significant if the Proposed Action or alternatives were to:

- Cause a substantial change in the existing occupational health and safety requirements and procedures as prescribed in AR 385-10
- Require substantial new occupational health and safety procedures as prescribed in AR 385-10

- Result in an increased injury/illness incident rate
- Result in public exposure to chemical or biological agents or hazardous materials
- Endanger public health or safety

4.12.2 Impacts of the Proposed Action

Proposed Action mission and support activities were analyzed for potential impacts to occupational health and safety and public health and safety.

4.12.2.1 Impacts to Occupational Health and Safety

Occupational health and safety requirements and procedures are activity-specific as described in Section 3.12.2, Occupational Health and Safety. Activities under the Proposed Action that would require a change to the existing health and safety requirements or result in new health and safety requirements and therefore cause significant impacts follow:

- Use of new chemical or biological agents
- Use of new hazardous materials
- Development of a new laboratory for unidentified potential biological and chemical threats

Occupational health and safety requirements presented in Section 3.12.2.1, Occupational Health and Safety Requirements, are designed to protect the health and safety of workers from exposure to any chemical or biological agent or hazardous material or waste used at DPG. There are no specific new biological or chemical agents or hazardous materials designated under the Proposed Action. However, as operations change, new biological or chemical agents may be introduced at DPG. All new biological and chemical agents and hazardous materials would be reviewed to determine if changes to the health and safety procedures are required or if a new health and safety program should be established. To the extent required by law, additional NEPA documentation will be provided if new biological or chemical agents or hazardous materials are used at DPG.

The Proposed Action for developing a new laboratory for potential biological and chemical threats that have not been identified or characterized could result in the presence of new biological or chemical agents at DPG that are not covered by the existing health and safety requirements. Unidentified potential biological agents may include organisms that would be classified as BL 4 organisms. DPG does not have

facilities designed to protect the health and safety of workers handling BL 4 organisms. It is not DPG's intent to handle BL 4 organisms, but if an emergency arises, DPG would assist to the extent possible. If a substance were determined to be a BL 4 material, it would be contained and shipped to an appropriate facility. Unidentified chemical agents may result in the development of a new decontamination process. The new decontamination process may result in a new hazardous waste stream, which may require new health and safety procedures.

Many of the activities under the Proposed Action are activities that are addressed in existing occupational health and safety requirements and procedures. Activities under the Proposed Action that would not significantly impact occupational health and safety include:

- Increased use of chemical or biological agents already approved for use at DPG
- Increased use of hazardous materials already in use
- New construction or installation of targets for air testing
- Increased levels of existing training and testing activities
- Construction of new buildings
- Use of the new utility helicopter

No activity under the Proposed Action, including increased traffic, should result in an increase in the injury/illness incident rate. The injury/illness incident rates at DPG are described in Section 3.12.2.2, Occupational Health and Safety Program Incident Rates. Increased training and testing under the Proposed Action would increase personnel and activities at DPG. This increase may in turn increase the number of injury/illness incidents that occur. However, the total number of hours worked would also increase. Therefore, the injury/illness incident rate is not expected to change.

4.12.2.2 Impacts to Public Health and Safety

Proposed Action mission and support activities were analyzed for potential impacts to public health and safety. Under the Proposed Action, potential impacts to public health and safety include:

- Accidental release of chemical or biological agents
- Artillery, mortars, and missiles missing their targets
- Uncontrolled wildland fires resulting from training

Accidental Release of Chemical or Biological Agents – Increased use of chemical and biological agents within facilities specifically designed to prevent accidental release of these agents to ambient air would not result in an increased potential for

release of agent to ambient air. The existing engineering, administrative and health and safety controls would continue to protect occupational and public health and safety under normal operating conditions.

However, any accident involving release of chemical or biological agent could result in a significant impact. This section describes potential impacts associated with accidental release of either biological or chemical agent within DPG boundaries.

A literature search was conducted to identify documents that contain accident or risk analyses for activities that may occur or facilities that exist at DPG. Six documents were found to contain these types of analyses. The accident and/or risk analyses identified during the literature search were conducted for baseline activities and existing facilities at DPG. Accident analyses evaluate how likely it is that an accident would occur and risk analyses evaluate who would be affected if an accident occurred. The scenarios analyzed and the findings for the analyses are applicable to the increased activities under the Proposed Action. A summary of the findings for each of these analyses is presented in Table 4.12-1, Summary of Relevant Accident or Risk Analysis Findings from Literature Search. No new accident or risk analyses were conducted specifically for this Future Programs EIS.

Table 4.12-1. Summary of Relevant Accident or Risk Analysis Findings from Literature Search.

Type of Accident or Risk Analysis	Findings	Source of Information
Biological Agents		
Release of biological agent due to testing with biological agents at the Lothar Salomon Life Sciences Test Facility	Estimates show impact only within DPG's boundary and distances of a few miles. This was true for *Coxiella burnetii* and *Botulinum* toxin A.	Dynamac, 1992
Release of biological agent due to testing with biological agents at a BL 3 laboratory	The amount of *Coxiella burnetii*, *Botulinum* toxin A, and RVFV released from the exhaust stack would be negligible and pose no threat to the community, or human or animal populations. There would be minimal or no impacts to laboratory workers due to the release of *Coxiella burnetii*, *Botulinum* toxin A, and RVFV.	DOD, 1989a
Far and near-field earthquakes near the Lothar Salomon Life Sciences Test Facility	The seismic risk analysis indicated that both far and near-field earthquakes could cause considerable damage to the buildings based on ground acceleration and attenuation. The impacts of a shallow earthquake directly underneath the Lothar Salomon Life Sciences Test Facility could result in slight to considerable damage to specially designed structures.	Dynamac, 1992
An aircraft crash into the Lothar Salomon Life Sciences Test Facility	The probability of an airplane from Michael Army Airfield crashing into the Lothar Salomon Life Sciences Test Facility was 6.6×10^{-9} aircraft per year (1 crash every 15 million years).	Dynamac, 1992
Meteorite strike into the Lothar Salomon Life Sciences Test Facility	The probability of a meteorite striking the Lothar Salomon Life Sciences Test Facility was 7.4×10^{-8} impacts per year (1 strike every 14 million years).	Dynamac, 1992
Release of biological agent due to a terrorist attack using biological agent	Impacts to the environment, general population, and laboratory workers due to a release of a biological organism from a terrorist attack are improbable because the events necessary for an attack are unlikely to occur.	DOD, 1989a

Table 4.12-1. Summary of Relevant Accident or Risk Analysis Findings from Literature Search.

Type of Accident or Risk Analysis	Findings	Source of Information
Release of biological agent due to a disgruntled employee attack at a biological defense testing facility	The probability of impacts to the environment and the general population due to a release of a biological organism from the acts of a disgruntled employee is remote because the events necessary for an attack are unlikely to occur.	DOD, 1989a
Chemical Agents		
Release of chemical agent during transportation of chemical warfare material between Deseret Chemical Depot and DPG	The likelihood of a release of chemical agent due to an accident involving transportation and handling of chemical agent material between Deseret Chemical Depot and DPG is remote.	PMACWA, 1998
Release of chemical agent during movement of munitions containing chemical agent for the Munitions Management Device Version Number 1	The greatest potential for impacts downwind would be due to a release of GB or CG during transport of chemical agent munitions from Igloo G to the Chemical Agent Test Chamber. The impacts could extend beyond DPG boundaries.	Wheeler and Wheeler, 1997a
Release of chemical agent during transport of individual munitions from Igloo G to different disposal sites	Health effects are expected at less than 1,180 m for CG and 3,962 m for VX. Fatalities are expected at less than 500 m for CG and 2,000 m for VX.	BIO/WEST, 1990b
Release of chemical agent due to sympathetic detonation of chemical agent filled munitions within Igloo G	Health effects are expected at less than 8,975 m for GB, 8,931 m for HD, 8,100 m for VX, and 1,180 m for CG. Fatalities are expected at less than 400 m for HD, 900 m for GB, 1,300 m for VX, and 500 m for CG.	BIO/WEST, 1990a
Release of chemical agent immediately outside the Bushnell Materiel Test Facility	Greatest potential downwind hazards are presented by GB and GD whose threshold distances are 18.1 km and 8.670 km, respectively. This suggests potential impacts outside the DPG boundary. All other threshold distances for HD, Lewisite, GA, and VX are less than 0.4 km.	Kleinfelder, 1993

CG	phosgene	HD	bis(2-chloroethyl) sulfide (or Distilled Mustard)
DPG	U.S. Army Dugway Proving Ground	km	kilometer(s)
GA	ethyl N,N-dimethylphosphoroamidocyanidate (or Tabun)	m	meter(s)
GB	isopropyl methylphosphonofluoridate (or Sarin)	RVFV	Rift Valley Fever Virus
GD	pinacolyl methylphosphonofluoridate (or Soman)	VX	O-ethyl S-(2-diisopropylaminoethyl) methylphosphonthioate

The results for these accident and/or risk analyses provided probabilities of an accident occurring, such as an airplane crash into the LSTF, or presented distances at which chemical or biological agent could affect individuals within and possibly outside DPG boundaries. Most of the results indicated that probabilities of an accidental release were low or that the impacts would be limited to within DPG boundaries. However, the impacts from an accidental release of chemical or biological agent would be significant and directly impact the environment as well as some individuals within DPG boundaries. In some catastrophic circumstances, persons outside DPG could also be affected.

Artillery, Mortars, and Missiles Missing Targets – Training is an activity projected to increase under the Proposed Action. Increased training at DPG would increase munitions firing at targets within the White Sage Impact Area. Increased firing at the White Sage Impact Area would increase the probability of munitions

missing their target and striking BLM land. This would, in turn, increase the safety risk to the public. The increase in public safety risk would be considered significant.

Uncontrolled Wildland Fires – Increased training at DPG would increase the number of wildland fires at DPG associated with training. The percentage of wildland fires associated with training is unknown. However, any increase in wildland fires would significantly impact occupational and public health and safety.

4.12.2.3 Compliance with Regulations and Management Plans

DPG is in compliance with all applicable regulations and management plans, as required by the Army. The Army periodically conducts audits and reviews of DPG operations to ensure compliance with established procedures. The operation is audited from a programmatic documentation standpoint and a procedure implementation standpoint. A list of audits and reviews conducted at DPG is in Section 3.12.2.3, Occupational Health and Safety Program Audits. These audits and reviews would continue under the Proposed Action.

In the event that DPG changes an established procedure or adds a new chemical or biological hazard to their process, DPG would need to evaluate the situation and determine if the health and safety program is sufficient to address the new hazard.

4.12.3 Impacts of the No Action Alternative

Under the No Action Alternative, DPG's Proposed Action would not be implemented. There would be no changes to the baseline occupational health and safety requirements or procedures and the injury/illness incident rate should not increase. The results for the accident and/or risk analyses discussed in Section 4.12.2.2, Impacts to Public Health and Safety, are for baseline DPG activities and facilities. The probability of an accidental release of chemical or biological agent is low. However, the impacts to public health and safety from any accidental release of chemical or biological agent due to the No Action Alternative would continue to be significant and directly impact the environment as well as some of the individuals within DPG boundaries. In some catastrophic circumstances, persons outside of DPG could also be affected.

4.12.4 Impacts of the Decreased Mission Alternative

Under the Decreased Mission Alternative, there would be no changes to the baseline occupational health and safety requirements or procedures and the injury/illness incident rate should not increase. The probability of an accidental release of chemical or biological agent would decrease under the Decreased Mission

Alternative. However, the impacts to public health and safety from any accidental release of chemical or biological agent due to the Decreased Mission Alternative would be significant and directly impact the environment as well as some of the individuals within the DPG boundaries. In some catastrophic circumstances, persons outside of DPG could also be affected.

4.12.5 Impacts of the Maximum Expanded Mission Alternative

Under the Maximum Expanded Mission Alternative, impacts to occupational health and safety would be the same as that of the Proposed Action. New activities or facilities that would result in a new chemical or biological agent at DPG would significantly impact occupational health and safety. Increasing baseline activities covered under the existing health and safety program would not impact occupational health and safety. The probability of an accidental release of chemical or biological agent would increase slightly. The impacts to public health and safety from any accidental release of chemical or biological agent due to the Maximum Expanded Mission Alternative would be significant and directly impact the environment as well as some of the individuals within the DPG boundaries. In some catastrophic circumstances, persons outside of DPG could also be affected.

4.12.6 Mitigation Measures

Occupational health and safety policies, requirements, and procedures are designed to protect the health and welfare of all workers, and to protect the environment. Because many of the requirements and procedures are based on the materials handled in the workplace, the introduction of any new hazardous material, or chemical or biological agent would require a thorough review and potential revision of the procedures in place to ensure continued protection of worker health and safety.

Under the Proposed Action, biological or chemical substances that have not been identified or characterized could be brought to DPG. It is not DPG's intent to handle BL 4 organisms, but if an emergency arises, DPG would assist to the extent possible. If a substance were determined to be a BL 4 material, it would be contained and shipped to an appropriate facility.

DPG is adhering to Army and Federal regulations, installation-specific SOPs, and health and safety programs relating to testing, transportation, and disposal of chemical or biological agents. Because these requirements and procedures are designed to prevent accidents, no additional mitigation measures are necessary for accidents. DPG should continue to enforce speed limits to minimize injury as a result of vehicular accidents.

In addition several emergency evacuation plans are in place at DPG and in Tooele County, UT as described in Section 3.12, Health and Safety. These plans are designed to maximize efficient response to an accidental release of chemical or biological agent and to minimize consequences of such a release. Periodic evacuation exercises for all plans are conducted and would continue to ensure that the plans could be rapidly implemented and function as designed. Expansion of the existing Fire Protection Mutual Aid Agreement Between Tooele County and DPG to include the county in evacuation exercises is also recommended.

The recommended mitigation measures for artillery, mortars, and missiles impacting public health and safety are:

- Thoroughly review all target locations in the White Sage Impact Area
- Explore the potential need to obtain additional land around the White Sage Impact Area from BLM to act as a buffer for existing targets

Mitigation measures for impacts caused by fires include:

- Manage all fires in accordance with the DPG Fire Management Plan
- Obtain financial compensation from training missions for fire management according to the MTAMP and the INRMP

4.12.7 Residual Impacts

Residual impacts for occupational and public health and safety could occur as long as DPG continues to transport, use, store, and dispose materials and wastes on-installation. Although the probability of an accident involving uncontrolled release of chemical or biological agent is low, it is not, nor would it reach zero.

4.13 Impacts to Materials and Wastes

This section analyzes the potential impacts to materials and wastes from the Proposed Action and the various alternatives. The criteria used to evaluate whether these potential impacts are considered significant and mitigation measures that could be implemented to reduce any adverse impacts are presented. Baseline materials and waste conditions are presented in Section 3.13, Materials and Wastes.

4.13.1 Significance Criteria

Impacts must be evaluated with criteria to determine whether or not they are significant. Impacts to material and waste resulting from the Proposed Action or alternatives would be considered significant if one or more of the following occurs.

- Existing material storage or RCRA-permitted storage space would be inadequate to accommodate any increase in material or waste volume.
- New material is introduced or a new waste stream is generated that would require substantial special storage or handling considerations above what is presently managed at DPG.
- New material or waste streams are introduced that would require substantial development of new SOPs and management plans.
- Material/waste volume increase or new material/waste is introduced that would cause DPG to be substantially out of compliance with Federal, state, or local environmental regulations.
- Material/waste volume increase or new material/waste is introduced that would require the application for additional environmental permits or revisions to existing permits to comply with Federal, state, or local environmental regulations.

4.13.2 Impacts of the Proposed Action

This section evaluates impacts to materials and wastes with these significance criteria in detail for the Proposed Action. Increases in materials and wastes, as a result of the Proposed Action, were assessed by evaluating impacts to the baseline conditions for DPG's capacity to properly handle and store materials/wastes and DPG's management system for materials and waste.

Impacts of the Proposed Action were considered for all the materials and wastes identified in Section 3.13, Materials and Wastes. Impacts to materials are evaluated in Section 4.13.2.1, Materials, and include the following materials:

- Asbestos
- Biological agents
- Chemical agents
- Biological and chemical simulants
- Hazardous materials
- Munitions and energetics

- Pesticides, herbicides, and rodenticides
- Petroleum fuels
- PCBs
- Radioactive materials
- Smokes, obscurants, and illuminants

Impacts to wastes are evaluated in Section 4.13.2.2, Wastes, and include the following wastes:

- Asbestos waste
- Biological agent-related waste
- Chemical agent-related waste
- Hazardous wastes
- Medical-related waste
- Munitions and energetic wastes
- Pesticide, herbicide, and rodenticide wastes
- Petroleum fuel-related waste
- PCB waste
- Radioactive waste
- Smoke, obscurant, and illuminant-related waste
- Solid wastes

4.13.2.1 Materials

Estimated annual material usage changes resulting from the Proposed Action are described in the subsections for each material.

Asbestos – As of February 1999, approximately 70 DPG buildings had some asbestos containing materials and 20 buildings had been completely abated of asbestos (Schafer, 1999). It is unlikely that asbestos containing materials would be used in future building construction at DPG. Based on the abatement of asbestos containing materials and the low probability that asbestos or asbestos containing materials would be used in the future at DPG, there would be no need for additional storage, management plans, or compliance with additional regulations. There would be no significant impact to asbestos materials from the Proposed Action.

Biological Agents –The Proposed Action is expected to result in an increase in biological agent use for indoor testing purposes, although the amount of increase under the Proposed Action from the baseline amount is a very small volume. Material levels used for each test are anticipated to decrease because of the increased sensitivity in biological defense detector equipment. DPG's baseline capacity for

storage and management plans for handling, storage, and transportation should not be affected by these volume increases (Parker, 1999). Therefore, the Proposed Action is expected to have no significant impact to biological agents.

The proposed development of a new laboratory for unidentified potential biological and chemical threats could result in the presence of new biological or chemical agents at DPG that are not covered under existing SOPs or management plans. Unidentified biological agents may include organisms that could have significant impact on DPG's storage capacity and management plans.

Introduction of unknown biological agents may require new Federal, state, and local permitting. Acceptance and testing of unknown biological agents would meet the significance criteria and would result in a significant impact.

Chemical Agents –The Proposed Action is expected to result in a substantial increase in the amount of chemical agent for indoor testing. The increase in chemical agent under the Proposed Action, while large in percentage terms, remains small in volume. However, Chemical Test Division personnel have indicated the existing storage capacity for chemical agent would be sufficient for this increase and no procedures, plans, and permits would need to be changed. This increase in indoor chemical testing would not result in a significant impact (Brimhall, 2000).

The Proposed Action includes the possibility for developing a new laboratory for unknown chemical agent threats. This new laboratory may result in a need for significant changes to SOPs and management plans, or require new permits and would result in a significant impact.

Biological and Chemical Simulants – Under the Proposed Action, the use of simulants for biological and chemical defense testing would decrease slightly as a result of increased sensitivity of test equipment. The existing storage capacity would be sufficient and no procedures, plans, and permits would need to be changed. This increase in biological and chemical simulant testing would not result in a significant impact to materials or wastes based on the significance criteria (Brimhall, 2000). Potential impacts to air quality and biological resources are evaluated in Sections 4.3, Impacts to Air Resources and 4.4, Impacts to Biological Resources.

Hazardous Materials – The supply division documented all materials received at DPG in 1996, 1997, and 1998, including hazardous material, in a central supply system. The supply system database did not have a specific category for hazardous materials. The hazardous material quantities listed in the SPCCP/ISCP (AGEISS, 2000a) were used to develop the baseline hazardous material quantities.

Under the Proposed Action, a maximum 5 percent increase in hazardous material managed through the supply system could be expected. The existing supply room has approximately 72 sq m (800 sq ft) of storage space and should be sufficient to handle the 5 percent increase (Humphrey, 2000). Based on the slight volume increases and DPG's capability of handling this increase with the existing storage capacity and management system, use of hazardous materials under the Proposed Action should not cause a significant impact.

Munitions and Energetics – The number of munitions under the Proposed Action would increase substantially. However, the existing storage capacity should be adequate for this increase and no additional procedures, plans, or permits would need to be developed. Use of munitions and energetics under the Proposed Action should not cause a significant impact.

Pesticides, Herbicides, and Rodenticides – Pesticide, herbicide, and rodenticide use would remain the same as baseline under the Proposed Action (Hancock, 2000), or may be reduced under an Army goal of reducing pesticide, herbicide, and rodenticide use by 50 percent (Pitt, 2000). Approximately 84 sq m (900 sq ft) of storage space, which is 75 percent full, is used to store pesticides, herbicides, and rodenticides. This storage space would provide adequate capacity under the Proposed Action. Since there would be no increase in pesticide, herbicide, and rodenticide use, there would be no significant impact to these materials from the Proposed Action.

Petroleum Fuels – Petroleum fuel use is not expected to significantly increase under the Proposed Action. The existing capacity for petroleum fuel storage at DPG would be adequate even if the Proposed Action were to result in a 25 percent increase in use (Bowers, 2000). Because petroleum fuel use would not significantly change and there is sufficient storage for the fuel, there would be no significant impact to petroleum fuels from the Proposed Action.

Polychlorinated Biphenyls – DPG is attempting to remove all PCB-containing equipment from the installation (Craig, 1996). Transformers and fluorescent light ballasts are the only types of PCB-containing equipment remaining at DPG (Hancock, 2000). No new PCB-containing materials would be brought on-installation as a result of the Proposed Action, and no significant impact would result.

Radioactive Materials – The only radioactive materials at DPG consist of sealed sources in laboratory equipment and specialized gun sights. The number of instruments and gun sights containing radioactive materials stored at DPG is low (approximately 20). The amount of radioactive sources would remain constant or

slightly decrease under the Proposed Action because there is not a great need for these materials (McBride, 2000b). Because the use of radioactive sources and sights would remain constant, there would be no significant impact to radioactive materials from the Proposed Action.

Smokes, Obscurants, and Illuminants – Smoke, obscurant, and illuminant use would increase in all of its applications at DPG under the Proposed Action. No new smoke, obscurant, or illuminant materials are expected to be used under the Proposed Action, and the increases in volume would be accommodated with the existing storage capacity. No new procedures, plans, or permits would be necessary under the Proposed Action. Increases in smoke, obscurant, and illuminant materials would not result in a significant impact under the Proposed Action. Impacts to air and biological resources are evaluated in Sections 4.3, Impacts to Air Resources, and 4.4, Impacts to Biological Resources, respectively.

4.13.2.2 Wastes

Changes in the amounts of wastes generated resulting from the Proposed Action are described in the subsections for each waste.

Asbestos Waste – The DPG asbestos removal program would continue in the future, and would continue to produce asbestos wastes at approximately the same volume under the Proposed Action. The approximately 70 DPG buildings which still contain asbestos materials would be remediated on an as-needed basis (Schafer, 1999). The rate of asbestos waste generation would not increase, unless funding allows it. Asbestos wastes are disposed of in the English Village Landfill, and the landfill capacity would easily be able to accommodate this waste (Hancock, 2000). DPG's Asbestos Management Plan (Lewis, 1996) would be the guidance used to handle the asbestos waste. There would be no significant impact to asbestos waste from the Proposed Action.

Biological Agent-Related Waste – Biological agent-related wastes are autoclaved. After autoclaving, these wastes are considered to be standard solid wastes and can be disposed of at the English Village Landfill (Parker, 2000). Air filters in the LSTF air filtration system and in the biosafety cabinets are also autoclaved and disposed of in the landfill (Parker, 1999). Under the Proposed Action the volume of biological agent-related waste is expected to increase (Parker, 2000). The landfill capacity can accommodate the projected future volume of biological agent-related waste. No significant impact would result due to biological agent-related waste.

Chemical Agent-Related Waste – The increase in volume of chemical agent use under the Proposed Action represents a substantial increase from baseline operations.

This would likely result in an increase in test related chemical agent-related waste. However, CHWSF personnel have indicated the existing capacity at the CHWSF would be sufficient for this increase and no procedures, plans, and permits would need to be changed. This increase in chemical agent testing would not result in a significant impact to waste (Brimhall, 2000).

Other chemical agent-related wastes are generated from the operation of special programs such as treatability studies. Waste generated by these programs may not be handled by the CHWSF but may be handled and disposed separately.

It is assumed that special programs would continue at DPG. Some special programs wastes would continue to be handled and disposed separately. The projected increase in chemical agent-related waste related to special programs would not result in a significant impact to waste.

Hazardous Wastes – All hazardous wastes are tracked in a database by CHWSF. Hazardous wastes covered in this section include:

- Charcoal filters
- Corrosives
- Flammables
- Laboratory chemicals
- Paints and thinners
- Petroleum, oils, and sludges
- Photo processing chemicals
- Solvents

Wastes generated by chemical agent testing; munitions and energetics; petroleum fuels from AST and UST spills and cleanup; smokes and obscurants; and IDW and waste generated from cleanup under environmental programs such as IRP and RCRA Closure programs are discussed in separate subsections and are not included in the volume estimates for hazardous wastes. Petroleum waste from oily rags, motor pools, diesel fuel, gasoline, jet fuel, fuel filters, and oily rags that have been coded as a RCRA-related waste are considered to be hazardous waste and are included under the category of petroleum, oils and sludges.

Chemical inventory reduction and the concerted efforts to minimize hazardous materials through the pollution prevention program would be continued, thereby reducing the generation of hazardous wastes from off-specification and out of date chemicals. Also, since the HSMS and the CHWSF database systems are actively

tracking hazardous materials from cradle to grave, the likelihood of encountering abandoned chemicals would decrease.

Under baseline conditions, the CHWSF is able to store 50 to 60 percent more hazardous waste than they are handling (Lawrence, 2000). Based on the hazardous waste programs to reduce hazardous waste and the capacity of the CHWSF, there would not be a significant impact on hazardous waste storage from the Proposed Action.

Medical-Related Wastes - Medical-related wastes are autoclaved, these wastes are considered to be standard solid wastes and can be disposed of at the English Village Landfill (Castro, 1997). Under the Proposed Action the volume of medical-related waste is not expected to increase. The landfill capacity can accommodate the projected future volume of medical-related waste. No significant impact would result due to medical-related waste.

Munition and Energetic Waste – The existing storage capacity should be adequate for the increase under the Proposed Action for munition and energetic waste and no additional procedures, plans, or permits would need to be developed. There would be no solid waste impact to munitions and energetic waste from the Proposed Action.

Pesticide, Herbicide, and Rodenticide Wastes – DPG attempts to completely use up all pesticides, herbicides, and rodenticides (Pitt, 2000). In the event that small amounts of waste are produced, the CHWSF would manage the waste and accommodate the waste at their storage facility until it is transported off installation for disposal. Due to the low amounts of pesticide, herbicide, and rodenticide wastes that would be generated, there would be no significant impact to these wastes from the Proposed Action.

Petroleum Fuel-Related Waste – Petroleum fuel-related wastes are generated from petroleum spills and cleanup of ASTs and USTs. The use of petroleum products could increase by 25 percent with no significant impact to storage and handling of fuel product (Bowers, 2000). It is assumed that the resulting increase in petroleum-related fuel waste would similarly have no significant impact from the Proposed Action.

PCB Waste – Transformers containing PCBs were removed from operation at DPG by 1992. All PCB-containing transformers and light ballasts were replaced with non-PCB containing components (Hancock, 2000). Because most of the PCB wastes were removed in 1998, PCB wastes are expected to decrease during the time period covered by the Proposed Action. The existing capacity and management system

would be able to handle any PCB waste to be removed. No PCB waste would be generated because of the Proposed Action. Based on the removal of PCB-containing materials and that no PCB-containing material would be used in the future, PCB waste would not be significantly impacted by the Proposed Action.

Radioactive Waste – There are no baseline activities or future activities in the Proposed Action that would result in increases of radioactive waste. The CHWSF is not permitted to manage radioactive waste and it is rare that radioactive wastes are generated (Lawrence, 2000). Since these environmental programs are not part of the Proposed Action they are not evaluated further in this EIS. Because radioactive waste would not be generated under the Proposed Action, there would be no significant impact to radioactive waste from the Proposed Action.

Smoke, Obscurant, and Illuminant-Related Waste – Smoke, obscurant, and illuminant use would increase under the Proposed Action, but the volume of waste would continue to be minimal. The existing waste capacities at the CHWSF and the English Village Landfill would be sufficient for smoke, obscurant, and illuminant-related waste storage and disposal, and no new procedures, plans, or permits would be necessary. Wastes generated from smoke, obscurant, and illuminant testing would not result in a significant impact under the Proposed Action.

Solid Wastes – With the increased activity at DPG under the Proposed Action, the annual volume of solid wastes generated over the period covered by this Future Programs EIS would likely increase. Since the English Village Landfill is in compliance with applicable state and Federal laws and regulations, and since landfill capacity is projected to remain at least through 2026, any additional solid wastes generated by Proposed Action activities would not result in a significant impact. No new solid waste management procedures, plans, or facilities would be needed. If the situation were to unexpectedly change in the future, DPG would be required to take appropriate management steps to maintain compliance with regulatory requirements. DEP would be the DPG unit responsible for compliance with solid waste regulatory requirements. Appendix A, List of Environmental Laws, Permits, and Management Plans, lists applicable laws, permits, and management plans relevant to DPG operations.

4.13.2.3 DPG Restoration Wastes

Restoration wastes include IRP waste and IDW. Residual ash is the only waste remaining from the destruction of conventional or chemical range recovered munitions.

The Proposed Action does not include waste generated from environmental programs, such as consent order actions or RCRA investigations, because they are considered to be outside the scope of materials and wastes that are related to DPG's mission. Although the generation of IRP waste could have a significant impact on capacity if there was a significant increase in cleanup activities, IRP wastes are not considered in the Proposed Action and they are not evaluated.

4.13.2.4 Compliance with Regulations and Management Plans

DPG is in compliance with all applicable regulations and management plans for storage and handling of materials and wastes. Under the Proposed Action, unknown biological or chemical substances could potentially be brought to DPG in emergency situations which could result in noncompliance if appropriate mitigation measures were not in place.

4.13.3 Impacts of the No Action Alternative

Under the No Action Alternative, DPG's Proposed Action would not be implemented. Therefore, any potential increases in material or waste volume would not occur. DPG would continue to operate under its baseline mission. The material storage and handling and waste storage, handling and disposal systems in place at DPG are adequate for the present volumes of material and waste. The types of materials used and wastes generated at DPG under this alternative would be essentially the same as those used and generated in baseline operations.

4.13.4 Impacts of the Decreased Mission Alternative

Under the Decreased Mission Alternative, the overall volume of material and waste at DPG would be reduced. Materials and wastes associated with conventional munitions, ECRT, modeling and assessment, and smoke, obscurant, and illuminant testing would not occur since these programs would no longer be located at DPG. Impacts would remain nonsignificant.

4.13.5 Impacts of the Maximum Expanded Mission Alternative

Under the Maximum Expanded Mission Alternative, the volume of material and waste would increase. This increase could result in a significant impact on material and waste volumes and management practices, depending upon the specific activity levels and material and waste types and volumes. Additional analysis of DPG procedures would occur for individual testing activities if material or waste types, amounts, or facilities substantially changed from baseline operations.

4.13.6 Mitigation Measures

Under the Proposed Action, biological or chemical substances that have not been identified or characterized could be brought to DPG. It is not DPG's intent to handle BL 4 organisms, but if an emergency arises, DPG would assist to the extent possible. If a substance were determined to be a BL 4 material, it would be contained and shipped to an appropriate facility. Impacts would be mitigated by implementing new SOPs, management plans, permits, and regulatory compliance, and constructing a new facility with the capabilities to handle unidentified biological or chemical substances.

4.13.7 Residual Impacts

Use of materials and generation of wastes at DPG is a necessary result of implementing DPG's mission. These impacts cannot be avoided, but would continue to be mitigated by proper management of materials and wastes and by the existing comprehensive legal and regulatory framework.

4.14 Unavoidable Adverse Impacts

Many of the foreseeable impacts to DPG's existing environment would be adequately mitigated by the control measures already in place at DPG and the mitigation measures identified in Sections 4.1 through 4.13 in this Future Programs EIS. However, implementation of the Proposed Action or alternatives would result in some unavoidable adverse impacts to some elements of the human and physical environment. These unavoidable adverse impacts are described as "Residual Impacts" in Sections 4.1 through 4.13 of this EIS. While these residual impacts would be unavoidable, they would be the direct result of implementing DPG's mission.

4.15 Relationship Between Short-Term Uses of the Human Environment and Long-Term Productivity

This section discusses the balance between the short-term use of the installation as proposed by DPG and the long-term productivity of the installation under the No Action Alternative that is continued use of DPG at baseline levels. The proposed activities at DPG would result in short- and long-term impacts to the existing resources within the various resource study areas.

Impacts associated with DPG's continuing operations would be a direct or indirect result of implementing DPG's mission. Many impacts would be mitigated through various control measures. Other impacts, however, could not be mitigated to any great degree.

Comparisons of short-term uses and potential long-term productivity follow.

- Potential impacts to soil resources would be primarily long-term and concentrated within the disturbed areas at DPG. Soil erosion levels would be above natural levels as a result of the direct and indirect disturbance of the ground. Soil productivity would be reduced over the long-term. New and altered landforms would create minor changes to the topography of the area for the long-term. Effects to geological resources would be negligible.

- Over the short-term, any water used in association with the Proposed Action or alternative would not be available for other uses. It is not expected that other water users would be affected as a result of DPG water use in the short- or long-term.

- DPG operations would result in the loss of some vegetation in both the short- and long-term. Over the long-term, some affected areas could not be fully returned to their pre-disturbance condition. DPG operations would also continue the trend of loss of native vegetation to weeds such as cheatgrass.

- With continued operations there would be a short-term loss of wildlife resources due to the loss of habitat and subsequent displacement of wildlife and direct mortality. Long-term effects to wildlife would be negligible with mitigation. Another potential impact to wildlife is a reduction of wildlife diversity at DPG due to loss of and/or changes in habitat.

- Potential impacts to air quality resulting from project-related emissions would be short-term in nature. No long-term impacts to air quality are anticipated as a result of the Proposed Action or alternatives.

- Each of the alternatives would have short- and long-term impacts to land use and access within the region surrounding DPG. The DPG land holdings have been committed to fulfillment of DPG's mission and would never be fully returned to pre-DPG conditions.

- Potential impacts to visual resources are both short- and long-term in nature. However, DPG's presence would be noticeable to relatively few persons in both the short- and long-term because of its isolated location.

- Cultural resources that were unrecorded or undiscovered could be destroyed with any alternative, thus foregoing long-term use of these resources. The recovery of archaeological information prior to the initiation of activities in undisturbed areas would be a beneficial short-term use insofar as the results enhance understanding

of the cultural history of the region. Any collected information would be preserved and available for re-analysis over the longer term, but these lost cultural resource sites would not be available for study in the future when archaeological data recovery techniques might have improved.

- Noise levels associated with the proposed DPG activities are considered short-term and directly related to DPG's mission. Because of the general lack of nearby noise receptors, there would be negligible short-term impacts for DPG-related activities under most conditions. Cumulative noise impact from AF activities would have a higher magnitude and frequency of short-term noise impact. No long-term noise impacts are anticipated.

- Continuation of DPG operations would provide short-term benefits to local and regional economies and could potentially provide long-term benefits in the form of improved infrastructure, schools, and other public facilities through direct and indirect tax revenues.

4.16 Irreversible and Irretrievable Commitment of Resources

The irreversible commitment of resources is defined as the use of nonrenewable resources or start of a process, which once committed to an action, would continue to be committed throughout the life of the action and thereafter. Irretrievable commitment of resources includes those resources used, consumed, destroyed, or degraded during any phase of an action that could not be retrieved or replaced for the life of the project or beyond. However, some irretrievable commitments may be reversed through use of mitigation measures or restoration of the site through natural processes. Irreversible and irretrievable commitment of resources associated with DPG's proposed activities include the following.

- The commitment of water resources, soils, wildlife, and vegetation at DPG are considered irretrievable in some cases. Those resources directly and indirectly involved in DPG's activities would be disturbed, displaced, or lost during the EIS time frame. However, mitigation measures and natural restoration processes would reverse some portion of this resource commitment.

Even with mitigation and natural restoration, land resources within DPG land holdings would never be returned to pre-DPG conditions. Some outdoor disturbance areas would be committed to remain in place irreversibly, with permanent loss of some soils and vegetation resources.

- The portion of DPG's landholdings designated for use as rangeland, or other heavily used lands, would be irretrievably committed to DPG's mission.

However, use of land for these military-related uses does allow wildlife habitat and open space land uses as well, although to a lesser quality than what would occur without DPG's presence.

- Socioeconomic resource effects are described as the social and economic benefits and costs to the affected communities and to Tooele County, UT. Socioeconomic commitments such as employment and income at DPG are irretrievable commitments for the life of DPG's operations and beyond to the extent that any direct or indirect tax revenues are invested in enduring public facilities and programs. Adverse impacts to one's sense of quality of life and lifestyle could be considered both irretrievable and irreversible for some persons.

- DPG's operations would irretrievably and irreversibly consume a variety of materials in carrying out its testing and training missions. DPG's operations also generate various wastes, which must be disposed in regulated sites. Waste disposal involves an irreversible commitment of land and other resources.

- Commitment of any lost cultural resources would be irreversible, although the information content of the sites could be recovered through mitigation.

- DPG's proposed activities pose a risk to occupational and public health and safety. While this risk of injury, illness, or catastrophic event is low, the risk cannot be totally eliminated through mitigation measures. Any injury, illness, or catastrophic event associated with DPG's operations would represent an irreversible or irretrievable commitment of human resources, depending upon the severity of the event.

- Because of their short-term nature and/or limited extent, impacts to air, visual, and transportation resources at DPG would represent negligible irretrievable and irretrievable commitments.

- Use of machinery and vehicles in DPG's operations is an irretrievable commitment of these man-made resources.

- Implementation of DPG's future activities would consume non-renewable energy resources such as fuel and electricity. Consumption of these energy resources would be irretrievable. Opportunities for energy conservation would be identified and integrated into future operations to the maximum practical extent given DPG's mission requirements.

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5.0 Cumulative Impacts

The cumulative impact analysis for this Future Programs EIS evaluates the potential impacts associated with DPG's Proposed Action as summarized in Chapter 4.0, Impacts of the Proposed Action and Alternatives, in combination with the potential impacts associated with other relevant activities which have occurred, are occurring, or may occur in the vicinity of DPG. Chapter 4.0, Impacts of the Proposed Action and Alternatives, already considers potential combined impacts from all major activities for which DPG is the proponent or can make a decision about the activity. Air training and testing activities in UTTR airspace, including airspace above DPG, are considered in cumulative impacts because DPG is not the proponent of these activities.

CEQ Definition of Cumulative Impacts

…the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taken place over a period of time.

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The cumulative impact analysis is presented in two parts. The first part summarizes the projects and activities included in the analysis, and the second part assesses the potential cumulative impacts of these projects and activities within the same structure of environmental resources and other topics presented and analyzed in Chapters 3.0 and 4.0.

5.1 Projects and Activities Included in the Cumulative Impact Analysis

For this cumulative impact analysis, the following past, current (as of 2000), or proposed projects or activities have been identified as having potential cumulative impacts that could collectively add to impacts from DPG's Proposed Action or alternatives:

- UTTR Air Training and Testing Activities
- NASA Activities
- Tooele Army Depot
- Deseret Chemical Depot and Tooele Chemical Agent Disposal Facility
- Safety-Kleen (Aragonite) Incinerator, Transfer and Storage Facility
- Envirocare of Utah Treatment, Storage, and Disposal Facility

- Safety-Kleen (Grassy Mountain) Treatment, Storage, and Disposal Facility
- Safety-Kleen (Clive) Treatment and Storage Facility
- Magnesium Corporation of America (MagCorp) Magnesium Refining Facility
- Kennecott Bingham Canyon Copper Mine and Processing Facilities
- Intermountain Power Project (IPP)
- Proposed Skull Valley Spent Fuel Storage Facility
- FUDS (Southern Triangle and Yellow Jacket)
- Tekoi Test Range (closed)
- Public Land Management
- Tooele County Economic Development and Growth
- State Road 36 Improvement
- Wildland Fires and Fire Management

The locations of projects or activities considered in the cumulative impact analysis are shown in Figure 5.1-1, Projects and Activity Areas Within the Cumulative Impacts Study Area. Summary descriptions and the status of these projects and activities as of the year 2000 follow. Wildland fires and fire management are also discussed in this section as a regional activity, but fire locations are not shown in Figure 5.1-1.

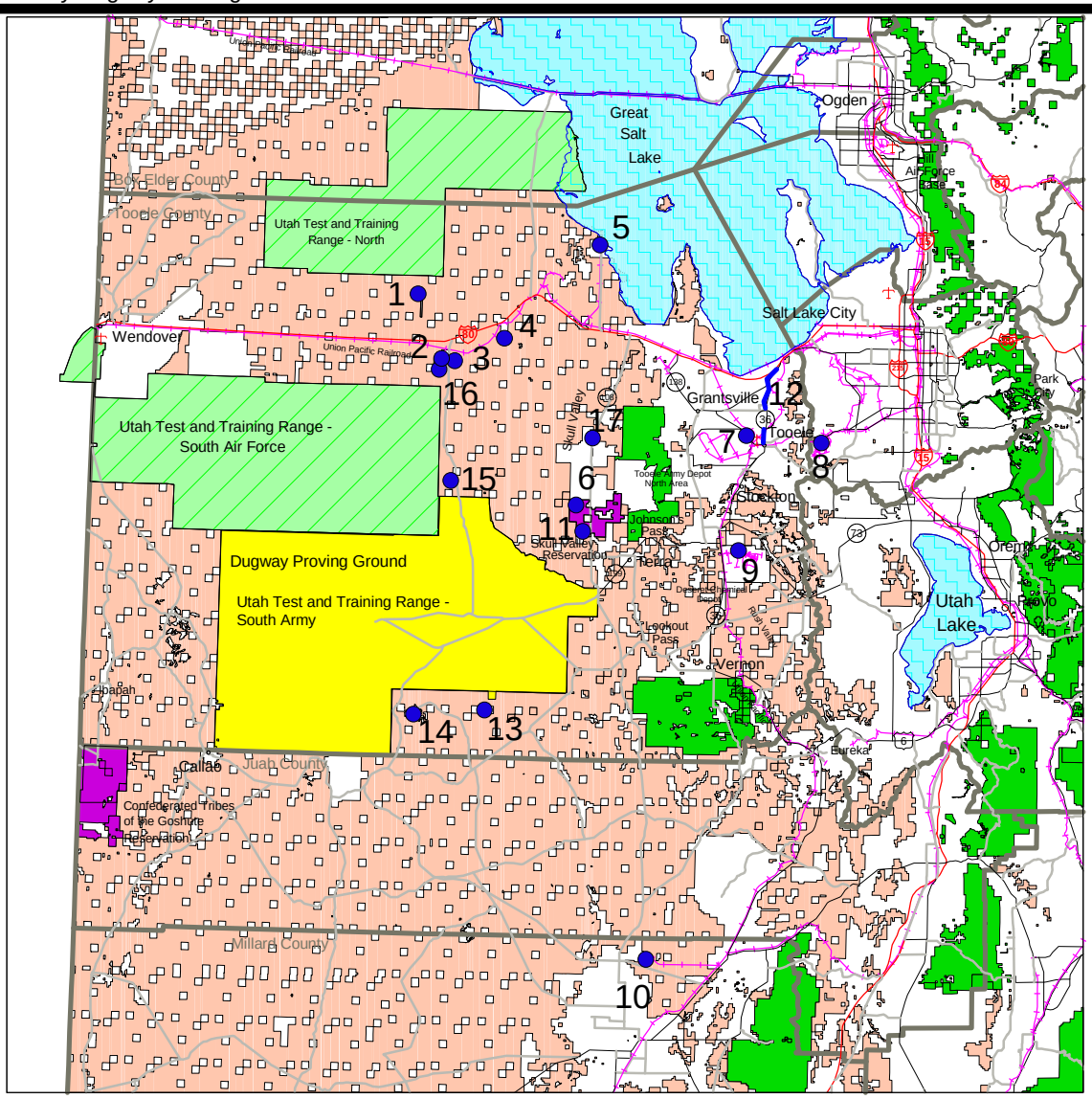
This cumulative impact analysis considers industrial, military, land management, and economic projects and activities. Projects and/or activities described in this section are ongoing unless otherwise noted.

DPG is not the proponent of any of these projects and activities within the cumulative impact area. DPG is therefore not responsible for impacts or for any required impact mitigation associated with these projects or activities. To the extent required by law, the proponent of each of these actions would conduct their own NEPA evaluations to identify and disclose the impacts of each project or activity.

5.1.1 Utah Test and Training Range Air Training and Testing Activities

As discussed in Section 2.1.4.3, Primary Outdoor Facilities, the AF manages the UTTR as a remote military reservation operating for:

- Practice bombing and gunnery range for military aircraft
- Propagation testing
- Rocket motor test firing
- Missile storage
- Small arms
- Machine-gun firing ranges



LEGEND

- Dugway Proving Ground
- Utah Test and Training Range
- American Indian Reservation
- U.S. BLM land
- U.S. Forest Service Land
- Water
- Major Road
- Minor Road
- Railroad
- County Boundary

BLM Bureau of Land Management
FUDS Formerly Used Defense Sites
SR State Road

Projects and Activity Areas Included in Cumulative Impact Analysis

1. Safety-Kleen (Grassy Mountain)
2. Safety-Kleen (Clive)
3. Envirocare of Utah
4. Safety-Kleen (Aragonite)
5. Magnesium Corporation of America (MagCorp)
6. Proposed Skull Valley Spent Fuel Storage Facility
7. Tooele Army Depot
8. Kennecott Copper Mine
9. Deseret Chemical Depot and Tooele Chemical Agent Disposal Facility
10. Intermountain Power Project
11. Tekoi Test Range (closed)
12. Highway SR36 Improvement
13. FUDS (Southern Triangle)
14. FUDS (Yellow Jacket)
15. Proposed Brown Sugar Mine
16. Clive Pit
17. Ensign Ranch

10 0 10 20
Miles

N

Figure 5.1-1

Projects and Activity Areas Within the Cumulative Impacts Study Area

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The primary mission of the UTTR is to provide military personnel with a realistic training environment and conduct operational test and evaluation supporting large footprint weapon systems to enhance combat readiness, superiority, and sustainability. Key functions and capabilities required for this range support include range infrastructure systems, equipment, software, targets, facilities, data processing and display, land and airspace control, environmental management, supply, security, and safety (RANS, 1998).

The UTTR is composed of airspace controlled by the AF and ground controlled by either the AF or the Army. The UTTR was withdrawn from public use by DOD. The UTTR is divided by I-80 into the North and South Ranges. DPG is located within the UTTR–South area of the UTTR. The DPG portion of UTTR–South is commonly designated as UTTR–South Army, while the AF portion is commonly designated as UTTR–South AF. UTTR operations focus on providing unique training and testing facilities that maintain skilled personnel and ready-to-use, state-of-the-art equipment (EnviroSupport, 1998). The entire UTTR consists of:

- 23 target complexes with 220 target arrays
- Four surveillance radars
- Four communication relay sites
- Five Television Optical Scoring System sites
- 54 ground stations to support tracking

The activities occurring within the UTTR–South area would have the primary identifiable cumulative impacts with DPG activities because the airspace above DPG is contained within the UTTR–South. Summaries of activities within the UTTR airspace above DPG are provided in Sections 5.1.1.1, UTTR Air Testing Activities in Airspace Above DPG, and 5.1.1.2, UTTR Air Training Activities in Airspace Above DPG. Ground troop training activities within the DPG portion of the UTTR are part of the Proposed Action as described in Section 2.1.6, Baseline Training Activities, because DPG has a high level of control over the locations, timing, and scope of these activities even though the AF is the proponent of the ground training activities. Other UTTR activities not involving DPG airspace are described in various UTTR documents including the Range Management Plan and EA for the UTTR (EnviroSupport, 1998) and the Environmental Assessment of Noise and Supersonic Effects at the UTTR (Booz-Allen & Hamilton and EnviroSupport Inc., 1999).

5.1.1.1 UTTR Air Testing Activities in Airspace Above DPG

Air testing includes launching, deploying and/or igniting weapons systems or components from the air and monitoring their performance. Both ground support services and the systems used to evaluate air testing activities are part of these tests. The 1998 level of air testing over DPG was about 400 test sorties per year, 360 by fighter aircraft and 40 by bombers. A sortie consists of one take-off and one landing. Of the total test sorties logged annually by the 388th RANS out of HAFB in 1997, about 60 percent used the UTTR-South (Booz-Allen & Hamilton and EnviroSupport, Inc., 1999). It is assumed that a sortie using the UTTR-South includes airspace over DPG.

The number of weapons impacting DPG annually from air launched weapons testing is in the range of 150 to 200. All are inert and those recovered are managed as solid waste. Approximately seven CMs also impact DPG annually.

AF air testing activities within the UTTR are anticipated to show a slight increase in some activities over baseline levels over the next 5 to 7 years. The future plans for air testing on the UTTR reflect an overall increased level of activity focused on testing new and more technically complex "smart" weapons systems, which are self-guided. Some of the new weapons require more space and more sophisticated evaluation and support systems than in the past. This is particularly true for air launched systems. Upgrades and additions to the existing weapons evaluation support system are planned. Most testing is operational, that is, designed to evaluate performance for existing systems. Some testing is developmental, that is, conducted with the more experimental objective of determining design criteria and performance for new systems. The major future air testing program components include:

- Weapons and Missile Systems Evaluation Testing – ongoing testing and evaluation for a broad range of air launched weapons systems, including live missiles that are authorized only at the Kittycat target on AF property.
- CM Testing – testing of live or inert warheads, usually involving several aircraft such as a bomber to launch the CM with up to four fighter planes used as CM chase vehicles.
- Joint Direct Attack Munitions – testing of live and inert weapons to determine the viability of converting standard bombs into accurate guided munitions.
- Aircraft Flight and Airworthiness – testing of new aircraft to ensure combat readiness.

- Ground Support and Infrastructure – Ground support systems and infrastructure, including that on DPG land, would be maintained and upgraded to meet future test and training requirements.

5.1.1.2 UTTR Air Training Activities in Airspace Above DPG

Air training includes flight crew training, target practice, use of chaff and flares (electronic countermeasures), and unit training where military reserve units train together. The majority of air training missions originate from the 388th RANS at HAFB; however, some originate from more distant points of origin such as Nellis AFB in Nevada and AF bases in California. In 1997, there were approximately 13,000 training sorties within the entire UTTR from HAFB under the 388th RANS (Booz-Allen and Hamilton and EnviroSupport, Inc., 1999; Science and Engineering Associates, 1999). Approximately 60 percent of pilot training is conducted at night.

Training missions are intended to simulate actual combat conditions. They include missions where both air crews and ground personnel conduct operations together against either real or simulated targets, and missions where air crews practice maneuvers such as air refueling, simulated flame-outs, touch and go, and target practice. Training flights on the UTTR-South frequently include supersonic flight. The supersonic operating area where aircraft are authorized to exceed the speed of sound at or above 1,525 m (5,000 ft) AGL, overlies a large portion of DPG. MAAF is used both as a base for conducting reserve unit training and as a location where maneuvers, such as simulated flame-outs and touch and go can be practiced. A simulated flame out is an exercise where the pilot, typically of an F-16, reduces power to idle and flies the exercise as if the engine had been shut off or flamed out. MAAF is the only airfield where this can be done on the UTTR, due to its remote location. The F-16 fighter is the predominant airplane used in training missions within the UTTR, with the B-1, B-2 and B-52 bombers and refuelers also in use to a much lesser extent.

Air training activities may include one or more of the following activities:

- Air-to-ground Training
- Air-to-air Training
- Chaff and Flares/Electronic Countermeasures

Some of these exercises involve ground support activities. Almost all missions use chaff and flares.

Use of chaff and flares released from aircraft is a regular part of Utah Test and Training Range air training activities.

A summary of air training activity and chaff use on the UTTR-South is shown in Table 5.1-1, Summary of 1998 Air Fighter Training and Chaff Use Activity on the UTTR-South, based on data collected by the 388th RANS out of HAFB and on chaff use assumptions (Science and Engineering Associates, 1999). Because of DPG's location, it is assumed that any training conducted on the UTTR-South uses airspace over DPG. Table 5.1-1 does not include training sorties originating at DPG during the Global Patriot exercise described in Section 2.1.6.1, Ground Training.

Table 5.1-1. Summary of 1998 Air Fighter Training and Chaff Use Activity on the UTTR-South.

Activity	1998 Number
Training Sorties over the UTTR-South	9,029
Air-to-ground Sorties	5,300
Air-to-air Sorties	3,729
Take-offs/ Landings at MAAF	895
Emergency Incidents at MAAF	15
Sonic Booms over the UTTR-South	2,400
Ground Impact Targets on DPG	2
Pounds of Chaff Deployed by Air-to-ground Sorties[1]	31,800
Pounds of Chaff Deployed by Air-to-air Sorties[1]	22,374
Air Support Personnel at Avery Technical Center	58

1 Assumes 6 pounds of chaff is deployed per sortie (Science and Engineering Associates, 1999).

DPG U.S. Army Dugway Proving Ground
MAAF Michael Army Airfield
UTTR Utah Test and Training Range

NOTE: Numbers are based on a HAFB estimate for 1998, with the share of training activities allocated at 93 percent of total UTTR-South sorties based on 1997 data. Flares are usually used in conjunction with chaff.

SOURCES: Booz-Allen & Hamilton and EnviroSupport, Inc., 1999; Zaccardi, 1999; Science and Engineering Associates, 1999

Air training conducted by the AF is anticipated to continue at more or less baseline levels for the next 5 to 7 years.

Planned future AF air training activities include:

- **Continued use of chaff, flares, and other forms of electronic countermeasures within the designated area including the west portion of DPG. Chaff and flares would be used on almost all air training missions in conjunction with other training objectives.**
- **Improved and expanded capabilities at the existing training impact targets on DPG, which include Baker Strong Point and the Sand Island Complex.**

The majority of change between 1998 and future air training activities are equipment-related changes, including maintaining and updating the ground support facilities and infrastructure at DPG to maintain a state-of-the-art capability for the UTTR.

5.1.2 NASA Activities

As of 1998, NASA activities at DPG consist of mission planning performed by NASA administrative and scientific staff stationed on a temporary basis at DPG. MAAF also serves as an emergency/alternate landing strip for the space shuttle, and developmental testing activities are intermittently sponsored or facilitated by NASA at DPG.

Existing DPG facilities and resources that may be used to support NASA activities include (NASA, 1997):

- MAAF
- Office building with a telephone and a fax
- Aircraft hangar
- Helicopter pad
- Radar tracking system operated by a NASA subcontractor
- Emergency medical technicians and equipment
- Fire/crash rescue on the airfield
- Security and public affairs personnel

NASA programs involving DPG facilities would expand during the period covered by this EIS. There are three future NASA programs that could involve DPG facilities:

- Stardust is an unmanned spacecraft designed to gather interstellar dust and cometary material from Comet 81P/Wild-2 and return it to Earth for analysis. The Stardust mission is a partnership between the University of Washington, Jet

Propulsion Laboratory, and Lockheed Martin Astronautics. The Stardust spacecraft was launched from Cape Canaveral on February 7, 1999 and is planned to land on the UTTR-South, which includes DPG, in 2006 (Unknown, 1999e). In the year 2004, the Stardust would approach within 150 km (90 mi) of the Comet 81P/Wild-2 to collect samples that would be sealed in a sample canister within a capsule on Stardust. After sample collection, the capsule would separate from the main craft and return to Earth, landing on the UTTR-South. Once the capsule has landed, it would be taken to Ditto/Avery where an exterior inspection of the capsule would be performed to verify that it is safe to be transported from MAAF to the curatorial facility at NASA's Johnson Space Center in Houston, TX.

- Genesis is a mission designed to collect samples of the elements and isotopes comprising the solar wind, which is material flung from the sun, and return them to Earth for detailed analysis (NASA, 1999a). The Genesis spacecraft would be placed in a halo orbit around the L-1 point at about 1,500,000 km (930,000 mi) from Earth on a line between the sun and the Earth. Genesis would be stationed outside the Earth's magnetic field to collect particles of the solar wind that would imbed themselves in specially designed high purity silicon wafers (NASA, 1999b). The Genesis spacecraft is expected to launch in 2001 and return to Earth with samples of oxygen, nitrogen, noble gases, and other elements contained in a Sample Return Capsule in 2003. The capsule would be recovered utilizing an "aerocapture" scenario that would involve a C-130 series airplane retrieving the capsule as it descends on a parachute. DPG is a candidate for capsule aerocapture operations (NASA, 1999a).

- MUSES is a planned mission to prove the technology that is needed to gather samples from an asteroid in the solar system and bring them back to Earth (NASA, 1999c). NASA and the Japanese Institute of Space and Astronautical Sciences have agreed to collaborate on the MUSES-CN Mission. The MUSES spacecraft would acquire a sample of an asteroid, which would provide valuable scientific information about the early state of the solar system. By studying the structure and chemical composition of asteroids, scientists can identify clues as to Earth's initial chemical composition and the conditions under which it formed some 4.6 billion years ago. The MUSES-CN is scheduled to launch from Kagoshima, Japan on a Japanese M5 rocket in 2002, and would rendezvous with asteroid 1989 ML. It would reenter the Earth's atmosphere in 2006 (NASA, 1999d). DPG is a candidate for landing and recovery of the MUSES-CN spacecraft.

No analysis, testing, evaluation, or experimentation with samples from the above listed or any other NASA test flights are proposed to be performed at DPG.

5.1.3 Tooele Army Depot

The Tooele Army Depot is located about 3.25 km (2 mi) south of Tooele, UT and 56.5 km (35 mi) southwest of Salt Lake City, UT. Tooele Army Depot comprises about 93 sq km (23,000 acres) of land, and employs about 550 people (primarily civilians). About 20 people live on-installation. The mission of Tooele Army Depot is conventional ammunition storage, maintenance and demilitarization. Over 4 sq km (1,000 acres) of Tooele Army Depot land were transferred in December 1998 to the Tooele Redevelopment Agency under the Base Realignment and Closure program. There are 60 active SWMUs at Tooele Army Depot. Tooele Army Depot has RCRA hazardous waste storage and incineration, and post-closure permits from the UDSHW. An OB/OD operation is under interim permit status (RCRA Part A). Tooele Army Depot is on the CERCLA national priorities list and has entered into a Federal Facilities Agreement with EPA Region 8. As a result of past disposal practices of wastewater into unlined ditches, groundwater underlying a large area of Tooele Army Depot has been contaminated with chlorinated solvents into three distinct chlorinated plumes. Efforts to better understand and remediate contamination at the Tooele Army Depot are underway through a projected 30-year cleanup project with CERCLA national priority list funding support.

5.1.4 Deseret Chemical Depot and Tooele Chemical Agent Disposal Facility

The primary mission of the Deseret Chemical Depot is storage of a large percentage of the U.S. stockpile of chemical munitions. The Deseret Chemical Depot also supports weapons demilitarization including research and development activities. The Rapid Response System, a mobile system designed to support the non-stockpile program, is also being tested at the Deseret Chemical Depot. The facility is located about 19 km (12 mi) south of Tooele, UT. It is operating with two RCRA Part B hazardous waste storage or treatment permits from UDSHW. The Tooele Chemical Agent Disposal Facility operations destroy through incineration the aging chemical munitions stockpile in storage at the Deseret Chemical Depot.

5.1.5 Safety-Kleen (Aragonite) Incinerator, Transfer and Storage Facility

Aragonite is a commercial incinerator, transfer, and storage facility located about 4 km (2.5 mi) south of I-80 at the Aragonite exit in Tooele County, UT. It is within the West Desert Hazardous Industry Area, a 362.5 sq km (140 sq mi) region of desert and low mountains designated for hazardous waste facilities by Tooele County. The facility began operation in 1992. It was formerly known as Laidlaw Environmental

Services (Aragonite), Inc. and Aptus, Inc. The incinerator is a 140 million British Thermal Units (BTU) slagging rotary kiln with a vertical afterburner chamber. The wastes that are handled at the facility include hazardous wastes, PCBs, industrial wastes, and other nonhazardous wastes. The facility is designed to handle high and low BTU liquid wastes, sludges, bulk solids, and containerized wastes. The permitted capacity of the incinerator is about 11,800 kg (13 tons) per hour, with typical processing of about 45,359 metric tons (50,000 tons) per year. Operations occur 24 hours per day, and the facility has about 180 employees. The nearest residential area is Grantsville, UT about 55 km (34 mi) from Aragonite. The facility is permitted by the UDSHW.

5.1.6 Envirocare of Utah Treatment, Storage, and Disposal Facility

Envirocare operates a commercial treatment, storage, and disposal facility located about 8 km (5 mi) south of the Clive, UT exit from I-80, which is about 130 km (80 mi) west of Salt Lake City, UT. The facility is about 2.6 sq km (1 sq mi) in size and is located in a remote desert area of the Bonneville Basin. It is about 32 km (20 mi) from the nearest permanent human habitation. The Envirocare facility can receive two types of wastes. The first type contains both low-level radioactivity with a hazardous waste component, known as mixed waste, and the second type of waste contains only a low-level radioactive component. The mixed waste operations are regulated by both UDSHW and the Utah Division of Radiation Control (UDRC), with the UDSHW regulating the hazardous waste portion and the UDRC regulating the radioactive portion of the waste. Wastes that are only radioactive are regulated by the UDRC and the NRC. Envirocare was authorized to store, treat and dispose of mixed waste through a RCRA Part B permit issued by the UDSHW in 1990. The nature of mixed waste managed at the facility includes contaminated soils, process waste, debris, and sludges. The facility has applied for approval to dispose of higher level radioactive wastes as well.

5.1.7 Safety-Kleen (Grassy Mountain) Treatment, Storage, and Disposal Facility

The Grassy Mountain Facility is a commercial hazardous waste treatment, storage, and disposal facility located near Knolls, Tooele County. The facility is within the West Desert Hazardous Industry Area, about 130 km (80 mi) west of Salt Lake City, UT in the desert portion of the Bonneville Basin near the Grassy Mountains. The site is about 2.6 sq km (1 sq mi) in area and is remotely located 40 km (25 mi) from incorporated towns or permanent human habitation. The facility is capable of handling hazardous wastes, PCB contaminated wastes and oils, industrial wastes, and other nonhazardous wastes. The facility can accept liquid, solid or semi-solid waste forms for treatment, storage, and/or disposal. The facility consists of six RCRA

landfill cells, five Toxic Substance Control Act (TSCA) landfill cells, and three industrial waste landfill cells. Three RCRA cells have been closed along with two industrial waste cells. One TSCA cell and one industrial waste cell have never been used. The facility was issued a RCRA Part B permit by the UDSHW in 1988.

5.1.8 Safety-Kleen (Clive) Treatment and Storage Facility

The Safety-Kleen (Clive) facility, formerly known as the Clive Incineration Facility, was designed to function as an industrial waste, TSCA waste (primarily PCBs), and RCRA hazardous waste treatment and storage facility. It is located about 130 km (80 mi) west of Salt Lake City, UT about 5.6 km (3.5 mi) south of Exit 49 on I-80. The facility's incineration train consists of two kilns that are ducted to a common secondary combustion chamber. The kiln was designed to treat energetic liquid (as a fuel in the burner), aqueous waste, sludge, gaseous, bulk solids, ram fed containers, and shredded/repackaged waste streams. The facility was issued a RCRA Part B permit in 1991 by UDSHW, and engaged in closure activities starting in 1997. Although incineration is not occurring at the facility, waste storage operations aid operations at the Safety-Kleen (Aragonite) facility by providing additional treatment capacity when necessary.

5.1.9 Magnesium Corporation of America Magnesium Refining Facility

The MagCorp facility is located about 24 km (15 mi) north of I-80 and is accessed from the I-80 Rowley Exit. The facility is a primary magnesium refining operation, with magnesium being extracted from a concentrated magnesium chloride solution derived from the Great Salt Lake. It is a PSD major source and has an AO issued by UDAQ. The major pollutant emitted from the refining facility is chlorine gas, with permitted emissions of 30,682 metric tons (33,821 tons) of chlorine gas per year. Other major emission types include hydrochloric acid (in gaseous form), PM_{10}, nitrous oxides, and VOCs.

5.1.10 Kennecott Bingham Canyon Copper Mine and Processing Facilities

The Bingham Canyon copper mine and processing operations have been in existence almost 100 years. Located about 24 km (15 mi) southwest of Salt Lake City, UT and about 80 km (5 mi) from DPG's main gate, the mine is the largest man-made excavation on earth. Processing facilities for the copper mined at Bingham Canyon include:

- The Copperton concentrator 8 km (4.8 mi) from the mine
- The older North concentrator and the Garfield smelter/refinery 20 km (12.5 mi) to the north of the mine

Total ore production from the mine in 1999 was 51.4 million metric tons (56.6 million tons). Refinery output in 1999 was about 240,000 metric tons (265,000 tons) of copper, 10,760 kg (346,000 oz) of gold, and 133,745 kg (4.3 million oz) of silver. Gold and silver are considered by-products of copper mining and processing. Air emissions are regulated by a Title V operating permit issued by UDAQ.

5.1.11 Intermountain Power Project

IPP went on-line in 1987 with two coal-fired electric utility steam generating units providing a combined 1,600-megawatts. The project is the largest coal-fired power plant in the western U.S., and is located about 40 km (25 mi) north of Delta, UT, about 96.5 km (60 mi) south of DPG's main entrance. The IPP is managed by the Los Angeles Department of Water and Power, which is the largest buyer of power, initially purchasing more than 62 percent of the output. As other project participants exercise their options on IPP's electricity production, Los Angeles' share would decline to about 45 percent. IPP emissions are regulated by a Title V operating permit issued by the UDAQ. The project is a major source of NO_2 and SO_2, with about 3,625 metric tons (4,000 tons) of each emitted each year. PM_{10} and CO are also major emissions from the project.

5.1.12 Proposed Skull Valley Spent Fuel Storage Facility

This proposed $125 million storage facility on land owned by the Skull Valley Reservation would be a larger version of the Surry, Virginia Independent Spent Fuel Storage Facility. The project is sponsored by a consortium of utility companies called Private Fuel Storage. It would need to be approved by the NRC, which is preparing an EIS on the proposed facility. The facility would provide temporary storage of about 40,000 metric tons (44,100 tons) of spent fuel, which is sufficient to accommodate all of the nation's spent fuel stored at the various nuclear power plants across the nation. The project could also include new transportation facilities within Skull Valley including a new rail siding and rail corridor into Skull Valley. The project would provide maximum construction employment (storage facility and rail link) of about 250 jobs with about 60 jobs during the operation phase.

5.1.13 Formerly Used Defense Sites

The Southern Triangle Joint Use Area and Yellow Jacket sites are designated as part of the FUDS program, which deals with inactive sites that are not within DPG boundaries. These sites are being processed for environmental clean-up under the FUDS program (10 U.S.C. 2701 et seq.) by the COE. The FUDS program is managed by the COE, which reported that it is highly probable that ordnance and explosive waste contaminate these areas (Woodward-Clyde, 1995).

DPG used the Southern Triangle area between 1942 and 1945 and in the 1950s and 1960s for munitions testing. DPG no longer uses the area, which is primarily controlled by BLM with a smaller area owned by the State of Utah. The Yellow Jacket Mine near the Southern Triangle also was used for past DPG operations during World War II and in the 1950s as part of a program to determine the effectiveness of chemical munitions when used against cave-type fortifications. The area has been inactive since these tests ended over 40 years ago. The Yellow Jacket area is owned by private citizens and through mine claims. The land in the Yellow Jacket area not owned through mining claims is controlled by the BLM.

5.1.14 Tekoi Test Range

The closed Tekoi Test Range was located in Skull Valley on lands leased from the Skull Valley Reservation. It was operated by Hercules Aerospace Company, which was acquired by Alliant Aerospace Company in 1995. The lease on the facility ended September, 1999. The test range was used to static fire solid rocket motors, which involved building a motor and securing it to a thrust block so it would remain in place. Hundreds of sensors were then attached to the motor to collect data on motor performance. Explosive tests using up to 22.7 kg (50 lb) of explosives per test were also conducted on the Tekoi Test Range.

5.1.15 Public Land Management

A large portion of the lands surrounding DPG is public land managed by the UTTR for military-related purposes and by the BLM in accordance to Federal Land Policy and Management Act (FLPMA). UTTR activities relevant to this analysis were summarized in Section 5.1.1, Utah Test and Training Range Air Training and Testing Activities. BLM's land management philosophy is to manage its lands under a multiple-use and sustain-yield concept.

…protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use by encouraging collaboration and public participation throughout the planning process.

Land Use Planning Manual

Land use and rangeland improvements are thoroughly analyzed as part of the BLM land management process to restrict new surface disturbance, reduce resource conflicts, and aid in the management of all resources. To accomplish these tasks, BLM inventories all public lands on a continuing basis, evaluates resource information to determine the appropriate use of the land, insures participation and cooperation with other agencies in a collaborative effort, provides a framework to guide subsequent decisions, and provides the public with documentation of land allocations and permissible resource uses (BLM, 2000).

In addition to the UTTR and BLM activities, the U.S. Fish & Wildlife Services has an important public lands management role at the Fish Springs National Wildlife Refuge. The refuge is located just south of DPG in Juab County, UT, and comprises about 73 sq mi (18,000 acres). It is centered on a number of springs that provide numerous managed pools on which substantial amounts of waterfowl, wading birds, and shorebirds are found during summer.

Bird numbers swell at the Fish Springs National Wildlife Refuge during spring and fall migration.

5.1.16 Tooele County Economic Development and Growth

Tooele County, UT has undergone extensive growth and development over recent years. The county retained its title as the fastest-growing county in Utah in 1999, with one state report estimating that the County grew by 8 percent between July 1998 and July 1999. Tooele County's growth has been made possible by inexpensive land, congestion and buildout in the Salt Lake Valley, a relatively easy commute and a country lifestyle (Schmerker, 1999b). The county continues to attract companies and ventures with ties to hazardous waste treatment, storage, or disposal, and has designated the West Desert Hazardous Industry Area along I-80 as a region acceptable for hazardous waste facility sites.

5.1.17 State Road 36 Improvement

SR 36 is a major regional roadway running north-south from I-80 through the eastern portion of Tooele County, UT. Because of the growing use of SR 36 and need for improved ground transportation in this area, major improvements to SR 36 have been

proposed. Options for improvement include expansion from the existing two-lane roadway to a four-lane roadway in the existing location, or construction of a new four-lane roadway west of the existing alignment while one segment of improvements would occur in 2000. An EIS by the Utah Department of Transportation and Federal Highway Administration is planned to evaluate alternatives for further improvement.

5.1.18 Wildland Fires and Fire Management

The Great Basin landscape is changing at a rapid rate due in part to wildland fires and the resulting spread of exotic annual grasses and noxious weeds. From 1987 through 1996, 615 wildland fires were suppressed on BLM lands in the Salt Lake District with a burned acreage totaling nearly 1,620 sq km (400,000 acres). Habitat within the Salt Lake BLM District is diverse, necessitating the need for a diverse management plan. In 1998, BLM developed an Integrated Fire Management Plan that identifies the following wildland fire suppression functions (BLM, 1998):

- Safely reintroduce fire into ecosystems to meet desired resource management objectives by utilizing the best science
- Use wildland fire control and suppression strategies and tactics that emphasize resource management objectives while minimizing total fire management costs
- Utilize a fire suppression strategy that balances resource management objectives and goals for protecting values at risk while minimizing fire management costs

The BLM Salt Lake District is divided into fire management planning areas that define the role and response that wildland fire has in a particular ecosystem. Areas are further broken down into Fire Management Zones (FMZ) based on fuel/vegetation type. The three recognized zones include:

- FMZ 1: cheatgrass/desert shrub
- FMZ 2: sagebrush
- FMZ 3: juniper/mountain shrub

The Integrated Fire Management Plan allows for more selective burning of areas to reduce fuel loads, benefit livestock grazing, and renew perennial vegetation. Vegetation treatments for FMZ 1, such as Skull Valley, and FMZ 2 are included to increase the trend towards natural revegetation (BLM, 1998).

Fire management on the private lands around DPG is approached with the primary goal of protecting structures and pastures. Therefore, disking is commonly used to

create firebreaks and prevent the spread of fires. There is considerable coordination for joint wildland fire management among DPG, BLM, and private landowners.

5.2 Cumulative Impacts of Regional Projects and Activities with the Proposed Action

This section summarizes the potential cumulative impacts of the projects and activities identified in Section 5.1, Projects and Activities Included in the Cumulative Impact Analysis. The major sources of potential cumulative impacts in the region are summarized in Table 5.2-1, Major Relationships of Regional Projects/Activities to Potential Cumulative Impacts.

Cumulative impact study areas vary in size depending on the anticipated impact region for a given resource when the combination of all past, present, and reasonably foreseeable impacts are considered. For most of the physical and biological resources such as air, water, geology, soils, cultural resources, vegetation, wildlife and land use, the primary cumulative impact study area would be the area immediately surrounding DPG. Study areas may extend into established or natural boundaries such as air basins, drainage areas, or wildlife habitat/vegetation patterns. For other resource areas such as socioeconomics, transportation, noise, and visual resources, the areas for cumulative impact assessment may be a larger region that focuses analysis on considerations such as the residents, communities, and roads that could be cumulatively impacted.

Table 5.2-1. Major Relationships of Regional Projects/Activities to Potential Cumulative Impacts

Project/Activity	Geology and Soils	Water Resources	Air Resources	Biological Resources	Socioeconomics	Environmental Justice	Land Use and Access	Cultural Resources	Traffic and Transportation	Visual Resources	Noise	Health and Safety	Materials and Wastes
Utah Test and Training Range	•	•	•	•			•	•		•	•	•	•
NASA Activities							•				•	•	
Tooele Army Depot		•	•								•	•	•
Deseret Chemical Depot and Tooele Chemical Agent Disposal			•									•	•
Safety-Kleen (Aragonite) Incinerator, Transfer and Storage Facility			•									•	•
Envirocare of Utah Treatment, Storage, and Disposal Facility												•	•
Safety-Kleen (Grassy Mountain) Treatment, Storage, and Disposal Facility												•	•
Safety-Kleen (Clive) Treatment and Storage Facility												•	•
MagCorp Magnesium Refinery			•										

Table 5.2-1. Major Relationships of Regional Projects/Activities to Potential Cumulative Impacts

Project/Activity	Geology and Soils	Water Resources	Air Resources	Biological Resources	Socioeconomics	Environmental Justice	Land Use and Access	Cultural Resources	Traffic and Transportation	Visual Resources	Noise	Health and Safety	Materials and Wastes
Kennecott Bingham Canyon Mine/Processing	•		•										
Intermountain Power Project	•		•										
Proposed Skull Valley Spent Fuel Storage Facility		•			•	•	•		•	•	•	•	•
Formerly Used Defense Sites	•	•					•					•	
Tekoi Test Range (Closed)	•	•										•	
Public Land Management	•	•	•	•			•	•		•	•	•	
Tooele County Economic Development and Growth	•	•	•	•	•	•	•	•	•	•	•		•
State Road 36 Improvement					•		•		•	•	•		
Wildland Fires and Fire Management	•		•	•			•	•		•		•	

5.2.1 Cumulative Impacts to Geology and Soils

Cumulative geological impacts could occur to paleontological resources and to valuable minerals. Cumulative impacts to regional geological resources would occur from soil compaction and other ground disturbance, soil erosion, and chemical changes within soils described in the following sections.

5.2.1.1 Geological Resources

Mining of metallic and nonmetallic resources can cumulatively impact the regional geological resources. Mining on public lands around DPG is controlled by the BLM through the mining law of 1872. In its role as public land manager, BLM can protect important wildlife and water resources from mining developments. Historical exploration mining occurred along the southern portion of DPG in the Yellow Jacket area (a FUDS) and at Callao, UT. No minerals were removed from these areas. The geode beds located south of DPG are a special area that is withdrawn from mining by the BLM for use specifically by rockhounders. Impacts from public use of the geode beds include increased erosion at the site and increased ground disturbances such as excavation.

The Clive mine, located north of DPG along I-80, is a three-pit sand and gravel mine. In the northwest corner of the UTTR–South AF near Wendover, minerals are being mined by Riley Industries on BLM land. The proposed Kennecott Brown Sugar Mine, approximately 1.6 km (1 mi) north of DPG's north boundary, would mine flux,

a substance that can decrease the melting point of copper. To access this site, a new road would have to be constructed, thereby resulting in impacts to potential cultural resources, biological resources, and geological resources in the area.

Other large regional mining operations such as Kennecott's Bingham Canyon copper mine and IPP's coal mining operations near Delta, UT also would result in long-term changes to the geological environment through the depletion of valuable mineral resources. While these existing and proposed mining operations would result in identifiable localized impacts to various environmental resources, their cumulative impacts to geological resources, including those from DPG, would not be significant on a regional scale.

5.2.1.2 Soil Compaction and Other Ground Disturbance

As described in Section 4.1.2.1, Impacts to Soil Physical Quality, soil compaction is a process that tends to decrease the volume of soil. Compaction of soil leads to a decrease and change in the vegetation due to the change in the soil's properties. These changes may then increase erosion from loss of plant species. Soil compaction occurs on the BLM land surrounding DPG and private lands from off-road vehicular use and movement of feral horse herds and grazing livestock. These activities would continue to increase erosion in the region, thereby resulting in further changes to vegetation patterns towards unwanted trends such as cheatgrass. In the Skull Valley grazing allotment areas, the loss of vegetation during recent drought conditions and wildfires have increased the soil instability already present due to historical grazing (BLM, 1999a).

In addition to direct soil compaction, other types of regional ground disturbances such as trenches, craters, etc. would cumulatively add to those same types of changes occurring at DPG. AF testing and training activities within the UTTR and historical activities at the Tekoi Test Range and the Yellow Jacket/Southern Triangle sites have caused ground disturbance in areas surrounding DPG. While the Tekoi Test Range is now closed and the Southern Triangle/Yellow Jacket sites are undergoing a FUDS investigation, ground disturbance at the UTTR would continue in the future. Regional ground disturbance is a significant cumulative impact and is further discussed in section 5.2.4, Cumulative Impacts to Biological Resources.

5.2.1.3 Soil Erosion

Soil erosion is closely linked with soil compaction and other ground disturbances. Increased erosion on lands adjacent to DPG would continue to occur due to:

- Increased off-road vehicle use on BLM and private lands
- Increased construction in Skull Valley
- Mining operations
- Movement of feral horses and grazing livestock
- Wildland Fires

Soil erosion has many identifiable impacts on the landscape. It alters the landscape by soil loss, which can make the area unattractive to certain species of plants and animals. Erosion also changes the patterns of vegetation communities, further increasing the trend towards exotic annuals, and decreases water quality through chemical and debris contamination. Due to the reduced fire interval in the area around DPG to 3 to 5 years per fire event, the soils on the Skull Valley grazing allotments risk further degradation from wind and soil erosion (BLM, 1999a). Soil erosion is also more likely to occur in areas dominated by exotic annual grasses (BLM, 1999b). The Ensign Ranch, the largest private land holder in Skull Valley, manages their pastures for erosion by not burning or disking the crops, but instead clipping them low to the ground (Thackery, 2000). The presence of even low vegetation often is enough to prevent erosion of the soils. Due to an increasing trend in frequency and severity of fires, soil erosion is likely to have long-term cumulative impacts in the region.

5.2.1.4 Soil Chemistry

Soil chemistry in areas surrounding DPG would continue to be impacted from ammunition and other military testing on UTTR land and from pesticide and herbicide use on agricultural lands. Munition residue or explosive waste from historical testing of ammunition on the area northeast of DPG at the Tekoi Test Range and Southern Triangle/Yellow Jacket FUDS is likely. Munitions testing from UTTR activities also contribute to the heavy metal contaminants in the soils within the region. No significant adverse impacts to soils would be expected as a result of AF chaff deployment within the UTTR (HAFB, 2000).

Pesticide, herbicide, and fertilizer application on DPG is minimal; however, spraying crops in Skull Valley is more concentrated. The State Department of Agriculture and Ensign Ranch coordinate spraying efforts in Skull Valley. Malathione and demolene have been sprayed on alfalfa and rye (Smith, 2000). Impacts are likely to be confined to the areas sprayed unless large precipitation events increase water run-off. The use

of fertilizers can increase soil nutrients that can increase the growth of both wanted and unwanted vegetation. Commercial fertilizers were historically used in Skull Valley; however, biosolids are now being used (Thackery, 2000). These fertilizers have a high available nitrogen content and good organic composition to allow for increased growth of plants. Biological contaminants are removed from the biosolids before they are used so there would be no impact to soils or water quality. Soils, however, may be beneficially impacted from the addition of organic material.

The continuing changes to soils from compaction, ground disturbances, erosion, and chemicals, including those impacts on DPG land, would be a significant cumulative long-term impact in the region.

These changes to soil result in increases in fire intensity, alteration of natural vegetation and habitat, and support for unwanted vegetation patterns throughout much of the cumulative activity impact area.

5.2.2 Cumulative Impacts to Water Resources

Water is an important resource throughout the cumulative activity area. The regional hydrologic regime is summarized in Section 3.2, Water Resources. This section summarizes cumulative impacts to regional water quantity and water quality.

5.2.2.1 Water Quantity

Increased growth in the Skull Valley area could impact the quantity of water certain users, including DPG, receive by decreasing the regional water table in the future. As of 2000, withdrawal rates at DPG are lower than historical water withdrawal rates, and water supply is not a problem in Skull Valley. Most of the water used for construction of the proposed Skull Valley Spent Fuel Storage Facility and its associated access routes would be purchased from off-site sources and transported to the points of use. No adverse hydrologic impact would result from obtaining water off-site (NRC, 2000).

In Tooele Valley, groundwater is already grossly over-appropriated. The State of Utah has issued groundwater permits that, if used, would allow a withdrawal rate of about 3,700,500 m^3 (3,000 acre-ft) per year in Tooele Valley (Schmerker, 2000c). The water withdrawal rate in 2000 of about 33,300,000 m^3 (27,000 acre-ft) per year has already led some water users to report that well depths are dropping and some springs are drying up.

Management of the feral horse population by BLM substantially affects the naturally occurring springs around DPG. Guzzlers providing water for both pronghorn and

chukars are installed on BLM lands to increase water availability for these species. However, the horse population is excluded from these water sources by fences (Warrick, 2000). The Cedar Mountain Management Plan allows for a maximum of 125 feral horses in the unit, although the herd is up to 861 horses as of 2000. Dry winters have reduced the available water in several of the nearby springs, which has forced the horses to find other water sources. The natural water sources are now being overused (Anderson, 2000), thereby reducing available water in the region.

The feral horse population managed by the Bureau of Land Management affects the springs around and on DPG.

In addition to the wildlife, domestic animals and crop irrigation also use water resources around DPG. Quincy Springs, Brown Springs, and Cedar Springs are used by livestock grazers during the winter grazing period. Competition for water sources by feral horse herds is minimal because the majority of the feral horses winter in the lowlands. However, year-round use of the springs cumulatively affects the amount of water available. In addition to the springs, cattle are watered in the surrounding allotments from three wells, a reservoir, a pipeline, and open ditches (Thackery, 2000). Mild winters could affect production from these water sources, which, with cattle use, an increase in feral horse use, and irrigation requirements, would cumulatively impact the quantity of water available in the region.

Dry conditions and greater economic activity and population in the region have also increased demand on the water needed for irrigation of agricultural lands. This impact could be significant if several years of dry winters do not resupply the recharge areas, and further irrigation demands are placed on groundwater supplies. One possible solution comes from the proposed Skull Valley Spent Fuel Storage Facility. If this project is implemented, a reservoir would be constructed to provide water year-round for irrigation. This new water source could decrease demand on the regional water supplies.

Overall, no significant cumulative impact to water availability would be expected in the Skull Valley area as long as DPG's withdrawal rates remain below historical values. However, cumulative impacts to water availability in Tooele Valley would be significant because of over-appropriation and increasing use of these water resources.

5.2.2.2 Water Quality

Regional activities can impact water quality within the cumulative activity region. An example of this is Tooele Army Depot, where nearly 40 years of dumping waste water into a drainage ditch has led to a plume of groundwater contaminated with a chlorine-based cleaning solvent. The plume is estimated to be 5.3 km (3.3 mi) in length, with a reported 140 billion L (38 billion gallons) of groundwater affected. Water remediation efforts are underway at Tooele Army Depot to resolve this problem, but there is new evidence of another plume along Tooele Army Depot's northeast boundary (Speckman, 2000d).

Skull Valley agricultural activities use pesticides and herbicides to maintain crops. These chemicals have the potential to migrate into Skull Valley groundwater. Other activities that could contaminate groundwater supplies in the future include waste generation from use of public BLM lands, proposed mining operations on BLM lands, AF testing activities within the UTTR, hazardous waste treatment, storage and disposal facilities, the proposed Skull Valley Spent Fuel Storage facility, and historical testing on the Tekoi Test Range and within the FUDS south of DPG. Explosive products and resulting chemical degradation could also impact water quality in the playas adjacent to the UTTR-South. Water samples from these sites have not been collected or analyzed, so the level of impact is unknown. No significant impact to water resources would be expected as a result of AF chaff deployment within the UTTR (HAFB, 2000).

Erosion is another factor that can affect regional water quality. Erosion in the Cedar Mountains occurs from off-road vehicle use, feral horse herds, and livestock grazing. Increased horse herds have significantly impacted the springs in the Cedar Mountains. More horses may range onto other lands such as DPG in search of new water supplies. The watershed in the Onaqui Mountains is at risk due to accelerated erosion from encroaching juniper stands (BLM, 2000). Other watersheds in the area are jeopardized by the invasion of exotic annuals that offer less soil protection. Due to less vegetative cover, rain hitting the ground loosens particles and blocks the soil pores. This causes a decrease in water infiltration into the soil and an increase in moisture runoff (BLM, 1999a). Groundwater is likely to be significantly impacted from increasing erosion.

Water quality at Fish Springs is threatened by an exotic annual that is beginning to encroach even into the wetland areas up to 0.4 km (0.25 mi) from open water (Banta, 2000). This encroachment threatens the area by choking out the wetlands.

Given the extensive regional development involving hazardous materials and wastes, the existing water quality problem at Tooele Army Depot, increased horse population, and increased recreational use, cumulative water quality impacts are considered significant.

5.2.3 Cumulative Impacts to Air Resources

Regional climate and air quality descriptions are provided within Section 3.3, Air Resources. The prevailing high-altitude winds in the vicinity of DPG are from the west, although winds can change frequently in direction and intensity. Air quality is generally considered excellent, and Tooele County is in attainment for all criteria pollutants except for SO_2 levels above 1,700 m (5,600 ft). Exceptions to the generally high air quality around DPG are caused by wind-blown dust, forest or wildland fires, and inversions in which air gets trapped in low-lying areas. Visibility is usually high. The UDAQ is responsible for ensuring compliance with all applicable air quality/emission regulations and permits and for developing plans to decrease pollutants in non-attainment areas such as in the Salt Lake City area.

The regional mountain ranges substantially influence weather patterns and the dispersion of air emissions. Three mountain ranges separate DPG from the higher level of air emissions from the Salt Lake Valley; therefore, Salt Lake Valley, UT air emission sources rarely reach DPG.

However, Salt Lake Valley air emissions can frequently affect the air quality within Tooele Valley. For example, an inversion potentially involving emission sources from the Salt Lake Valley was reported in the fall of 1999 in the Tooele Transcript-Bulletin (Schmerker, 1999a), with pollution sources primarily resulting from automobiles according to a representative of the UDAQ. The potential for an increasing frequency and magnitude of air pollution events involving inversions in the Tooele Valley is likely to increase in the future as Tooele County, UT grows and more residents commute to other areas.

In addition to automobile emissions, industrial pollution sources are also a regional concern. Within Tooele County, UT the major industrial emission source is the MagCorp refinery. This facility is permitted to release 2,994 metric tons (3,300 tons) of pollutants in a 30-day period (Schmerker, 1999a). Other Tooele County industrial emission sources such as Deseret Chemical Depot, Tooele Army Depot, UTTR, and the regional hazardous waste facilities emit much smaller amounts of pollutants

compared to the MagCorp refinery. The Kennecott copper mining, concentrating, and refining operations (in Salt Lake County) and the IPP (in Delta County) are also major regional air emission sources of PM_{10}, NO_2, SO_2, and CO. Prevailing wind patterns do not typically allow the mixing of any of the emissions of these sources with emissions from DPG; however, on a regional basis beyond the vicinity of DPG, the MagCorp, Kennecott, and IPP industrial sources of air emissions must be considered substantial contributors to any cumulative impacts.

The following conclusions can be made for cumulative air impacts.

- It is expected that while emissions levels within Tooele County, UT would increase in the future, Tooele County would remain in attainment status during the period covered by the Future Programs EIS.
- The regional mountain ranges and typical wind frequency and direction would continue to serve as buffers to air emission mixing in the vicinity of DPG. Air emissions usually dissipate quickly unless inversion conditions occur. The frequency and magnitude of inversion events could increase in the future within the Tooele Valley.
- Non-point emissions from automobiles would be the fastest-growing source of regional air emissions.
- MagCorp, Kennecott, and IPP would continue to be major cumulative industrial air emission sources in the region. These and other industrial point sources would continue to be regulated by the UDAQ with permit conditions adjusted as necessary in the future.
- The potential for toxic air emissions from sources such as MagCorp, Deseret Chemical Depot and Tooele Chemical Agent Disposal Facility, and the regional hazardous waste facilities within the West Desert Hazardous Industry Area, would continue to be a major concern. While the potential for catastrophic air emissions events is small, the risk of such events cannot be totally eliminated by any mitigation measures.
- The most likely new emission source in the immediate vicinity of DPG would be construction of the proposed Skull Valley Spent Fuel Storage facility. If constructed, this facility would increase all criteria pollutants during construction (most notably particulates). The Draft EIS for the proposed project concluded that construction impacts from the proposed storage facility would typically not be additive or cumulative to DPG's air emissions, and that no NAAQS for particulate matter would be exceeded or closely approached by the proposed

project construction. The Draft EIS also states that construction of the rail line with the storage facility could occasionally produce moderate cumulative impacts to PM_{10} levels on I-80 due to the proximity of the construction site to the Interstate (NRC, 2000). Overall, the proposed project air impacts would be localized and short-term in duration.

- Impacts to air quality from continued use of chaff and flares by the AF would not be significant. The potential for release of HAPs is not an issue with chaff deployment because the impulse cartridges no longer contain calcium chromate. Calcium chromate was replaced by potassium perchlorate. Chaff deployment would also not affect the PM_{10} NAAQS because chaff settle to the ground quickly and are greater than 10 μm in size (HAFB, 2000).

- Emissions from fires may be an increasingly important source if dry conditions persist into future years, thereby increasing cumulative air emissions throughout Tooele County, UT.

Cumulative impacts to air quality would not cause regulatory or policy violations, and are therefore not considered significant. However, regional air quality issues would continue to be a major regulatory and public perception concern in the future.

5.2.4 Cumulative Impacts to Biological Resources

Biological resources in the cumulative activity region are affected through ground disturbance, wildland fires, spills or exposure to hazardous materials, noise and overhead motion, and human presence. Coordinated management of biological resources among the major land managers in the area (Army, AF, BLM, U.S. Fish and Wildlife Service, and UDWR) is important because vegetation patterns and wildlife cannot be categorized by artificial borders. Impacts to vegetation are closely linked to impacts to wildlife.

5.2.4.1 Ground Disturbance

Ground disturbance on DPG and surrounding UTTR, BLM, and private lands would continue to cumulatively affect vegetation communities in the region. Soil compaction is caused by many activities within the cumulative activity area, as discussed in Section 5.2.1.2, Soil Compaction and Other Ground Disturbance. Soil compaction leads to the spread of exotic vegetation, decreased native vegetation, and increased soil erosion. The loss of native vegetation in the area decreases the availability of an immediate seed source, and further supports the unwanted growth of exotic vegetation within DPG and other areas in the region.

Grazing activities also cause vegetation loss or changes. Grazing by both wild species such as horses and domestic species such as cows and sheep causes soil compaction and loss of specific species of plants during critical growth times. However, it has been suggested that cows can be used to manage cheatgrass by grazing at certain times of the year (Becker, 2000; Martin, 2000).

Changes in vegetation can affect wildlife migration patterns if habitat becomes unusable or is destroyed. Noxious weed infestation in the Great Basin is increasing by approximately 14 percent annually (BLM, 1999b). Migratory birds, pronghorn, mule deer, and horses are not limited in their ranges to artificial boundaries (such as DPG, the UTTR, or BLM land). Populations migrate to and from DPG and other regional areas, and individuals come and go from populations, which is important for maintaining genetic heterogeneity. If vegetation corridors used by migrating populations are lost, forage, nesting, and denning habitat is also lost.

Extensive vegetation loss can be detrimental to wildlife populations.

Increased horse populations in the Cedar Mountain herd unit have heavily impacted the natural vegetation. Horses in the area are roaming further to forage because of soil erosion and indirect loss of vegetation. Increased erosion can decrease essential elements for pronghorn, such as copper and selenium, which would ultimately decrease the pronghorn population (Becker, 2000). In some areas heavily used by horses, vegetation changes to native species have also been observed (Anderson, 2000).

Cumulative impacts from ground disturbance are a significant impact to DPG and the surrounding area.

5.2.4.2 Wildland Fires

Wildland fires are a major environmental and safety concern throughout the cumulative activity area. When they occur, wildland fires have a significant and

long-term impact on vegetation, wildlife, and other natural resources. Issues associated with wildland fires in the Great Basin include (BLM, 1999b):

- Loss of native plant communities
- Stability of watershed and soils
- Declining habitat for wildlife
- Less forage for feral horses
- Increase of noxious weeds and exotic annuals
- Reduced livestock grazing
- Fewer recreation opportunities
- More dangerous and costly wildland fire fighting

Sources of regional wildland fires are both natural and man-caused. With increased activity in the region, the potential for future fires caused by humans is likely greater than baseline conditions.

Man-caused fires from military-related testing or training at DPG and within the UTTR could result from sources such as live bombing and flare use. Fires from live bomb drops observed on June 25, 1998 burned for over an hour (EnviroSupport, 1998). Specific restrictions and procedures have been established for flare use to minimize the potential for wildland fire starts. These restrictions and procedures include minimum ground clearance levels for dispensing flares to ensure adequate time for complete combustion and consumption of the flare pellets before they reach the ground (HAFB, 2000).

Wildland fires directly result in obvious loss of vegetation, which is often replaced by unwanted exotic annual vegetation such as cheatgrass. Management of wildland fires, such as disking fire lines by public land owners, also cause direct impacts to vegetation by increasing ground disturbance. Fifty to 75 percent of the grazing allotments surrounding DPG no longer support native or desired plant species, and the vast majority of the allotments have been converted from native salt desert shrub to cheatgrass (BLM, 1999a). Wildland fires affect wildlife through direct mortality and indirectly through loss of habitat. Fires increase particulate matter in air that can affect wildlife respiratory systems. Fires have a significant adverse impact on wildlife populations and the regional ecology; however, some fires are a result of natural conditions and have positive effects such as increased habitat for chukars and resulting increased hunting opportunities.

Each regional land owner manages wildland fires differently, making fire control and management difficult. Wildland fires that begin off DPG have the potential of moving onto DPG and vice versa. A Memorandum of Agreement between BLM and

DPG is being drafted to deal with multi-jurisdictional fires. As of 2000, over 80 percent of the Salt Lake District BLM fire costs are spent in Skull Valley. Other agencies in the region involved in fire management include the AF and private landholders. Any fires that occur on the UTTR–North are immediately extinguished. Wildland fires in the UTTR–South AF around the Wildcat and Kittycat targets are allowed to burn since there is very little flammable material in the area and fires do not often last (Blood, 2000). Private landholders use disking methods to control and stop wildland fire advancement, which can destroy vegetation and cause significant ground disturbance (Thackery, 2000).

Wildland fires have a significant, long-term cumulative impact on the region.

5.2.4.3 Spills or Exposure to Hazardous Materials

Contamination of the soil within the cumulative activity area resulting in subsequent loss of vegetation can be caused from spills of pesticide and herbicide used by the farmers in Skull Valley, fire suppression methods, and transportation and handling of hazardous wastes and radioactive wastes. Herbicides may not be species-specific and may destroy desired vegetation with the unwanted vegetation. Herbicides are applied by both private and BLM land managers, and pesticide spraying is coordinated with the Utah Department of Agriculture.

Spills could indirectly result in the loss of wildlife through consumption of contaminated vegetation. The Safety-Kleen and Envirocare hazardous waste management facilities are located along migration routes for the pronghorn, and the pronghorn population could be affected if a spill were to occur and it was not timely reported and remediated.

Although the occurrence of a spill may be unlikely, a spill could affect wildlife indirectly through consumption of affected vegetation.

No significant impact is expected from spills in the region. The likelihood of a spill or other exposure to hazardous materials is small, and impacts would likely be localized if a spill were to occur. The potential for impacts from a spill cannot be totally eliminated.

5.2.4.4 Noise and Overhead Motion

Cumulative impacts to wildlife from noise and overhead motion result from activities associated with the UTTR. Cumulative noise impacts are summarized in Section 5.2.11.4, Effects from Exposure to Noise. Bird strike danger is also a concern within the Fish Springs National Wildlife Refuge. Flights into the UTTR from the south near the refuge should be limited during the spring (February through March) and fall (September through October) to reduce danger to wildlife in the area (Utah State University, 2000). If these high-use times are avoided, no significant impact to wildlife populations are expected from overhead motion.

5.2.4.5 Human Presence

Vehicular collisions are the leading human impact on wildlife within the cumulative activity area. Expansion of economic activity and population in Tooele County and a subsequent increase in commuters increase the likelihood of wildlife mortalities. Any mortalities within the deer population around DPG, especially of bucks, would substantially impact the local deer population due to low baseline population. Traffic along I-80 poses a threat to the migrating pronghorn herd.

Raising livestock around DPG may also affect the pronghorn population. The pronghorn population in the area is on a decline. Exact causes of the decline are unknown, but one hypothesized reason may be the contraction of blue tongue passed from domestic sheep (Becker, 2000). Increased livestock populations could have a significant effect on the pronghorn herd if this disease is partially responsible for their decline.

Encroachment of human habitation in Skull Valley and other parts of Tooele County into “wilderness” areas can push wildlife out of their habitat and into other locations. Changes in the locations of generalist predators (such as cougars and coyotes) can impact specialist predators (such as the kit fox) and prey populations. In addition, increased human presence increases the chance of human-wildlife encounters, which could lead to removal of the wildlife. Human presence impacts wildlife populations on a regional basis, and impacts to biological resources would likely be significant when additive with ground disturbance and fire.

5.2.4.6 Use of Chaff

The AF deploys chaff as part of its air training activity within UTTR airspace. Deployment of chaff is a highly effective countermeasure against many of the modern radar-guided and heat-seeking weapons. After its air deployment, chaff will fall to the ground. Chaff interference with wildlife activities is expected to be

negligible due to the limited amount of chaff used, characteristics of chaff, and field observations of chaff accumulation. Since there is no evidence of heavy chaff accumulation on the ground or water, even in heavy use areas, avoidance of foraging areas by wildlife due to chaff is unlikely (HAFB, 2000).

Incidental ingestion of chaff does not affect the health, weight gain, or reproductive capability of wildlife or domestic animals. Chemicals potentially leaching from chaff would not adversely affect food sources. Chaff that may be deposited on cropland would be easily washed off and is not anticipated to affect the quality or safety of agricultural products (HAFB, 2000).

5.2.4.7 Sensitive Species

The area surrounding DPG contains vegetative and aquatic characteristics not found on DPG. Some areas are more suitable and attractive for migrating species, such as birds. Fish Springs National Wildlife Refuge and Blue Lake on the western edge of the UTTR–South AF are two areas with a diversity of both plant and animal species. As large bodies of water, migrating birds are attracted to these areas on an annual basis. Desert grassland species of interest such as the burrowing owl can be impacted by cattle grazing. Preventing vegetation loss from grazing and fires and decreasing brown-headed cowbird parasitism are important for maintaining breeding populations of these birds (Utah State University, 2000). Land management for species in areas surrounding DPG, especially sensitive species, may impact the potential for these species to occur on DPG lands.

5.2.5 Cumulative Socioeconomic Impacts

With extensive changes underway in the cumulative activity area, concerns over socioeconomic issues are increasing. Further changes to the existing regional socioeconomic environment are expected in the future.

5.2.5.1 Regional Issues and Concerns

The Tooele County General Plan (Gillies, 1995) provides a summary of major issues in the region by Tooele County Planning District. The planning districts including or directly linked to DPG are described in Section 3.7.2, Regional Land Uses. Regional issues identified in the plan for other planning districts include the following.

- The Tooele Valley planning district faces more intense growth pressure than other districts. Most of the Tooele County's residents live in this district. As a result, issues and problems related to land use, protection of natural environments, and growth management are more complicated than in other

districts. This planning district contains mostly privately-owned land. Grantsville and Tooele, UT are incorporated cities in the valley, and there are several concentrations of population in unincorporated areas including Pine Canyon/Lincoln, Erda, Stansbury Park, and Lake Point. There are BLM and U.S. Forest Service lands and the Tooele Army Depot in the center of the valley. Two eastern areas of Tooele Army Depot were recently annexed by the City of Tooele, UT. Growth pressure on this district is a result of increasing population, proximity to Salt Lake City, UT, and availability of private land for development. Growth is in conflict with some residents' desires to maintain the traditional rural lifestyle and open space in the valley.

- The Rush Valley Planning District is experiencing the greatest growth pressure outside of Tooele Valley. Issues associated with this growth pressure include the debate over whether to locate development in incorporated towns or in the county; increasing interest in recreation and recreation-related development; access to BLM and U.S. Forest Service lands; destruction or damage of cultural (historic and prehistoric) resources; efforts to balance water resources with water consumption; and protection of the rural environment.

- The I-80 Corridor Planning District issues include recreational uses and development of historic, recreation, and environmental resources. Some commercial and industrial development opportunities are possible. Developmental impacts upon the character and appearance of the district could be significant.

In addition to these district-specific issues, county-wide concerns and issues include:

- Public service delivery and provision of infrastructure (sewer, water, roads, etc.)
- Housing types and densities
- Natural resources including air and water quality
- Recreation resources
- Cultural and scenic resources
- Hazardous waste facilities
- Land use planning and growth management
- Quality of life and lifestyle

These issues form the basis for many of the cumulative impact concerns for citizens living and working in Tooele County, UT.

5.2.5.2 Regional Employment and the Economy

The regional economy is described in Section 3.5.3, Economic Activity. DPG is the largest employer in Tooele County, UT and there is a close link between DPG and other military-related activity with the regional economy. Much of the economic development in Tooele County, UT involves government and private facilities using dangerous materials and generating, treating, and storing hazardous wastes. Much of the county-wide employment and income comes from these activities. The general economic growth trend and the growing importance of materials and wastes-related employment are expected to continue in the future. Other continuing trends affecting the regional economy include Tooele County, UT serving as a source of residency for employment in Salt Lake City, UT, and Tooele County, UT serving as a growing source of recreational activities in the region. Cumulative impacts to the regional economy and employment would be significant; however, impacts would be considered beneficial by some persons and adverse by others, depending on individual and group values, beliefs, and goals.

5.2.5.3 Population

With the growth in the regional economy, a perceived high quality of life, and proximity to Salt Lake City, UT, the population of Tooele County, UT would continue to grow into the future. The population is projected to grow about 40 percent from 2000 to 2010.

The proposed Skull Valley Spent Fuel Storage Facility would be a new project about 16 km (10 mi) from DPG land. This project would provide a maximum of slightly less than 200 new residents in about 90 new households during the construction phase of the project. These new residents are projected to live in the eastern portion of Tooele County, UT in Grantsville and Tooele, UT because these areas are the closest residential areas with available housing. It is unlikely that any in-moving workers and their families would locate in Skull Valley itself since there are few, if any, housing units available. It is possible that members of the Skull Valley Band who return to their reservation for employment at the facility might decide to live on the Reservation (NRC, 2000).

Cumulative impacts to the regional population would be significant. However, impacts would be considered beneficial by some persons and adverse by others, depending on individual and group values, beliefs and goals.

5.2.5.4 Housing

With economic and population growth comes the need for additional housing. Hotel capacity in the region could also become inadequate. There is substantial undeveloped land in the cumulative activity area to provide for additional housing, and the private housing sector would generally respond to the demand by building new housing and hotel units.

While demand for new housing may be filled in the future, housing pricing may be a future problem for many buyers. Fifteen years ago the average price of a home in Tooele, UT was around $52,000, while in the year 2000 the average price had risen to over $120,000. With increasing regional housing demand, and Tooele area housing costs 15 to 20 percent below Salt Lake City, UT, this increase in housing prices is expected to continue into the future (Speckman, 2000c). Cumulative impacts to the regional housing market would be significant; however, impacts would be considered beneficial by some persons and adverse by others, depending on individual and group values, beliefs and goals.

5.2.5.5 Public Services and Infrastructure

With the regional growth already underway and expectations of further growth in the future, demand for public services and infrastructure in Tooele County, UT would also increase. Efforts within the county are underway to deal with this need for additional services and infrastructure.

One of the major sources of concern for infrastructure is in the Tooele County school system. While enrollment at DPG schools are well under capacity, Tooele County's overall student population is the fastest growing in the state and the fourth fastest growing in the country. Year 1999-2000 student enrollment was 8,777, but by October 2004 that number is expected to rise to 15,146 according to projections by the Utah State Office of Education (Speckman, 2000e). Construction of at least three new elementary schools along with improvements to high schools in Tooele and Grantsville, UT are planned. As growth occurs and services and infrastructure improvements are needed, the budgets of affected cities, Tooele County, and the school system would likely be strained. As with the school system improvements, public financing of these improvements would need to be approved by voters in many cases. Cumulative impacts to public infrastructure and services would be significant.

5.2.5.6 Lifestyles and Quality of Life

Lifestyle and quality of life are major regional issues, as noted in Section 5.2.5.1, Regional Issues and Concerns. There is evidence of conflict between growth and rural values, and this conflict would likely continue in the future. Willingness to accept changes is based on individual and group values, beliefs, and goals. Therefore, effects may be different among individuals or groups.

Overall, cumulative impacts to socioeconomics would be significant on a regional basis. However, DPG now serves as a major stabilizing factor in the regional economy because of its substantial employment and important role in the economy.

5.2.6 Cumulative Environmental Justice Impacts

Environmental justice issues and requirements are explained in Sections 3.6, Environmental Justice, and 4.6, Environmental Justice Impacts. EO 12898 states that the Executive Office policy on environmental justice requires the consideration of potential disproportionate effects on minority and/or low-income populations.

There are minority and/or low-income population segments located in various parts of Tooele County, UT, including the Native Americans residing on the Skull Valley Reservation and Confederated Tribes of the Goshute Reservation. General economic development in Tooele County and the list of cumulative activities considered in this analysis include many activities that could lead to environmental, socioeconomic, and/or health impacts to nearby residents. The proposed Skull Valley Spent Fuel Storage Facility would have environmental justice issues associated with it because of its location on a Native American reservation. These environmental justice issues are being assessed in the environmental review process being conducted on the proposed facility by the NRC. This review process reported that the proposed facility would add little to the cumulative impacts.

The DEIS on the Proposed Skull Valley facility states, “Examination of the various environmental pathways by which low income and minority populations could be disproportionately affected reveals no disproportionate high and adverse impacts from construction or normal operations. There are also no credible accident scenarios by which such impacts could take place. Thus, the effect of the proposed (project) on environmental justice concerns through direct environmental pathways is small. When considering past, present, and foreseeable future actions, the impacts from the proposed (project) would add little to the indirect impacts and cumulative impacts and are considered to be small.”

There is no evidence that the projects and activities in the cumulative activity area have any cumulative disproportionate effects on any specific minority and/or low-income populations. Cumulative impacts to environmental justice are therefore not considered significant.

While there may not be any identifiable environmental justice issues in the region in the context of EO 12898, Tooele County, UT has a much higher share of activities and facilities (including those at DPG) dealing with dangerous or hazardous materials and wastes than a typical county.

County and community officials and leaders, many members of the public, and the Skull Valley Goshute tribal leadership have supported the trend of locating these facilities and activities using dangerous or hazardous materials and wastes within Tooele County, UT. However, some proportion of the public is not supportive of the individual or collective dangerous or hazardous facilities and activities in the area.

5.2.7 Cumulative Impacts to Land Use and Access

Major regional landholders around DPG are summarized in Section 3.7.2, Regional Land Uses. Existing land use patterns in the region are firmly established because of the extensive control of land by DPG, UTTR, and BLM. Private land owners such as the Ensign Ranch, which owns or controls about 270 sq km (67,000 acres) in Skull Valley, also play a regional role in land use patterns. Private land ownership becomes more prevalent in the eastern portion of Tooele County, UT. The largest land quality concern in the area relates to the influx of unwanted vegetation such as cheatgrass. Access to the region's military related sites such as DPG, UTTR, Tooele Army Depot, and Deseret Chemical Depot, and Tooele Chemical Agent Disposal Facility is extremely limited. Fences, locked gates, and the presence of security personnel are used extensively to restrict access to these areas.

5.2.7.1 Land Ownership and Use

In addition to the military-related roles played by DPG, UTTR, Tooele Army Depot, Deseret Chemical Depot, Tooele Chemical Agent Disposal Facility, and the private facilities within the West Desert Hazardous Industry Area, much of the land around DPG is used for grazing, farming, and recreational activities. Late 1980s grazing practices changed the salt desert shrub and sagebrush communities by removing perennial grasses and expanding native shrubs that allowed for the encroachment of exotic species. In the pinyon-juniper stands, decreased livestock grazing and the elimination of fires has allowed the expansion and survival of younger trees into the shrub communities (BLM, 1999b). Fish Springs National Wildlife Refuge historically had problems with trespass grazing that prevented restoration of the

refuge lands (Banta, 2000). Grazing patterns have changed from historical patterns, but are still a large regional land use of public lands.

Increased use of regional land by outdoor recreationalists has increased the impacts to public lands (Laub, 2000). BLM and U.S. Forest Service land serve as major recreational attractions to Tooele County residents and visitors alike. After a 1997 inventory of the West Desert area by BLM to determine wilderness characteristics in accordance with FLPMA, designation of additional wilderness in the region has not yet occurred.

NASA's use of DPG land could potentially expand in the future if land is needed for landing sites or associated facilities. NASA land needs would be small, and any impacts associated with land used for future NASA activities would not be significant.

5.2.7.2 Land Quality

A 1994 survey of the Great Basin public lands found 17 million acres dominated or heavily infested by cheatgrass, which is further exacerbated by the increase in fire return intervals. Land quality of the area surrounding DPG is significantly affected by the spread of noxious weeds and exotic annuals, and this trend would continue without immediate and aggressive action.

The Great Basin is changing more rapidly now than at any other time in the last 150 years. Millions of acres in the Great Basin have changed from healthy, functioning ecosystems primarily consisting of native species, to biological systems dominated by annual weeds.

Out of Ashes (BLM, 1999b)

The Great Basin Restoration Initiative is an interagency and interdisciplinary team established to develop methods for restoring the Great Basin habitat and increasing the quality of public lands. Overall strategies include:

- Develop steps required to identify and inventory plant communities needing protection or restoration
- Develop partnerships necessary to obtain critical research
- Develop strategies to increase seed production
- Develop monitoring strategies
- Determine how priorities for restoration will be decided

Because of typical site conditions, time needed to accomplish reseeding, budgets, and the lack of seed availability, reseeding of burned land is often not deemed feasible (BLM, 1999a). In some cases, the BLM and private land owners would work together to perform emergency seeding. Strategies have been adopted by the Salt Lake City District of BLM for implementation in the Skull Valley area to control the spread of fire and create buffer zones around DPG (Washington, 2000).

Other land quality issues in the region include increased regional development and urbanization, the potential for wilderness designation, BLM management of feral horse herds in the Cedar Mountain Unit, and unauthorized access of recreationalists using UTTR lands to access dunes and playas.

While there are some local issues and minor changes projected in the region, land use would continue to be relatively stable, and cumulative impacts to land use and ownership are not considered significant. However, cumulative impacts to land quality in the region would be considered significant, primarily because of the widespread adverse impacts on land quality from fire, ground disturbance, increased usage, and spread of exotic vegetation.

5.2.8 Cumulative Impacts to Cultural Resources

The areas surrounding DPG are rich in paleontological resources similar to those described in Section 3.8.3, Paleontologic Resources, for DPG. Increased access and popularity of these sites have increased their use and the removal of fossils from the area. While fossil hunters are not likely to significantly impact DPG's resources because of DPG's limited access, loss of these paleontological resources would continue to occur on BLM lands.

Cultural resources in the cumulative activity area would be similar to those described at DPG in Section 3.8, Cultural Resources. As with DPG, there is a vast area within the region that has yet to be surveyed for cultural resources. Areas that have been surveyed on surrounding lands include several BLM grazing allotments. On the Skull Valley grazing allotments, about 21 percent of the allotment acreage has been surveyed. Seventeen percent of the South Skull Valley allotments, and about 14 percent of the West Onaqui allotments, have also been surveyed (BLM, 1999a). About 25 percent of UTTR-North lands and 19 percent of UTTR-South AF lands have been surveyed for cultural resources (EnviroSupport, 1998).

Impacts to cultural resources would continue to occur throughout the region in the future. Major contributors to regional impacts to cultural resources are the grazing and public use of BLM lands, the population growth in Skull Valley and other areas of Tooele County, UT, and AF activities within the UTTR. As with DPG, ground

disturbances have the major impact on cultural resource sites in the region. Munitions testing and training activities on the UTTR can destroy archeological sites. The feral horse population in the region compacts soil around natural springs, which often contain cultural resource sites. Mining and public use of BLM lands increase disturbance and vandalism within cultural resource sites and increase illegal artifact collection. Fires, either caused by nature or humans, destroy glass and paper historical artifacts and can make archeological sites more accessible. The increasing population in Tooele County, UT, would lead to upgrading roads or creating new roads on public land by the BLM to accommodate increase in use, which can destroy potential sites. Additionally, chemical contamination of sites may occur from the use of pesticides and fire suppression methods.

In addition to the Army, the major landowners in the area are the BLM and AF. Similar to the situation at DPG, both the BLM and AF have cultural resource protection management plans in place. Cultural resource surveys take place as necessary on BLM and AF lands, and both agencies must comply with the extensive legal and regulatory cultural resource protection framework summarized in Section 3.8, Cultural Resources. Any cultural resources potentially affected by cumulative activities on DPG land (e.g., NASA activities) would also be protected through the existing legal and regulatory framework.

Because of these features in place to protect cultural resources on lands owned by the Federal government, cumulative impacts to cultural resources would not be significant.

5.2.9 Cumulative Impacts to Traffic and Transportation

The regional road network is described in Section 3.9.2.2, Regional Roadways. In rural, less populated parts of the cumulative activity area such as those near DPG or other lands within the UTTR, roads are generally still adequate to handle existing and projected future traffic flow. However, activities such as the proposed Skull Valley Spent Fuel Storage Facility would place new strains on the existing roadway infrastructure. If developed, this facility would have a substantial impact during the early phases of construction, when traffic delays along SR 196 may result due to a 172 percent increase in traffic on the road for the movement of construction materials and workers (NRC, 2000).

In Tooele Valley and other areas showing high growth rates, traffic flow on the existing roadways is becoming problematic. There have been several proposals for major roadway improvements in this area, including: widening SR 36 in its existing alignment, or adding a new alignment west of the existing route to avoid the

populated areas of northern Tooele County, UT. Studies of both alignments are underway. An EIS on the SR 36 improvements may be needed before determination of the new route is finalized.

One major reason for improving SR 36 is the increasing flow of hazardous materials on this roadway. SR 36 is a major route for materials flow into DPG as shown on Figure 3.9-2, Primary Routes for Ground Transportation of DPG Materials and Wastes. In addition, this route handles materials and wastes for other facilities in the county. The Tooele County Sheriff's Office estimated that an average of 726,000 kg (1.6 million lb) of hazardous materials traveled through Tooele City, UT on SR 36 per day as of November 1997. The information in this hazardous materials flow study was "intended to demonstrate the urgent need for a bypass road around the populated areas of the northern section of Tooele County" (Tooele County Sheriff's Office, 1997).

Cumulative impacts from this flow of hazardous materials along SR 36 is a major regional concern, and is considered significant until flow of these hazardous materials can occur through less populated areas.

Flight operations into, from, and near civilian airports in the vicinity of DPG, including Salt Lake City International Airport, may be affected by infrequent and short-term delays or route changes imposed in conjunction with NASA activities. These impacts would not be significant, and communication and coordination protocols to minimize impacts would be covered in the program development and NEPA documentation for these NASA activities.

5.2.10 Cumulative Impacts to Visual Resources

Natural visual resources in the cumulative activity area are generally the same as those within DPG, with panoramic, scenic, open, and expansive views of valleys, mountain ranges, and sometimes barren land. There are some very high quality scenic areas such as designated wilderness, wilderness study areas, the Fish Springs National Wildlife Refuge, and U.S. Forest Service lands.

Natural visual resources in the DPG region include scenic views of mountain ranges.

Modifications to natural views have been made through construction of buildings, roads, and other infrastructure used by man. All of these activities change the form, lines, colors, and textures of the natural environment. Within Skull Valley in the vicinity of DPG land holdings, the area has generally remained undeveloped. However, the proposed construction and operation of the Skull Valley Spent Fuel Storage Facility would change the scenic quality of Skull Valley by introducing an industrial presence into a largely undeveloped landscape (NRC, 2000).

Additionally, UTTR air testing and training activities result in a variety of impacts to the visual environment in the region. High-speed aircraft are a common sight throughout the region. Views of flares and illuminants are also common. For example, in early February 2000, dozens of white flares were reported seen at sunset south of I-80 and west of the Cedar Mountains in the UTTR airspace north of DPG. A representative of the 388th RANS reported that the flares were from two B-52 bombers as part of an exercise to drop live bombs on specified targets below while avoiding simulated threats from the ground. The flares were released from the planes to simulate avoidance from heat-seeking missiles (Speckman, 2000a). While views of aircraft or flares may be acceptable or even exciting to some, views of these events may be unacceptable to viewers within high quality scenic areas such as wilderness or the Fish Springs National Wildlife Refuge.

Based on field studies, frequency of sighting chaff fibers and other chaff debris released by the AF during air training activities is directly related to the intensity of chaff use. Chaff debris has low visibility and little effect on the aesthetic quality of the environment. Chaff debris does not generally accumulate in quantities that are noticeable to most persons in low-use areas. In high-use areas, chaff debris may be visible in open spaces where vegetation is sparse. Chaff debris is generally only visible in the foreground and would not affect the attributes that contribute to the visual quality using BLM VRMS methods (HAFB, 2000).

In addition to the effects of fires on biological and physical resources, they also have an effect on visual resources. Depending on the type and amount of vegetation

burned, visual scars from fires can remain for many years after a fire occurred. Visually, there is little that can be done to improve a burned-out area until vegetation is re-established.

The types and magnitudes of visual intrusions to the natural visual resources would continue to grow with the anticipated economic and population growth. This growth also would continue to support high air pollution events that can result in poor visibility. These events result from air inversions with particulates becoming trapped in the lower air level. A representative of the UDAQ reported that automobiles are the major source of the problem, and that some of the pollution in Tooele Valley could be moving into the area from the Salt Lake Valley (Schmerker, 1999a).

Overall, while there would be increasing localized effects to visual resources, these impacts would not be considered significant on a regional scale. Most of the land in Tooele County, UT would remain undeveloped in the future.

5.2.11 Cumulative Noise Impacts

Noise sources at DPG, which include aircraft noise, sonic booms, and detonations are characterized in Section 3.11, Noise. These military-related noise sources also occur regionally through UTTR activities conducted by the AF. Other major regional sources of noise arise from automobile traffic and other urban activities.

5.2.11.1 Aircraft-Related Noise Sources

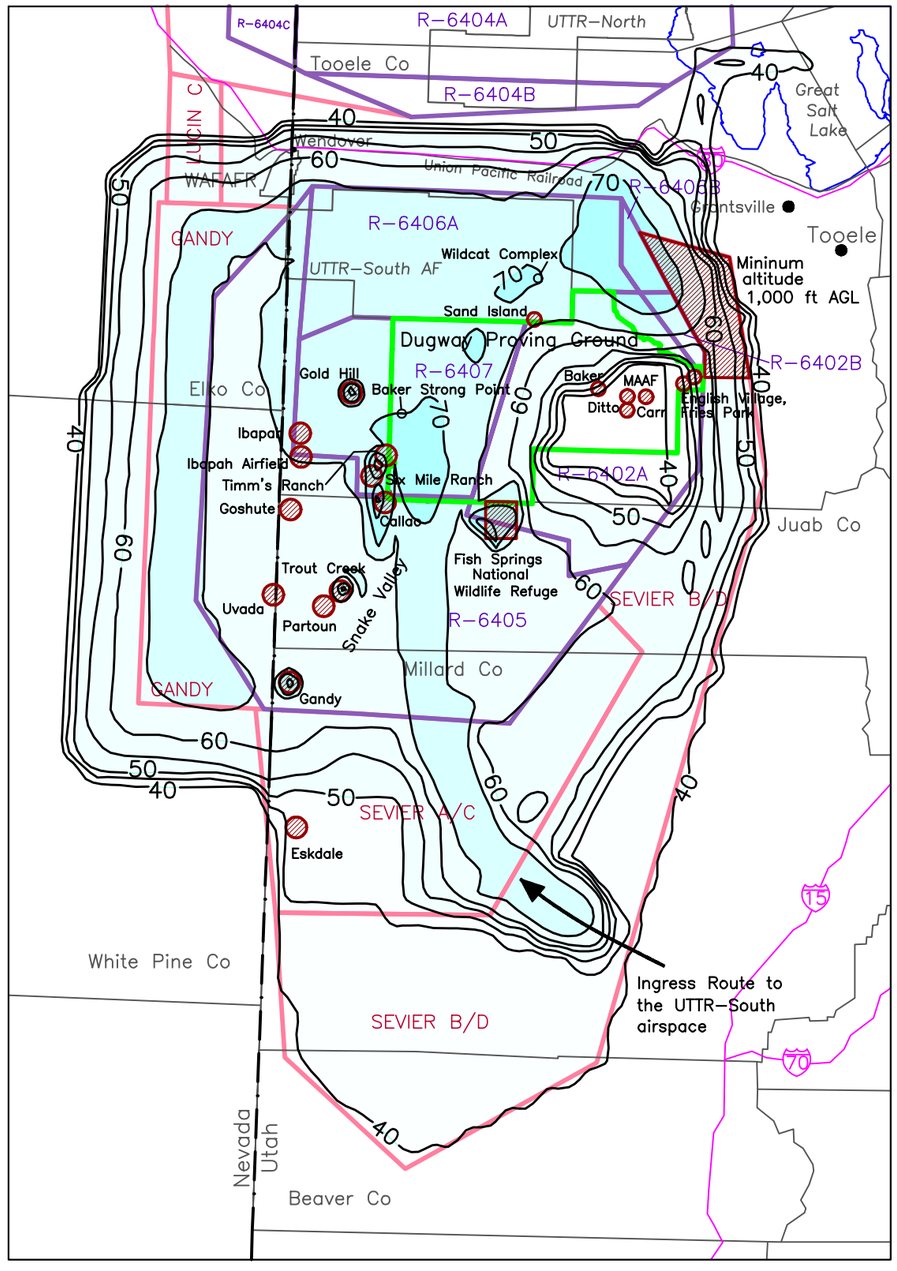
As identified in Section 3.11, Noise, aircraft noise and sonic booms from air testing and training activities are the greatest sources of noise in areas around DPG in terms of noise magnitude, extent, and frequency. This would also be true for much of the region. The primary source of noise in much of the cumulative activity area would continue to be air training and testing activities in UTTR airspace. UTTR air training and testing activities show essentially no planned increase according to the 388th RANS Five-Year Range Plan. Therefore, the general level of noise in the short-term from these UTTR activities would be expected to be about the same as baseline levels.

As the largest component of UTTR range use, air training activities contribute substantially to noise throughout the UTTR region. In addition, because training activity tends to emphasize operations near the ground and high airspeeds, noise impacts from training may be expected to be disproportionately high as compared to air testing activities.

Air testing activities involve more controlled test scenarios than air training activities. Air test objectives require planned and specifically defined operational parameters to enable highly accurate data on performance. This situation makes air testing activities more predictable and less likely to impose unanticipated noise impacts. However, this should not imply that air testing activities are totally predictable.

Noise contours obtained from modeling noise sources and magnitudes are shown in Figure 5.2-1, Aircraft Noise Pattern at the South Range, and Figure 5.2-2, Sonic Boom Noise Pattern at the South Range. These noise modeling results from the UTTR EA (Booz-Allen & Hamilton and EnviroSupport, Inc., 1999) indicated that target location and noise avoidance areas tend to focus air operations and associated noise impacts at specific generally remote locations. The most heavily impacted UTTR-South airspace would be a low-altitude track or corridor up the eastern side of Snake Valley diverging to the Wildcat or Baker Strong Point targets, as shown on Figure 5.2-1, Aircraft Noise Pattern at the South Range. The Baker Strong Point target is within DPG land. The model confirmed that noise levels at Callao, UT, Trout Creek, UT, and Partoun, UT were the highest encountered by any populated place beneath the UTTR airspace.

Although all populated areas and the Fish Springs National Wildlife Refuge are listed as flight avoidance areas, noise complaints are received by the AF for UTTR activity in these areas. On the South Range, the communities southwest of DPG along the west side of Snake Valley, the mountain communities to the west including the Confederated Tribes of the Goshute Reservation, and the military communities have been the source of recurring noise complaints, as has the Fish Springs National Wildlife Refuge, east of the Snake Valley in the South Range. Callao, UT, because of its location, and the Fish Springs National Wildlife Refuge, because of its location and extent, are both particularly exposed to a frequently used aircraft approach route up Snake Valley. Further, because the refuge lies beneath airspace that is often used for unscripted opposed air strikes, there is a potential for inadvertent overflight of the refuge. Opposed air strikes are missions that are attacked by a defending force and the pilot is training to “escape an adversary” by flying the aircraft as would be flown in actual combat. AF range and airspace managers note that concerns for bird strike hazards, as well as its flight avoidance status, encourage pilots to avoid the refuge.



LEGEND

- Noise Contours
- 40 Noise Contour Values, L_{DNMR}, Decibels
- County Boundary
- State Boundary
- Railroad
- Interstate Route
- Lake
- Increasing Noise Level
- UTTR Restricted Airspace
- UTTR Military Operating Area
- DPG Boundary
- South Range flight avoidance areas are below 3,000 ft AGL unless otherwise noted.

AF	Air Force
AGL	above ground level
Baker	Baker Area
Carr	Carr Facility
Co	County
Ditto	Ditto Technical Center
ft	feet
L_{DNMR}	onset rate-adjusted monthly day-night average sound level
MAAF	Michael Army Airfield
UTTR	Utah Test and Training Range
WAFAFR	Wendover Air Force Auxiliary Field Range

-N-

0 30
Scale In Miles

0 40
Scale In Kilometers

Approximate Scale

Figure 5.2-1

Aircraft Noise Pattern at the South Range

SOURCE: Booz-Allen & Hamilton and EnviroSupport Inc., 1999

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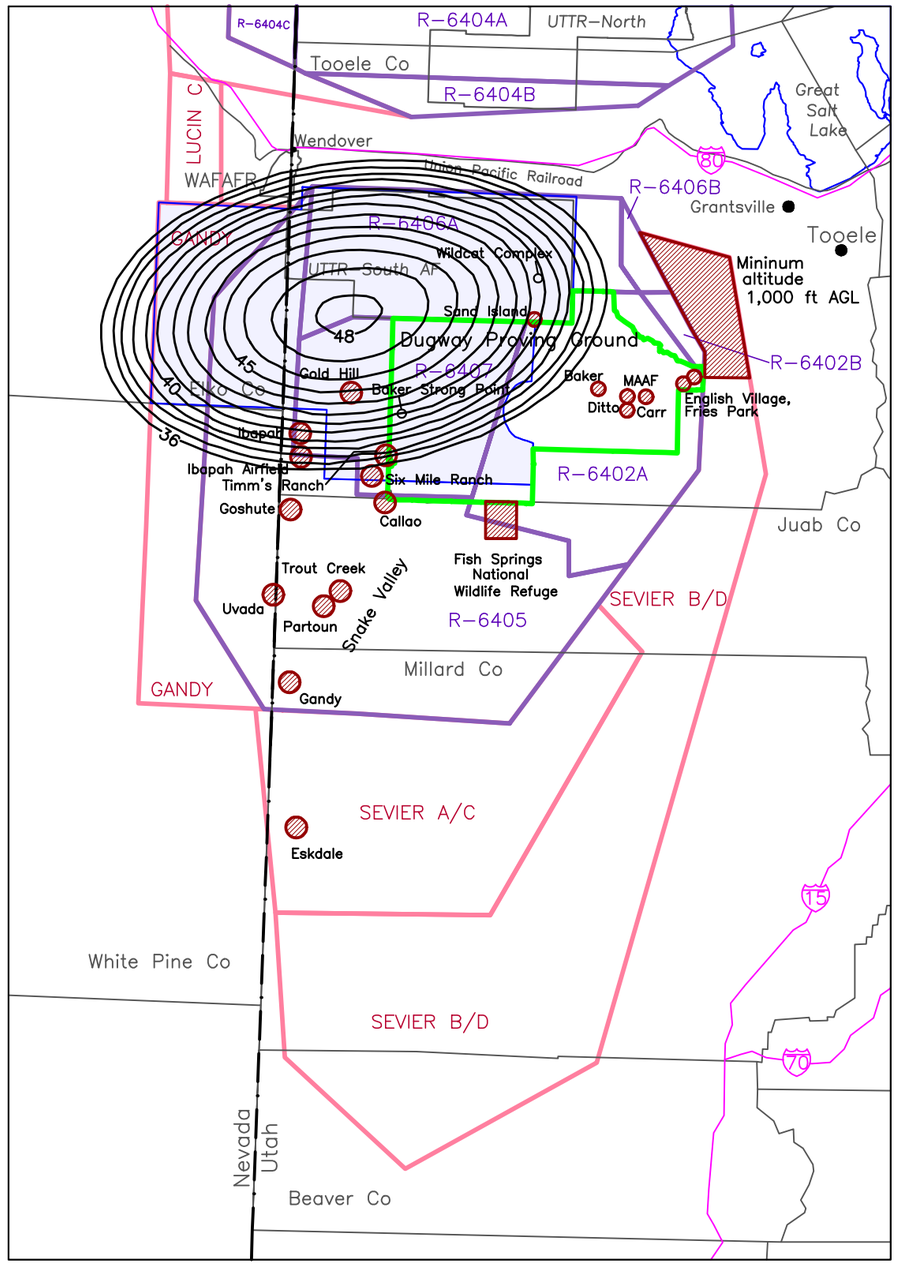

LEGEND

- Sonic Boom Ellipse
- 36 Sonic Boom Ellipse Values, CDNL, Decibels
- County Boundary
- State Boundary
- Railroad
- Interstate Route
- Lake
- UTTR Supersonic Operating Area (above 5,000 ft AGL)
- UTTR Restricted Airspace
- UTTR Military Operating Area
- DPG Boundary
- South Range flight avoidance areas are below 3,000 ft AGL unless otherwise noted.

AF	Air Force
AGL	above ground level
Baker	Baker Area
Carr	Carr Facility
CDNL	C-weighted day-night average sound level
Co	County
Ditto	Ditto Technical Center
ft	feet
MAAF	Michael Army Airfield
UTTR	Utah Test and Training Range
WAFAFR	Wendover Air Force Auxiliary Field Range

-N-

0 30
Scale In Miles

0 40
Scale In Kilometers

Approximate Scale

SOURCE: Booz-Allen & Hamilton and EnviroSupport Inc., 1999

Figure 5.2-2

Sonic Boom Noise Pattern at the South Range

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Based on the total of 86 noise complaints from flight activities on the UTTR from 1995 through 1998:

- More complaints occur from spring through fall than during winter
- More complaints occur in the morning than at other times of day
- Most complaints regard low flight, noise, and sonic booms from F-16, B-1, and F-15 aircraft
- About 53 percent of the complaints have been substantiated by analysis of AF radar tapes that confirm the occurrence of sonic booms or intrusion into a noise avoidance area

The key areas of concern to communities underlying the UTTR airspace were (Booz-Allen & Hamilton and EnviroSupport, Inc., 1999):

- Safety – are AF flight operations a hazard to persons on the ground?
- Startle effect – the sudden appearance of aircraft and rise in sound intensity associated with a low altitude overflight
- Specific impacts on young children
- Damage to windows or other structures caused by sonic booms
- Perceived lack of consideration – the feeling that residents' concerns are not of interest to the AF and other leaders

5.2.11.2 Other Noise Sources from Federal Government Activities

UTTR and Tooele Army Depot activities also generate noise from detonations. Weather, topography, and other factors can greatly influence noise levels associated with detonations as noted in Section 4.11, Noise Impacts. In most instances, detonations occurring within the UTTR land, including those at DPG, are heard only by a small number of test personnel.

Based on the potential for noise impacts, Tooele Army Depot voluntarily decided to reduce the size of its detonations of deteriorated items by 50 percent. Operating experience at Tooele Army Depot has shown that a wind shear sometimes occurs under otherwise ideal detonation weather periods. These wind shears, which are a sudden unusual movement of air, transmit the detonation sounds further than normal.

An example of this wind shear occurred on October 26-27, 1999, when residents near Tooele Army Depot reported unusual noise levels from the detonations.

Because of the lack of project-specific information about future NASA activities, noise impacts cannot be projected as to location and magnitude.

5.2.11.3 Traffic and Growth-Related Noise Sources

As economic activity and population growth occur in the cumulative activity area, noise impacts from urbanization have also increased. Major noise generated from traffic would be mostly found in high-traffic areas such as in the Tooele Valley. Other urban noise sources such as construction would primarily be found in cities and towns in the area, although more undeveloped areas such as the proposed Skull Valley Spent Fuel Storage Facility also result in short-term construction noise. One's ability to accept noise depends on individual and group values and goals. Complaints about traffic and urban noise would be expected to increase as growth continues to occur.

5.2.11.4 Effects from Exposure to Noise

Impacts from noise in the cumulative activity area could result in the following types of impacts:

- Impacts to people
- Economic impacts
- Impacts to structures
- Impacts to wildlife

Discussion of these impact types is provided below.

Impacts to People – Noise impacts to people take the form of health effects and annoyance effects. Health effects for occupational workers would be mitigated by conformance with OSHA standards (or their equivalent) that require control of noise sources to acceptable levels for workers. For the public, noise impacts would more likely result in annoyance effects rather than in health-related effects.

The level of annoyance is a measure of adverse psychological reactions to noise. As described in Table 3.11-1, Relationship of Noise Zone and Noise Limits, less than 15 percent of people are highly annoyed by noise resulting from aircraft and vehicle activities that has an ADNL less than 65 dBA. Less than 15 percent of people are highly annoyed by impulsive noise, such as detonations or sonic booms, that has a

CDNL of less than 62 dBC. Aircraft noise and sonic booms at the UTTR are below these thresholds at which significant adverse impact would occur.

Different people will react to the same noise in different ways, depending on a variety of attitudes and physical and social factors. In addition, age and familiarity with the purpose and process of UTTR activities can influence response to intrusive noise. The range of frequencies that the human ear can detect generally becomes narrower with age. Younger people may react more adversely to a broader range of sound frequencies, particularly to higher frequency sounds, such as those greater than 15 kilohertz, than older persons who are subjected to the same events. The team conducting the EA at the UTTR noted that persons attending public meetings in the west desert of Utah were particularly concerned about the acute and long-term impacts of aircraft noise on very young children.

Also, the more familiar people are with the details of training and testing activities at the UTTR, including their design, equipment, and goals, the more likely they are to be interested in all aspects of an activity, rather than reacting specifically to its noise. The unique characteristics of individuals make it impossible to accurately predict how any one person will react to a noise event.

Noise from activities within and adjacent to the UTTR occurs on an irregular basis. There is no regular pattern of noise events, although noise from aircraft occurs most frequently compared to other noise sources. It is possible that a noise receptor may experience “combined” noise events, in which noise is heard by a person from two or more sources at or near the same time. While the location and magnitude of these combined events cannot be predicted because of the irregular nature of noise events and patterns, it is likely that one of the noise sources in any combined noise event would include aircraft noise and/or sonic booms. In these situations, the aircraft noise/sonic booms would likely be the dominant noise source. Any combined noise events would be short-term in nature.

While health-related and annoyance noise issues would cause problems to some individuals, cumulative noise impacts to people are not considered significant.

Economic Impacts – Noise could have potential indirect impacts on the local and/or regional economy by making an area undesirable for certain land uses. These concerns would generally occur only in heavily populated areas around airports or large military sites that are characterized by substantial numbers of daily aircraft operations. In scoping meetings for this EIS, the public also noted a concern over the noise effects from aircraft on livestock near the UTTR. While there may be some localized effects, major impacts cannot be identified. Overall, in the largely

undeveloped environment of the cumulative activity area, cumulative economic impacts from noise are not significant.

Impacts to Structures – An aircraft flyover may cause structural vibrations, broken windowpanes, and the secondary rattle of hanging pictures and other possessions. These events are not atypical in and around the UTTR. On-installation personnel would tend to be more accepting of the noise-induced vibrations and rattling associated with aircraft flyovers compared to persons off-installation. Noise-induced structural vibrations may also damage aged structural materials in historical structures. Scoping comments from the public and a review of noise-related complaints to the AF indicate the existence of public concerns over structural impacts and broken window panes from aircraft activity within the UTTR. While the Booz-Allen & Hamilton and EnviroSupport, Inc. (1999) EA acknowledged these concerns, it concluded that noise-related impacts were not significant with appropriate mitigation measures.

Impacts to Wildlife – AF training flights and munitions testing in the UTTR–South would add to the noise and motion impact on wildlife produced by DPG's mission. Noise complaints from AF training flights are common within the Fish Springs National Wildlife Refuge. Specific data are not available to determine the impacts of noise on regional wildlife populations. However, the startle effect, in particular, is likely to be experienced by wildlife in the area because of explosives, sonic booms, and low-flying aircraft. Further effects on wildlife are likely because their hearing range is different from that of humans and diverse across different species. In addition, wildlife are typically exposed to other environmental stressors, particularly during reproductive and overwintering periods, that may act cumulatively with noise impacts. Noise studies elsewhere indicate that animals do adjust to noise within their habitat, and impacts are not considered significant.

5.2.11.5 Control of Noise Impacts from UTTR Air Activities

While there are no State of Utah or local noise controls applicable to UTTR activities, the AF has taken steps to control noise impacts through designation of noise avoidance areas and other flight restrictions in and adjacent to UTTR airspace. Specific mitigation measures for air training and testing activities at the UTTR can be found within the 1999 EA of Noise and Supersonic Effects at the UTTR (Booz-Allen & Hamilton and EnviroSupport, Inc., 1999):

Most combat aircraft are not designed to minimize noise, and many training activities call for considerable low-altitude, high-speed flight resulting in a high noise level for receptors on the ground. Therefore, mitigation efforts related to air training and

testing activities are primarily limited to measures that manage impacts rather than actual reduction of the noise resulting from the aircraft operation.

UTTR operations would generally continue to be consistent with existing noise control measures and plans. However, air overflights and sonic booms would continue to occasionally occur in inappropriate areas such as near communities or the Fish Springs National Wildlife Refuge. The potential for these direct impacts would be reduced by the mitigation measures identified by the AF, but would not be totally eliminated.

5.2.12 Cumulative Impacts to Health and Safety

Because of the high level of military-related activities and activities involving hazardous or other dangerous materials and wastes in the cumulative activity area, health and safety concerns are a major regional issue. Much of the health and safety risk in the area is associated with the Federal facilities such as DPG, UTTR, Tooele Army Depot, and Deseret Chemical Depot and Tooele Chemical Agent Disposal Facility, which have unavoidable risks associated with their missions.

5.2.12.1 General Occupational Injuries or Fatalities

Much of the activity in the cumulative activity area involves storage, handling, transportation, use and disposal of hazardous or other dangerous materials and wastes as discussed in Section 5.2.13, Cumulative Impacts from Materials and Wastes. These activities have the potential to result in accidents, injuries or fatalities. There is also the potential for more typical occupational incidents which would not be related to hazardous or other dangerous materials and wastes.

Throughout the region, there is the potential for a variety of occupational injuries or fatalities including, but not necessarily limited to:

- Occupational accidents
- Exposure to airborne gases and vapors
- Exposure to hazardous materials, chemicals, etc.
- Inhalation of asbestos
- Explosions, fire, or exposure to flammable or combustible materials
- Internal radiation exposure hazard
- Damage to eyes
- Exposure to wildland fires

While occupational injuries or fatalities are unavoidable with human activity, the public and private facilities within the cumulative activity area are highly regulated.

There is a substantial regulatory framework for occupational health and safety, with OSHA serving as the backbone for protection of workers. Additionally, DPG, the UTTR, the Tooele Army Depot, the Deseret Chemical Depot and Tooele Chemical Agent Disposal Facility, and the hazardous waste management facilities within the West Desert Hazardous Industry Area have developed operating procedure guidelines to protect their workers.

With these worker protection plans and programs in place, cumulative impacts to general occupational health and safety are not considered significant.

5.2.12.2 Storage, Transportation, and Disposal of Chemical Agent

In addition to DPG's role with chemical agent, the Deseret Chemical Depot stores chemical agent and the Tooele Chemical Agent Disposal Facility disposes of unneeded agent. As with activities at DPG, there is the potential for accidents and/or accidental release of chemical agent at these facilities.

For example, the Tooele Chemical Agent Disposal Facility reported a leak of about 18 µg (6.3 x 10^{-007} oz) of the nerve agent GB from an incinerator stack in May 2000. This leak exceeded state permitting levels and demilitarization efforts at the Tooele Chemical Agent Disposal Facility were suspended because of this incident. No one was exposed to the GB or injured in the incident. An extensive health and safety program is in place at each of the facilities to protect workers and the public. For example, workers at the Tooele Chemical Agent Disposal Facility and Deseret Chemical Depot donned protective masks immediately after the May, 2000 incident occurred, and none were hospitalized nor did any administer the first-defense anti-agent medication shots workers on-site are required to carry at all times (Schmerker, 2000c).

While these types of accidents are certainly not expected, the potential for incidents cannot be eliminated. The potential for a catastrophic incident is low, but impacts of such an event would be significant.

5.2.12.3 Unexploded Ordnance

In addition to the Army's testing and training roles at DPG, AF activities at the UTTR would also continue to include the use of explosives and munitions. Specific land areas within the UTTR, including DPG land, have the potential to contain UXO. Locations that could contain UXO are relatively isolated and remote, and both the Army and the AF have extensive procedures in place to protect worker exposure to the potential harmful effects of UXO, although there is the potential for an accident to occur.

Other areas that could contain UXO include the Southern Triangle/Yellow Jacket FUDS areas south of DPG. Ordnance incidences reported in these areas include (Woodward-Clyde, 1995):

- Unconfirmed reports suggest that miners discovered ordnance in these areas and even threw munitions down mine shafts
- In October 1982, two 454 kg (1,000-lb) chemical bombs were found in the Dugway Mountain Range. One was cracked open and empty; the other was intact with the exception of the fin assembly and fuzing. DPG's EOD transported the intact bomb to Igloo G at DPG and destroyed the second bomb by detonation.
- A geologist working in the Yellow Jacket area notified EOD of a munition in late 1991. The EOD Unit subsequently recovered a 227-kg (500-lb) warhead that contained 83 kg (182-lb) of explosives. This munition was reportedly detonated in October 1991.
- On May 3, 1993, EOD discovered an unexploded burster in the Yellow Jacket area. EOD removed and detonated this burster.
- There were reports of a large amount of ordnance scrap and "very large pieces of frag" in the Yellow Jacket area during interviews made for the Archives Search Report as part of the FUDS process.

Thousands of rounds, many containing chemical agent, were fired, launched or released into the Southern Triangle/Yellow Jacket areas. There is also the potential that some rounds landed outside the designated target areas. Some of this land is accessed by the public, with previous visitors to the area including Boy Scouts. Since discovery of live munitions, however, the Boy Scouts have been officially informed to avoid the area (Speckman, 2000f). Warning signs have been placed outside the FUDS investigation area, however, access to the area is still possible and additional measures may be necessary to prevent inadvertent entry. The FUDS assessment underway by the COE should mitigate potential risks, and impacts are not considered significant.

5.2.12.4 AF Use of Aircraft, Cruise Missiles, Chaff, and Flares

AF activities at the UTTR are summarized in Section 5.1.1, Utah Test and Training Range Air Training and Testing Activities. In its air testing and training operations, the AF uses aircraft, CMs, chaff, and flares. Use of this machinery and materials have potential health and safety issues, as summarized in this section.

The dangers of aircraft use, especially in training missions, involve the potential for aircraft collisions and crashes. While the risk of incidents is small, the risk for collisions and crashes is unavoidable given the AF mission at the UTTR. These incidents could result in the loss of life of the involved pilots, or if a crash were to involve a building or occur in a populated area, could involve workers at UTTR/DPG facilities or the general public. Risks associated with catastrophic events at DPG are summarized in Section 4.12, Impacts to Health and Safety.

CM testing activities conducted by the AF are projected to increase in the next 5 to 7 years. CM testing is conducted during all seasons but only during daylight hours. CMs fly at about 152.4 to 3,048 m (500 to 10,000 ft) AGL. There is the potential for CMs to fly off-course and miss intended targets. For example, an inert CM reportedly crashed on BLM property near the Confederated Tribes of the Goshute Reservation in western Tooele County, UT in March 2000. Three other known CMs have missed intended targets over the last 10 years in Utah. Additionally in 1997, a CM struck an improperly located support trailer associated with a cosmic ray observatory within DPG. CM incidents such as those reported above are investigated by the AF to determine the source of the problem. No injuries have been reported in association with these incidents (Speckman, 2000b).

The potential for continued CM incidents remains and is unavoidable given the AF mission at the UTTR. CM incidents are not likely, but the potential for a catastrophic event cannot be eliminated.

Chaff and flares are used routinely as part of the AF air training mission at the UTTR. Air Combat Command has studied the potential environmental effects of chaff and flares (ACC, 1997). Conclusions of this study relevant to health and safety issues include:

- There is little safety risk to aircrews, aircraft, or the public from the use of chaff.
- No incidences of injuries from falling chaff debris have ever been recorded.
- Accidents involving flares and flare systems have occurred, but none have resulted in serious injury.

Therefore, impacts to health and safety from the use of chaff and flares are not considered significant.

An Air Combat Command study concluded that no serious accidents have occurred from flares

.

5.2.12.5 Spills or Other Exposure to Hazardous Materials or Wastes

Because of the relatively high number of facilities and activities dealing with hazardous materials and wastes within the cumulative activity area, there exists the potential for spills or other exposure to hazardous materials or wastes. Potential receptors include both occupational workers and the public. Factors affecting exposure to hazardous or dangerous materials or wastes include:

- Likelihood of release
- Likelihood of exposure
- Location of release
- Mode of release
- Amount of material or waste released
- Fate and transport characteristics of materials or waste released
- Response and cleanup efforts following a release

The major existing public and private facilities in the region have spill prevention and other plans to avoid or mitigate potential effects of a spill or accident.

Potential cumulative radiological impacts include those from the proposed Skull Valley Spent Fuel Storage Facility and from the Envirocare facility which accepts low-level radioactive wastes for disposal. NRC staff concluded that the cumulative health effect of the spent nuclear fuel and other radioactive waste transport on the population of Utah is small. The radiation dose to the nearest resident who is 3.2 km (2 mi) from the proposed Spent Fuel Storage Facility would be less than the natural radiation environment (NRC, 2000).

Because of the wide variety of materials and wastes stored, transported, used, and disposed in the region, the effects of any incident could range from negligible to catastrophic, depending upon the variables listed above. The likelihood of release and the likelihood of exposure for both workers and the public is small, but potential risks cannot be totally eliminated.

5.2.12.6 Public Safety and Evacuation Planning

The Tooele County Emergency Operations Center manages the Chemical Stockpile Emergency Preparedness Program which is associated with the incineration of stockpiled chemicals at the Tooele Chemical Agent Disposal Facility. This center is a coordination and information resource in case of an emergency originating from the Tooele Chemical Agent Disposal Facility. The center uses outdoor sirens, weather stations, mapped evacuation routes and mobile traffic control plans to prepare for an emergency at the Tooele Chemical Agent Disposal Facility. Information given by sirens/public announcement systems would direct the public to their televisions and radios for Emergency Broadcast System guidance about in-place sheltering and/or evacuation procedures. The center is also prepared to respond to a Tooele Chemical Agent Disposal Facility chemical agent emergency outside the facility through provision of trained personnel and communications equipment including microwave and radio networks (Gillies, 1995).

Based on the findings from a survey conducted by the University of Arizona, many citizens in Tooele County do not fully understand the potential for a catastrophic event at the Tooele Chemical Agent Disposal Facility, how they would be informed in the event of an evacuation or shelter-in-place order, or exactly what to do in case the sirens are activated. In Tooele, about 60 percent of responders said they know their community's evacuation routes, 75 percent know how they will be informed of a chemical emergency, 68 percent can hear warning signals when they are outside, 27 percent use an indoor chemical warning system such as a tone-alert radio, and 38 percent say the warning signals work "very well" (Schmerker, 2000b).

While evacuation planning is in place, the continuing addition of new facilities such as the Skull Valley Spent Fuel Storage Facility within Skull Valley could cause cumulative evacuation problems. For example, if simultaneous emergencies were to shut down both SR 36 and SR 196, efficient evacuation on a regional scale would be difficult. Improvement of SR 36, as summarized in Section 5.1.17, State Road 36 Improvement, would serve to make evacuation along this roadway more efficient and effective than under baseline conditions.

5.2.13 Cumulative Impacts from Materials and Wastes

DPG's use of materials and generation of wastes is described in Section 3.13, Materials and Wastes. Many of the other projects and activities in the cumulative activity area also use or store materials, and/or generate, treat, store, or dispose of wastes. Primary U.S. government facilities in the cumulative activities area that use or store a high volume or potentially dangerous materials include the UTTR, the Tooele Army Depot, and the Deseret Chemical Depot and Tooele Chemical Agent Disposal Facility. These facilities also generate wastes, some of which are classified as hazardous according to U.S. or Utah law. For a list of laws, see Appendix A, List of Environmental Laws, Permits, and Management Plans. These wastes must be disposed of either on- or off-site in approved facilities.

The AF uses a variety of materials to support its UTTR air testing and training operations. Hazardous materials used by the AF at the UTTR are controlled through a hazardous material management program that tracks the material from the purchase request stage through its end use or disposal. Hazardous materials can only be used, stored, or present at specific locations at the UTTR lands. The AF has permitted solid waste landfills within both the UTTR-North and UTTR-South, including one on DPG land near the Baker Strong Point. Hazardous wastes are only generated by AF activities on the UTTR-North, which is considered a small-quantity hazardous waste generator.

Tooele Army Depot is an active site primarily responsible for shipping, receiving, storing, inspecting, demilitarizing, and maintaining training ammunition and conventional ammunition. In this role, Tooele Army Depot uses a variety of materials and generates solid and hazardous wastes. Storage areas for the various materials used at Tooele Army Depot include over 900 igloos, above ground magazines, and warehouses. Overall storage capacity is about 232,250 sq m (2.5 million sq ft), including over 176,500 sq m (1.9 million sq ft) of explosives storage capacity.

The Deseret Chemical Depot stores a large percentage of the U.S. stockpile of chemical munitions. Some of these chemical munitions are used in testing at DPG. The Tooele Chemical Agent Disposal Facility disposes of chemical agents that are stored in projectiles and weapons, using two incinerators to accomplish this chemical agent disposal. The GB agent incineration campaign is planned for completion by the end of 2001. After completion of the GB disposal program, Deseret Chemical Depot plans to incinerate VX agent next. The VX campaign would take about 10 months. VX is the most volatile and deadly chemical agent stored at the facility. The VX campaign would be followed by incineration of mustard agent. There is

907,200 kg (2 million lb) of VX agent and 5,443,100 kg (12 million lb) of mustard agent stored at the Deseret Chemical Depot. Plans call for Tooele Chemical Agent Disposal Facility to be finished with its chemical agent disposal mission in 2007 (Schmerker. 2000a). While operational and engineering controls are extensive, a small amount of GB was accidentally released from an incinerator stack in early May, 2000, which may delay the timeline. This release of GB is further discussed in Section 5.2.12, Cumulative Impacts to Health and Safety.

Existing private facilities in the cumulative impact area that treat, store or dispose of hazardous wastes include:

- Safety-Kleen (Aragonite)
- Safety-Kleen (Grassy Mountain)
- Safety-Kleen (Clive)
- Envirocare of Utah

Additionally, the Skull Valley Spent Fuel Storage Facility is proposed. Each of these facilities is regulated and permitted by the UDSHW, and by the UDRC and/or the NRC in the case of Envirocare of Utah and the proposed Skull Valley Spent Fuel Storage Facility which both involve radioactive wastes. Permit requirements for all of these facilities include extensive procedural and engineering controls. Specific information on permit terms and regulatory requirements for these facilities is available from the UDSHW.

Overall, while the use of potentially dangerous materials and generation of hazardous and other wastes is a major regional issue and concern, the existing legal and regulatory framework has been established to control and manage the flow of materials and wastes.

As noted in Section 5.2.6, Cumulative Environmental Justice Impacts, Tooele County, UT and community officials and leaders, many members of the public, and the Skull Valley Goshute tribal leadership have supported the trend of locating these facilities and activities within Tooele County, UT. Therefore, cumulative impacts from materials and wastes, including those from DPG activities, are not considered significant.

6.0 Consultation and Coordination

A critical element in this Future Programs EIS process is an extensive consultation and coordination with internal and external sources. Internal consultation and coordination sources include individuals within DPG, higher Army command, and DPG tenant organizations. External consultation and coordination sources include the public and government agencies.

A primary goal of EIS external consultation and coordination is to implement a public involvement program to educate the public about DPG's activities and to provide opportunities for interested parties to participate in and contribute to the EIS process. Public involvement and government agency coordination are continuous parts of the EIS process, and outreach efforts to the public and governmental agencies are conducted by the Army throughout the process.

Many of the public involvement and notification activities for this EIS that have been conducted by DPG, such as publishing the NOI and conducting public scoping meetings, are mandated by NEPA and Army regulations. DPG also believes that a progressive and proactive approach to involving DPG's stakeholders would benefit the development of the Future Programs EIS and provide DPG with an opportunity to build stronger relationships with its constituents, neighbors, and environmental interest groups. A list of individuals, agencies, and organizations that will receive a copy of the Final Environmental Impact Statement is provided in Appendix L, Distribution List.

6.1 Consultation Within DPG, Higher Army Command, and Tenant Organizations

Throughout this EIS process, personnel within DPG, higher Army command, and tenant organizations have been consulted to gather information about the baseline DPG activities and to describe DPG and tenant plans for the 7-year Proposed Action period, the coverage period for this Future Programs EIS. These consultations have been conducted to ensure that information within this EIS is accurate. Specific references reflecting these consultations are cited in this EIS.

6.2 Public Involvement Program

The public involvement program for the Future Programs EIS has included the following major elements:

- Informational Materials and Announcements
- Scoping Meetings
- Evaluation of Scoping Comments
- Distribution of the Draft Environmental Impact Statement

- Public Comment Period and Public Meetings
- Response to Public Comment

Each of these elements is described in the Public Affairs Plan (AGEISS, 1996e) specifically developed to facilitate and guide such public involvement for this EIS. A description of these elements follows.

6.2.1 Informational Materials and Announcements

DPG developed a variety of informational materials and public announcements to notify interested parties of the Future Programs EIS. DPG advertised the Future Programs EIS scoping meetings by placing public announcements in classified advertisements in the local newspapers of towns surrounding DPG and in the major Salt Lake City newspapers. A press release was distributed by the DPG Public Affairs Office to encourage media to attend scoping meetings and request information regarding the Future Programs EIS. Additionally, DPG prepared and mailed a brochure about the Future Programs EIS to approximately 500 individuals, agencies, and groups on its mailing list.

A brief description of the informational materials and announcements distributed by DPG is provided in the following sections:

- Notice of Intent
- Fact Sheets
- Brochure
- Posters
- Reading Rooms
- Website
- Newsletter

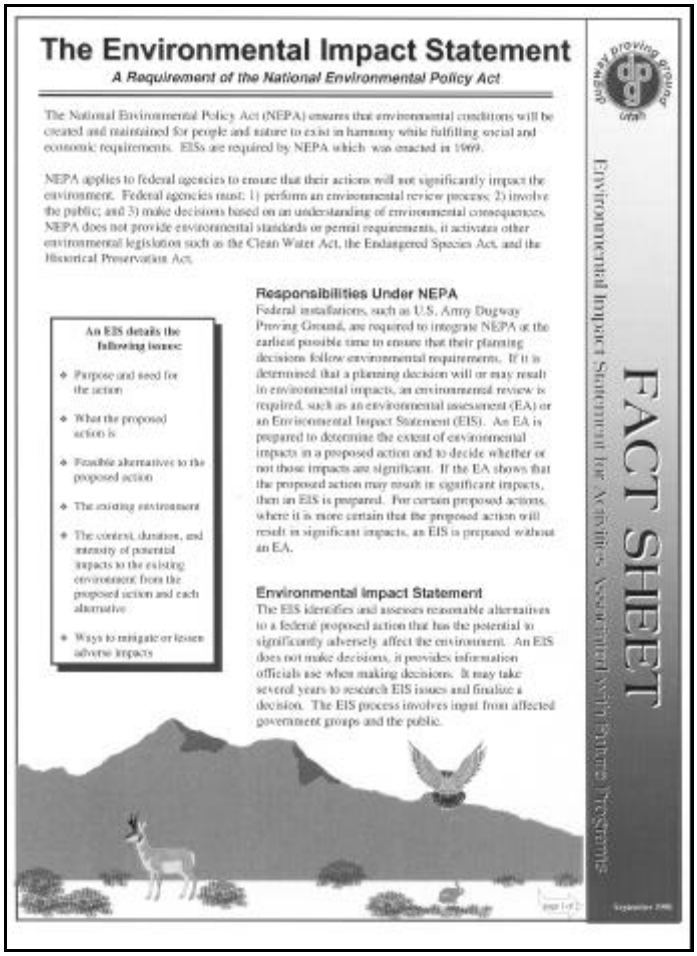
6.2.1.1 Notice of Intent

DPG published an NOI in the *Federal Register* on Wednesday, July 29, 1998 (Federal Register, 1998) submitted by Raymond J. Fatz, Deputy Assistant Secretary of the Army. The NOI announced the intent to prepare the Future Programs EIS, and identified the Proposed Action, the conceptual alternatives to the Proposed Action, and the purpose and general actions for the scoping process. The NOI also provided the dates of the scoping period and Army contact information.

6.2.1.2 Fact Sheets

Six fact sheets were developed for the Future Programs EIS. These fact sheets were distributed at the public scoping meetings and are available on the website throughout the EIS process. More information about the EIS website including its address is provided in Section 6.2.1.7, Website.

- ***History of Dugway Proving Ground*** – contains information about DPG's history and activities that have occurred at DPG.
- ***Dugway Proving Ground*** – describes DPG and current activities taking place at DPG.
- ***The Environmental Impact Statement*** – describes the regulatory requirements for the EIS and the EIS process.
- ***The Environmental Impact Statement for Activities Associated with Future Programs*** – describes the purpose of the Future Programs EIS and the Proposed Action and alternatives as identified before scoping.
- ***Public Involvement*** – describes opportunities for the public to participate in the process for the Future Programs EIS.
- ***Testing, Training, and Facilities*** – describes the testing and training activities and the facilities at DPG.



The Environmental Impact Statement

A Requirement of the National Environmental Policy Act

The National Environmental Policy Act (NEPA) ensures that environmental conditions will be created and maintained for people and nature to exist in harmony while fulfilling social and economic requirements. EISs are required by NEPA which was enacted in 1969.

NEPA applies to federal agencies to ensure that their actions will not significantly impact the environment. Federal agencies must: 1) perform an environmental review process; 2) involve the public; and 3) make decisions based on an understanding of environmental consequences. NEPA does not provide environmental standards or permit requirements, it activates other environmental legislation such as the Clean Water Act, the Endangered Species Act, and the Historical Preservation Act.

An EIS details the following issues:

- Purpose and need for the action
- What the proposed action is
- Feasible alternatives to the proposed action
- The existing environment
- The context, duration, and intensity of potential impacts to the existing environment from the proposed action and each alternative
- Ways to mitigate or lessen adverse impacts

Responsibilities Under NEPA

Federal installations, such as U.S. Army Dugway Proving Ground, are required to integrate NEPA at the earliest possible time to ensure that their planning decisions follow environmental requirements. If it is determined that a planning decision will or may result in environmental impacts, an environmental review is required, such as an environmental assessment (EA) or an Environmental Impact Statement (EIS). An EA is prepared to determine the extent of environmental impacts in a proposed action and to decide whether or not those impacts are significant. If the EA shows that the proposed action may result in significant impacts, then an EIS is prepared. For certain proposed actions, where it is more certain that the proposed action will result in significant impacts, an EIS is prepared without an EA.

Environmental Impact Statement

The EIS identifies and assesses reasonable alternatives to a federal proposed action that has the potential to significantly adversely affect the environment. An EIS does not make decisions, it provides information officials use when making decisions. It may take several years to research EIS issues and finalize a decision. The EIS process involves input from affected government groups and the public.

FACT SHEET

Environmental Impact Statement for Activities Associated with Future Programs

EIS fact sheets provide information to the public about DPG and the EIS.

6.2.1.3 Brochure

DPG produced a multi-colored brochure describing the purpose of the Future Programs EIS, the schedule, and the public scoping opportunities. This brochure also included a mail-in comment card which commentors could use to request to be added to the mailing list and to provide comments on the scope of the EIS. Prior to the public scoping meetings, DPG mailed this brochure about the Future Programs EIS to approximately 500 individuals, agencies, and groups on its mailing list.

6.2.1.4 Posters

Nine posters were produced and displayed at the public scoping meetings to provide information about DPG and the Future Programs EIS. Much of the information contained on the posters was based on the fact sheets and the brochure.

6.2.1.5 Reading Rooms

As required by NEPA, DPG distributed information pertaining to the Future Programs EIS to public reading rooms in selected libraries in the area. Materials in these reading rooms are updated as necessary. These reading rooms are located in the following libraries:

- Whitmore Library
  2197 Fort Union Boulevard
  Salt Lake City, UT

- University of Utah
  J. Willard Marriott Library
  Special Collections – Western Americana
  5th Floor
  295 South 1500 East
  Salt Lake City, UT

- Dugway Public Library
  5124 Kister Avenue
  Dugway, UT

- Tooele City Public Library
  128 West Vine Street
  Tooele, UT

6.2.1.6 Website

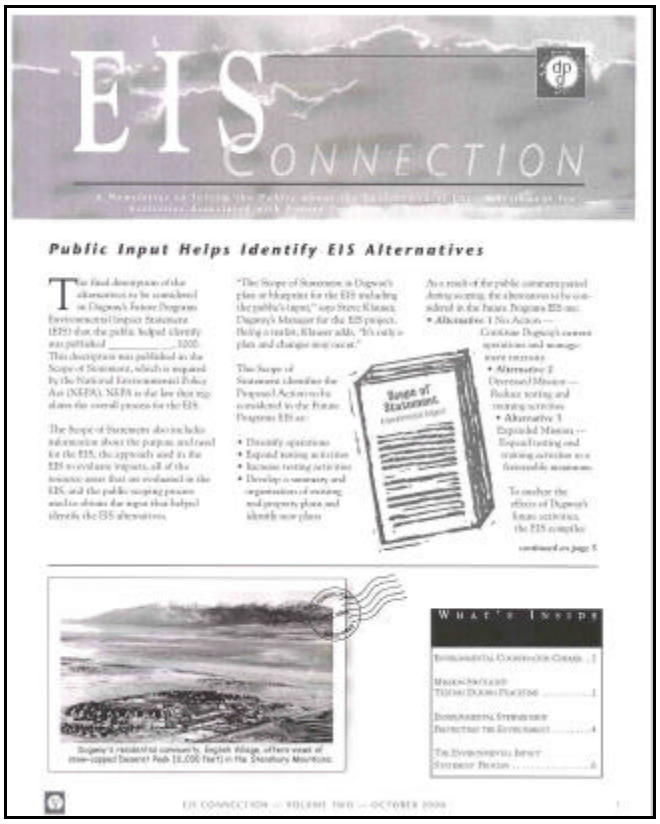
The Future Programs EIS is accessible from DPG's website at https://www.dugway.army.mil/. This is a secure website that requires an internet browser with a specific level of security capability. The Future Programs EIS website provides schedules, fact sheets, newsletters, and documents generated during the EIS process, including the Scope of Statement (DPG, 2000j). The website also provides an email address to request information and ask questions about the Future Programs EIS, and to request that contact information be added or deleted from the mailing list. The email address is stedppa@dugway-emh3.army.mil.

6.2.1.7 Newsletter

A newsletter series called the *EIS Connection* was produced to inform the public about the Future Programs EIS process. Newsletters were issued in:

- July 1999
- October 2000

Each issue of the *EIS Connection* is mailed to all contacts on the Future Programs EIS mailing list, and is available to all others who request it through DPG's Public Affairs Office or DEP. The newsletters are also available on the website.


EIS CONNECTION

Public Input Helps Identify EIS Alternatives

The EIS Connection informs the public about the EIS for Activities Associated with Future Programs at DPG.

6.2.2 Scoping Meetings

DPG conducted two types of scoping meetings, including one-on-one meetings with individuals, agencies, and groups, as well as open public meetings, to actively involve DPG's stakeholders in the EIS scoping process. The intent of both types of meetings was to identify issues and concerns as input for the EIS process and impact analysis.

With the individual stakeholder meetings, DPG could identify specific individual and organizational issues. Many of these same stakeholders attended the formal public meetings, which allowed for interaction and discussion generating additional issues and concerns. Each of these meeting formats is described in the following sections.

6.2.2.1 Stakeholder Meetings

DPG identified its stakeholders to solicit their questions, issues, and comments about the public scoping process and Future Programs EIS as soon as the NOI was published so that all interested parties could actively participate in the process.

DPG conducted meetings with stakeholders prior to the public meetings. DPG identified the key stakeholders from its current mailing list and from entities who respond to and query DPG on a regular basis regarding its environmental activities. DPG met with over 35 individuals, including Federal, state, and local government officials; representatives from Federal and state environmental regulatory agencies; representatives from environmental interest groups and citizen action groups; DPG employees; DPG tenants; Native American tribes; and personnel from surrounding government facilities. A list of these stakeholders follows.

- BLM
- Confederated Tribes of the Goshute Reservation
- Congressman Merrill Cook’s Office
- Downwinders
- Governor's Office, Technical Review Committee
- HAFB
- Mayor of City of Grantsville, UT
- Mayor of City of Stockton, UT
- Mayor of City of Vernon, UT
- President of Terra Community Association
- Congressman Jim Hansen’s Office
- Senator Orin Hatch’s Office
- Senator Robert Bennett’s Office
- Sierra Club
- Skull Valley Band of Goshute Indians
- State of Utah, Department of Environmental Quality
- Tooele County Commissioners
- U.S. Department of the Interior, Bureau of Indian Affairs
- U.S. Department of the Interior, Fish and Wildlife Service, Fish Springs National Wildlife Refuge
- U.S. Environmental Protection Agency Region 8
- Utah Air NG
- Utah Army NG

The objectives of the stakeholder meetings were to:

- Proactively involve as many of DPG's key stakeholders as possible as early as possible in the EIS process
- Identify additional interested or affected stakeholders with whom DPG may not be familiar
- Provide a tailored, advance notification of the public meeting to DPG's key stakeholders and to respond to any questions about the NOI
- Provide a forum for DPG to discuss the level and type of participation anticipated by some of the key public entities in the scoping meetings
- Receive assistance from stakeholders in developing issues that will be analyzed in the EIS
- Identify other EISs or EAs being prepared by stakeholders that may be related to DPG or its Proposed Action
- Identify environmental or regulatory review or consultation requirements that may occur as a result of the Proposed Action
- Gather information relating to potential cumulative environmental impacts
- Identify reasonably foreseeable actions by any public or private entities which may create significant environmental impacts when added to impacts from DPG
- Obtain public agreement to minimize issues that are not significant for detailed consideration, which is required by NEPA and supports economical use of finite fiscal resources

DPG documented these meetings and entered the comments into a database. This information is part of the Administrative Record for the Future Programs EIS. The Administrative Record is the body of documents that are the basis of the decisions that will be made about DPG's Proposed Action for this EIS.

6.2.2.2 Public Meetings

Three public meetings were held on the evenings of September 28, 29, and 30, 1998, at English Village on DPG, Tooele, and Salt Lake City, respectively. At the start of each public meeting, DPG held an Open House for 15 minutes prior to the formal meeting. This allowed participants to sign-in, gather information, view poster

displays, and meet various DPG personnel. At the beginning of each meeting, either the former DPG Commander, Colonel John A. Como, or the former Director of Environmental Programs, Mr. Bob Johnson, formally welcomed the participants and introduced presenters and key DPG personnel.

A presentation followed which provided an overview of the activities and missions at DPG, the EIS process, the Proposed Action and alternatives for the Future Programs EIS, the schedule, and public involvement opportunities.

The attendees were then encouraged to comment on the Proposed Action and alternatives for the Future Programs EIS. A facilitator and recorder fielded the comments and recorded all of the information for everyone to view. The purpose of the comment period was to generate discussion and ideas. Instead of providing technical answers to all questions, the facilitator responded to certain questions with new questions to learn more about the root issues of the commentor's question. These comments provided DPG with an understanding of the stakeholder's needs and values.

6.2.3 Evaluation of Scoping Comments

There were several opportunities for stakeholders and the public to present comments to DPG. Most of the comments were received during the one-on-one stakeholder meetings and the public meetings. Many organizations, such as the U.S. Fish and Wildlife Service, EPA Region 8, and Sierra Club, provided formal comments in writing. Several stakeholders emailed their comments or used one of the Public Comment Forms distributed at the public scoping meetings.

Public comments received at the stakeholder and public meetings, as well as written comments that were not received at these meetings, have been summarized in the Scope of Statement for the Environmental Impact Statement for Activities Associated with Future Programs (DPG, 2000j).

DPG's responses for each summarized comment are also provided in the Scope of Statement. The Scope of Statement is available to the public on the website referenced in Section 6.2.1.7, Website and in the reading rooms described in Section 6.2.1.5, Reading Rooms. These scoping comments were used as a direct input into the scope and content of the EIS, as described in Section 1.5.2, Involving the Public, and Section 1.6, Results of Scoping.

In addition to the specific comments received on Future Programs EIS issues, a number of comments were received during the scoping period that were not directly

related to the EIS. These comments have also been entered into the public scoping database and were forwarded to the appropriate entities at DPG.

6.2.4 Distribution of the Draft Environmental Impact Statement

The Army published an NOA for the DEIS in the Federal Register on July 2, 2002. The EPA published an NOA for the DEIS in the Federal Register on July 5, 2002 and amended its notice on July 26, 2002. The DEIS was distributed to each individual, agency, and organization on the initial distribution list published in Appendix L of the DEIS. Where appropriate the distribution was modified to account for inaccuracies in the distribution list; for example, elected officials who had taken office since the publication of the list. Recipients received either the Executive Summary or the full EIS by U.S. mail. Additional copies were mailed as requested.

6.2.5 Public Comment Period and Public Meetings

The Army solicited public comment on the issues and findings presented in the DEIS. The public comment period began with the publication of the NOA in the Federal Register. Comments were accepted at the public meetings described below and written comments were accepted through October 25, 2002.

Public meetings were held on the evenings of September 17, 18, and 19, 2002 at English Village on DPG, Salt Lake City, and Tooele, respectively. A printed flyer was mailed to the parties on the distribution list on August 28, 2002 to announce the public meetings. A subsequent flyer was mailed on September 9, 2002 announcing the meetings and informing the public of the locations of the public reading rooms. Advertisements for the public meetings were published three times in the Salt Lake City Tribune and the Deseret News and four times in the Tooele Transcript, first appearing on September 1, 2002. Public notices were also published in the Salt Lake City Tribune, Deseret News, and the Tooele Transcript.

United States Department of the Army

PUBLIC MEETINGS

The United States Department of the Army invites public comment on issues and findings presented in its draft Environmental Impact Statement for Activities Associated with Future Programs at U.S. Army Dugway Proving Ground (Dugway EIS). The Dugway EIS assesses the environmental impact of current and future operations at the installation.

Attend public meetings:
Meeting participants must present a valid photo ID when signing in at the public meetings.

Dugway, Utah
September 17, 2002
U.S. Army Dugway Proving Ground
Community Center
Building 5124
(435) 831-3409
6:30 p.m.

Salt Lake City, Utah
September 18, 2002
Martha Hughes Cannon Building
288 North 1460 West
Room 114
(801) 538-6109
7:00 p.m.

Tooele, Utah
September 19, 2002
Utah State Firemen's Museum
2930 West State Route (SR) 112
(435) 830-4079
7:00 p.m.

For more information regarding the Dugway EIS and public meetings, please call (435) 831-3409

Review Dugway EIS documents:

Tooele City Public Library
128 West Vine Street
Tooele, UT 84074
(435) 882-2182

Whitmore Library
2197 East Fort Union Boulevard
Salt Lake City, UT 84121
(801) 944-7533

Dugway Public Library
5124 Kister Avenue
Dugway, UT 84022
(435) 831-2178

University of Utah
J. Willard Marriott Library
Special Collections - Western Americana
295 South 1500 East
(801) 581-8863

Send written comments:
Comments presented at the public meetings or written comments **postmarked by September 19, 2002** will be given equal consideration in preparation of the Final EIS.

U.S. Army Dugway Proving Ground
EIS for Activities Associated with Future Programs
c/o AGEISS Environmental, Inc.
P.O. Box 463
Dugway, Utah 84022-5000
nicholsn@dpg.army.mil

EIS flyer provided information to the public about the public meetings for the DEIS.

At the beginning of each meeting, Mr. Rand Gibson formally welcomed the participants and introduced the technical experts present at each meeting to help participants understand DPG's Future Programs EIS. Six fact sheets and 13 posters were developed for the public meetings. The fact sheets and posters were available to provide information regarding the Future Programs EIS process and the issues and findings of the DEIS. The attendees were encouraged to comment on the DEIS. A court reporter was available at each meeting to record comments.

6.2.6 Response to Public Comment

The following entities provided comments on the DEIS:

- United States Environmental Protection Agency, Region 8
- United States Department of the Interior, Office of Environmental Policy and Compliance
- Utah National Guard
- Citizen's Education Project

- Environmental Health Committee, Utah Chapter of the Sierra Club
- Certified Decontamination

DPG carefully evaluated all comments in preparation of this FEIS and provided written responses to all substantive comments. Chapter 7.0, Public Comments and Responses, contains reproductions of the original comment letters received and DPG's written responses to the substantive comments.

6.3 Consultation with Government Agencies

DPG is the "lead agency" for this Future Programs EIS. There are no formal cooperating agencies for this EIS, but as noted in Section 6.2.2.1, Stakeholder Meetings, stakeholder meetings were held during scoping with a number of Federal, state, and local agencies. Each of these agencies was invited to actively participate in the EIS process. All comments received from these agencies were used as input into the DEIS scope and content.

Formal consultations are sometimes necessary as part of an EIS process, especially in the areas of biological resources and cultural resources. However, for this EIS specific formal consultation was not required with the U.S. Fish and Wildlife Service (which is required under Section 7 of the Endangered Species Act if threatened or endangered species would be adversely impacted) and the Utah SHPO (which is required under Section 106 of the NHPA when certain cultural resources would be adversely affected).

Consultation on biological and cultural resource issues is an ongoing part of DPG's environmental management. Ongoing consultation on biological issues occurs with the BLM and the UDWR. Consultation with the Utah SHPO is an ongoing part of cultural resource management.

7.0 Public Comments and Responses

This chapter contains the comments received on the Draft Future Programs EIS during the public comment period and responses to these comments. All comments received have been reproduced from their original form and are included in Section 7.1, Comments Received on the DEIS. The substantive comments and DPG's responses to these comments are presented in Section 7.2, Public Comments and Responses on the DEIS. Each substantive comment was given a unique number to identify it. These numbers are also shown on the reproduced comments next to the comments they identify.

7.1 Public Comments Received on the DEIS

The following entities provided comments on the DEIS:

- United States Environmental Protection Agency, Region 8
- United States Department of the Interior, Office of Environmental Policy and Compliance
- Utah National Guard
- Citizen's Education Project
- Environmental Health Committee, Utah Chapter of the Sierra Club
- Certified Decontamination

Reproductions of the original comment letters are provided below.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
99918 TH STREET - SUITE300
DENVER, CO 80202-2466
http://www.epa.gov/region08

September 9, 2002

Ref 8EPR-N

Commander
U.S. Army Dugway Proving Ground
Dugway, UT 84022-5000

Comment 1

Attn: STEDPPA

Re- Dugway Proving Ground, Future Programs
DEIS Review No. 020281

Dear Sir or Madam:

In accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, Region 8 of the Environmental Protection Agency (EPA) has reviewed and rated the *Draft Environmental Impact Statement (DEIS) for Activities Associated with Future Programs at US. Army Dugway Proving Grounds* dated August 2001 (submitted July 2002). Our comments on the DEIS and rating of the preferred alternative follow.

Proposed Actions

I . The FEIS should describe how activities at Dugway have changed or may change as a result of the events of 9/11. In particular it appears likely that counterterrorism training may increase. Will any new facilities be built at Dugway or will there be an increase in use of existing or proposed facilities? Will Dugway obtain biological safety level 4 testing and decontamination capabilities? Are any additional impacts expected as a result of changes made due to the events of 9/11 or will any additional areas be impacted? 1-1

7-3

2. We recommend that several of Dugway's environmental activities be elevated to be proposed action. This type of planning would help integrate Dugway's mission of environmental stewardship (on page 2-5) with the Army's plans for long-term military use of Dugway. We suggest that following environmental projects be added to the proposed actions in the FEIS:

Increased rates of cleanup/closure of Solid and Hazardous Waste Management Units (SVVMU & HWMU). The DEIS identified as of 1996, 160 SWMUs and 45 HWMUs. According to the DEIS only 7 SWMU had been cleaned up as of 1996. Although we are sure that progress has been made since 1996, the number of waste management units and extent of historic activities using hazardous material illustrate the need for 1-2

accelerating environmental cleanups as part of the facilities' core activities for the next years. ◦Closure of abandoned or inactive water wells that are not expected to have future use. ◦increased identification and cleanup of hazardous materials from previous activities such as historic testing sites and ranges. 1-2 Cont

3. Is not clear from the document if Dugway plans to use inactivated pathogens for simulation of biological agents. The FEIS should analyze the potential impacts from this activity if proposed. 1-3

Mitigation

4. The DEIS did a thorough job identifying the general mitigation needed to offset environmental impacts. It appears that much of the mitigation has been incorporated or will be incorporated into various management plans at the facility. However, the impetus for implementation and the level of mitigation are not clear such as thresholds for taking action, standards, or protective goals. For example, are there goals for maintaining or improving soil conditions? Will additional mitigation measures be taken if soil conditions continue to deteriorate? The FEIS should include a description of the events that will trigger mitigation, and the procedures that will be used to determine if additional mitigation is needed. The discussion should also address if there are any factors which will limit mitigation such as a lack of funding, institutional constraints, incomplete approvals or further environmental analysis. Will the activities that require under or unfunded mitigation be postponed until adequate funding becomes available? 1-4

5. The following management plans are important for protection of existing resources and reducing ongoing impacts from current operations. We recommend that the FEIS more fully describe these plans and their protection measures as well as the proposed mitigation. 1-5

DPG Fire Management Plan (draft in 2000) and Memorandum of Agreement between Dugway and BLM for Controlling Fires controlling fires (draft?) (page 4-55 in DEIS). Integrated Fire Management Plan (BLM, 1998)

- Integrated Cultural Resources Management Plan (2001), specifically implementation of ficultural resources inventories on unsurveyed land based on a priority ranking" as described on page 4-108.
- Natural Resource Management Plan (199 1) and Integrated Testing Area Management Program (ITAM). As described in section 3.1.4.3, the ITAM program has been in place for more than ten years to monitor and mitigate damage to natural resources. The DEIS describes ongoing significant impacts to soil and deterioration of the vegetative community in the training ground. It appears therefore, that the plan/program may need to the updated to stabilize or slow deterioration of the soil and vegetative community. It is also not clear if the proposed mitigation measures are already implementable under this plan or if revisions are needed before implementation.
- Noxious Nuisance Weed Management Plan (2000) and Integrated Pesticide Management Plan. In view of the invasive weed (cheatgrass) problem at Dugway and

the surrounding area, additional control measures need to be implemented as soon as possible and will need to be ongoing as long as ground training activities continue. 1-5 Cont

6. The new Paladin howitzers are much more destructive to the land than previous smaller units. We recommend that mitigation be developed to limit the area disturbance for these howitzers such as confining deployment to several specific areas. 1-6

7. According to a quote from a BLM report, on page 5-38 of DEIS "Great Basin (including Dugway) is changing more rapidly now than in any other time in the last 150 years. Millions of acres in the basin have changed from healthy functioning ecosystems primarily consisting of native species, to biological systems dominated by annual weeds." We recommend inclusion of additional mitigation for soil compaction and erosion, and impacts to vegetation on pages 4-20 and 4-74. The level of implementation should also be expanded above current levels to reverse the deteriorating trend from current and historic activities. The Army may also want to consider adding offsite mitigation for noxious weed control, as Dugway is unlikely to be successful in adequately controlling noxious weeds because of the ongoing nature of the disturbance from ground training activities. 1-7

8. As new facilities are built or upgraded, we recommend that Dugway adopt power line design that is protective of raptors with broad wing spans such as eagles. We understand that there has been some rapture mortality over time at Dugway. 1-8

Impact Anaslysis

9. In several areas in the DEIS, compliance with regulations was considered to be equivalent to 11no significant impacts." This is of concern, because many significant environmental impacts are not regulated, or significant impacts may be present at or below regulatory levels, In future NEPA analysis, we recommend using regulatory discussions to demonstrate control of impacts and as an indicator of the magnitude of impacts. For example, in a pristine environment, activities which lower water or air quality to the regulated levels would have significant deleterious impacts. In addition, there are many impacts which are not regulated. For one-of-a-kind facilities like Dugway, there are many activities which do not occur with sufficient frequency to be regulated specifically. 1-9

Based on the procedures EPA uses to evaluate the potential effects of proposed actions and the adequacy of the information in the DEIS, the environmental analysis for the *DEIS for Activities Associated with Future Programs at US. Army Dugway Proving Grounds will* be listed in the Federal Register in the category EC-2. This means that the review has identified environmental impacts that should be avoided in order to fully protect the environment, and the DEIS does not contain sufficient information to thoroughly assess environmental impacts. Enclosed is a summary of EPA's rating definitions.

We appreciate your interest in our comments. Please contact Dana Allen at (303) 312-6870 if you have any questions about these comments.

Sincerely,

Cynthia Cody

Director, NEPA Program
Office of Ecosystems Protection and Remediation

Enclosure

cc: Marguerite Duffy, EPA HQ

Environmental Protection Agency Rating System for Draft Environmental Impact Statements
Definitions and Follow-Up Action*

Environmental Impact of the Action

LO - - Lack of Objections

'ne Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC - - **Environmental Concerns**

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO - - Environmental Objections

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU - - Environmentally Unsatisfactory

Ile EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 - - Adequate

~ EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clariffing language or information.

Category 2 - - Insufficient Information

'ne draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in Order to fully protect the environment, or the EPA reviewer has identified new Teasonaby available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 - - Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions lmpacting the Environm. February, 1987.

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United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
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October 10, 2002

ER 02/0752

Colonel Edward A. Fisher
Commander
U.S. Army Dugway Proving Ground
Dugway, Utah 84022-5000

Comment 2

Dear Colonel Fisher:

The Department of the hiterior has reviewed the Draft Envirom-nental Impact Statement (DEIS) for Activities Associated with Future Programs at U.S. Army Dugway Proving Ground (DPG). The DEIS addresses changes proposed to mission activities over the next 7 years. The Proposed Action, the Preferred Alternative, would increase the level of activity of current mission components, diversify operations, and implement a Summary Development Plan (SDP). According to the document (p. 2-147), the Proposed Action for training at DPG consists of marked increases in both ground training and counterterrorism training. Some of the details regarding ground based activities of each follow (continued baseline events number used as current status):

7-7

Increased level of activity of current mission components:

- Ground training activities
- Artillery - events will increase from 4 to 18, days from 14 to 114
- Special Operations - events will increase from 4 to 40, days from 45 to 120
- Acres used for bivouac activities would increase from 66,000 to 75,000
- Acres used for firing point activity would increase from 4,600 to 7,500
- Troops in off-road areas would increase from 3,300 to 6,800
- Overall ground training events would increase from 37 to 109

Diversification of operations:

- New ground-training activities (baseline of 0) Reserve component chemical units - 1,000 to 4,000 troops will be trained in three events over 21 days, using up to 600 vehicles
- Support to U.S. Army Chemical School - 800 troops will be trained in 25 events over 100 days using 18 vehiclcs
- The new Paladin artillery program would add new firing points at Camels Back Ridge and a new training area and bivouac sites at Granite Peak

General Comments:

We understand that mission changes may necessitate expansion of activities at DPG, and appreciate the ongoing efforts to implement environmentally sensitive management at the facility. However, we have concerns that the proposed expansion will result in significant impacts to fish and wildlife resources for which there is insufficient mitigation. Increases in bivouac areas in remote sites, increases in firing points, increases in troops in off-road areas, and increases in off-road vehicle use will significantly contribute to further invasion and dispersion of invasive vegetation, destruction of cryptobiotic soils, and the degradation of wildlife habitat. Of special concern are potential impacts to migratory birds and their habitat.

The Department of the Interior recommends a more extensive discussion specific to migratory birds and their habitat in the document, as well as more suitable mitigation measures. Federal agencies have a responsibility to migratory birds under authority of the Migratory Bird Treaty Act (MBTA)(16 U.S.C. §703-712), a strict. liability law which makes it unlawful to take, kill, or possess migratory birds, their parts, nests, or eggs. Executive Order 13186, issued on January 10, 2001, outlines the responsibilities of Federal agencies to comply with the MBTA. Migrant and resident species of DPG that are on the Partners in Flight Priority List for Conservation Measures include sage thrasher *(Oreoscoptes montanus)*, sage sparrow *(Amphispiza belli)*, and gray flycatcher *(Empidonax wrighth)*. We are also concerned about potential indirect effects from DPG activities on Fish Springs National Wildlife Refuge, adjacent to the southern boundary of DPG, which provides habitat vital to migrating and resident birds. 2-1
We recommend addressing migratory birds in the DEIS and programmatically as follows:

- Address the potential short-term and long-term effects of the proposal on migratory bird populations. Habitat changes can be used to measure these effects.

- Identify conservation and mitigation measures in the proposal aimed at conserving migratory bird habitats and populations. At present, the only measure proposed as mitigation for impacts to migratory birds is monitoring. Commitments to habitat protection and restoration also should be made.

- Address cumulative effects and relationships of proposed and past projects and their resulting effects on migratory birds.

We recommend you continue and expand the ongoing cooperation with the Partners in Flight Coordinator of the Utah Division of Wildlife Resources to monitor neotropical migrant birds. Implementation of the DPG Natural Resources Program's proposal to form a Cooperative Natural Resources Team will further efforts to develop monitoring, restoration, and mitigation plans with broad support and added expertise.

Land-based training is already contributing to the rapid expansion of exotic annual weeds. The current document notes (page 4-50) that 54 percent of the training areas are dominated by 2-2

cheatgrass. In addition to the increased fire frequency and loss of vegetative diversity, the resultant shift in habitat may be affecting wildlife populations and diversity. Overall trends of migratory bird populations on DPG already indicate declines in shrubsteppe-migrant species with replacement by grassland-adapted species (Martin et al., 2001). There may be similar effects to pollinator species dependent on the shrubsteppe habitat, as well as population shifts in small mammals and insects that are prey for raptors and other predators. We do not believe that the issue of invasive vegetation within the context of increased training has been adequately addressed within this document. It should describe measures to ensure that vehicles moving from "sacrifice sites" do not distribute invasive species parts or seeds. It also should note measures to remediate where invasion has inadvertently occurred. We believe that completion and implementation of the Integrated Natural Resources Management Plan and an Invasive Species Management Plan will improve the ability of DPG to mitigate for current and proposed impacts. 2-2 Cont

The presence and management of wild horses under the Wild Horse and Burro Act received little discussion in the DEIS. The Salt Lake Field Office, Bureau of Land Management (BLM), has revised the map showing the herd areas, wild horse herds found on both the Cedar Mountain and the Onaqui Mountains. Both herds are known to utilize areas on Dugway. None of the maps in the draft EIS identified the herd use areas or addressed their management under the proposed plan. BLM is willing to enter into an agreement addressing herd management. 2-3

The proposed action in section 2.2.2.2, Counterterrorism Training, identified the potential construction of a Chemical and Biological Mock City, and states that the Cedar Mountain Site is the most viable. There was no specific discussion of environmental consequences from this action, nor their potential conflicts with wild horses or nearby recreational uses. 2-4

The document does not identify which mitigating measures would be implemented, and when they would be implemented. 2-5

7-8

The subject of fire was mentioned several times in the document, but the maps in the document did not show the fires which have burned off Dugway onto adjacent public lands. BLM and Dugway have a positive history of coordination regarding wildfire suppression. However, suppression costs for human-caused fires burning onto adjacent public lands have not previously been shared. The document's projection of additional human-caused fires escaping Dugway should also include a mitigating measure which acknowledges Dugway's commensurate responsibility to share suppression expenses with BLM. This would also be a logical extension to the current working relationship between Dugway and BLM. 2-6

Our review did not find any statement about safety which clearly states Dugway's obligation to not undertake activities posing threats to the public, livestock, or wildlife that use adjacent public lands. At a minimum, it seems reasonable to acknowledge there is a responsibility to safeguard adjacent public use. 2-7

Specific Comments:

Section 3.4.4.3, Mammals, pages 3-142, 3-143: The section on Large Mammals only discusses wild horses in their interaction with pronghorn. The document should address wild horses as their own entity, as well as interactions and conflicts with other wildlife species. Herd areas should be disclosed on a map to reduce conflicts between the wild horses and ground training exercises. 2-8

Section 3.11.3. Affected Environment, Noise, DPG Noise Sources and Characterization, page 3-237: The document states that, with the exception of aircraft noise, the amount of reliable noise data analysis generated from activities by DPG tenant units is limited because noise levels are not typically measured during testing activities. This does not mean that noise levels and frequency are not an issue for wildlife. Activities involving loud noise levels during sensitive seasons or times of day should be identified to determine if they exceed threshold levels and necessitate remediation/mitigation efforts. Remediation/mitigation plans should contain monitoring to determine effectiveness of remediation measures. 2-9

Section 4.1.6, Impacts of the Proposed Action and Alternatives, Impacts to Soil Physical Quality, Mitigation Measures, page 4-20: We are concerned by the statement, "when possible limit track vehicle use and prohibit cross country travel." We are aware that there are currently frequent examples of failure to abide by existing restrictions on cross country travel. Without adequate enforcement, the problem can only increase under the proposed expansion. The document should detail who will decide, in any individual case, when and how such activity will be limited. It also should note whether or not it involves individuals who can assess both the tactical and environmental impacts of limiting or not limiting this activity in any one case. There also should be a commitment to provide for a conservation enforcement team. 2-10

The DEIS should clarify the statement "revegetate affected areas and have training units contribute finances for this effort" by detailing revegetation plans. Reestablishment of historical native communities is preferred. Use of nonnative species would likely dilute native biotic diversity. If it is necessary to use nonnatives, they should be species that do not naturalize, spread, or impede the natural reestablishment of native species.

The document proposes rotating training areas to allow for 4 to 7 years of rest and to allow for revegetation within acceptable industry standards. Please provide additional specifics regarding the level of revegetation expected prior to continued operation of an area.

Section 4.1.6, Impacts of the Proposed Action and Alternatives, impacts to Soil Physical Quality, Mitigation Measures, page 4-2 1: The statement "restrict future development/use of mineral resources at Granite Peak" is confusing. The document should state whether this means restricting private use in the form of mineral rights. Too little information is presented to assess what this statement means and how it provides mitigation. 2-11

Section 4.4.2. 1, Impacts of the Proposed Action and Alternatives, impacts to Vegetation, page 463 and 4-64: This section only discusses wild horses in relation to their impact to pronghom. There should be more discussion on the impacts of the proposed action and alternatives directly on the wild horses. 2-12

Section 4.2.2.2, Impacts of the Proposed Action and Alternatives, Impacts to Surface Water Quality, page 4-27: The document mentions a water analysis of Fish Springs NWR surface water. Please identify the specific water source for the analyses; i.e., whether samples were collected from Fish Springs NWR or from adjacent DPG property. Additionally, there is wide variability in water chemistry throughout the Refuge, so sampling at the end of the system may give a worst case scenario. The document should clearly explain the source of these data. 2-13

Section 4.4.2.2, impacts of the Proposed Action and Alternatives, impacts to Wildlife, page 4-64:
The document states that no data are available to determine the specific impacts of noise and blast overpressure or their significance on DPG's wildlife species. As this type of noise would increase under the proposed expansion, we are concerned that failures to ascertain the impacts and provide mitigation may lead to long-term impacts to wildlife species on DPG. We recommend you work with the U. S. Fish and Wildlife Service, Utah Division of Wildlife Resources, and the wildlife experts in Program 52, Environmental Noise of the U.S. Army Center for Health Promotion and Prevention Medicine at Aberdeen Proving Ground to address this knowledge gap. 2-14

Section 4.4.2.2. impacts of the Proposed Action and Alternatives, impacts to Wildlife, page 4-65:
The document states that wildlife responses to overflights have not been documented on DPG. It further states that reaction to overflights is not believed to be a significant impact because it would not cause a decrease in the entire population. If overflights reduce reproductive success or cause stress that results in species making long distance migrations in insufficient condition to do so, the total population could, in fact, be decreased. For some of the Partners in Flight Priority Species, a small population loss could be significant. Many of the animals residing under the UTTR airspace on Dugway are likely affected by overflight. The degree to which they are affected has not been documented, and the only data referenced to support the contention of no affect is for large ungulates, a group which is, numerically speaking, a very minor portion of the DPG fauna. Response to overflights varies by species, by individual, and by season. The document should provide more information on this subject, and DPG should work with the USAF to develop cooperative studies to determine the effects of overflights on the wildlife using DPG. 2-15

Page, 4-7 1: The DEIS states that the leading cause of mortality for DPG pronghorns, is vehicular collision. The document should provide details on measures to minimize the problem. Migratory birds are frequently lost to vehicle collisions, particularly at night. We recommend you expand your discussion accordingly. 2-16

Section 4.4.2.4, Impacts of the Proposed Action and Alternatives, Impacts to Wildlife, Compliance with Regulations and Management Plans, page 4-73: The document states that it has been difficult to mitigate damage to the ranges, and that DPG may be out of compliance with the Sikes Act. We have concerns that expansion of ground disturbing activities, especially the Paladin system, may lead to further unmitigated impact to ecosystems. The document should discuss how DPG proposes to remedy past unmitigated impacts and ensure that future impacts are mitigated. We recommend that the proposed expansion not occur until DPG has completed the documents for and can implement protective and remedial measures in the following: the Integrated Natural Resource Management Plan; the Military Training Management Plan; the Invasive Species Management Plan of the ITAM Program; and the Training Environmental Assessment. 2-17

Section 4.4.6. Impacts of the Proposed Action and Alternatives, Impacts to Wildlife, Mitigatio Measures, pages 4-75 and 76: We commend DPG for proposing temporary closures to avoid training and testing in areas of high wildlife population concentrations, nesting sites, or wintering ranges. We believe DPG should commit to habitat protection and restoration activities that will maintain and enhance wildlife populations and their habitat. Severely impacted habitat may be unavailable for wildlife until restoration is completed. Even if there is alternate habitat to which the wildlife are displaced, it is unlikely that the area to which they are displaced is not inhabited by other wildlife. Depending on the season, displacement could lead to nest abandonment, inter and intra-specific competition, reproductive failure, and possible mortality. 2-18

We strongly support the proposals to implement a biomonitoring program at the landscape level and to conduct needed biological inventories and monitoring. These efforts should be fully integrated into the pending Military Training Area Management Plan with commitments to alter or mitigate actions determined to be negatively impacting wildlife resources.

Section 4.4.7, Impacts of the Proposed Action and Alternatives, Impacts to Wildlife, Residual Impacts, page 4-77: The document states that if wildlife populations become extremely depressed, more management practices over an extended period of time would be necessary after the initial mitigation measures, in order to allow the population to fully recover. Wildlife populations should not be allowed to become "extremely depressed". You should determine the numbers necessary to maintain viable populations on DPG, set thresholds, and commit to change activities when they approach that threshold. 2-19

4.12.2.2, Impacts to Public Health and Safety, Artillery Mortars, and Missiles Missing Targets, page 4-131 and 4-132: The document states that "increased firing at the White Sage Impact Area would increase the probability of munitions missing their target and striking BLM land." "The increase in public safety risk would be considered significant." Exposing the public to the risk of munitions missing their target does not seem to be consistent with the responsibilities of an agency to avoid actions which may threaten the public. The total of over 1,000,000 acres of DOD land currently dedicated to military purposes seems to be an area better suited to absorb 2-20

munitions which may miss their target. Of Dugway's over 798,000 acres, there are vast acreages west and northwest which could be used as impact areas for artillery, mortars, and missiles which, if they missed their targets, would impact land presently dedicated to Dugway. Scheduled increases in use may occur on impact areas not adjacent to the Dugway boundary.

2-20 Cont

An alternative would be to not increase the use of White Sage, and relocate target locations to avoid flying over BLM land and areas close to the boundary. For example, the portion of UTTR adjacent to the north of Dugway includes about 460,000 acres which is primarily an impact area now.

Section 5.2.4.6, Cumulative impacts, Cumulative Impacts to Biological Resources, Use of Chaff, page 5-3 1: The impacts to wildlife of the continued use of chaff, or any expansion in the use of chaff on any portion of DPG, is not sufficiently documented in the science that UTTR staff has presented to date. Nearly all of the negligible impacts presented for terrestrial fauna are based on consumption of chaff by large ungulates. We disagree that these results can be extended to any other terrestrial vertebrates. In addition, the 1999 report, "Environmental Effects of RF Chaff- A Select Panel Report to the Undersecretary of Defense for Environmental Security" (Naval Research Laboratory, Washington, D.C. 20375-5320), noted there were unanswered questions regarding a review of threshold metal toxicity values in humans, animals, and fresh and marine organisms, respirability of fibrous particles in avian species, chaff accumulation on water bodies and its effect on animals, and the potential for impacts on highly sensitive aquatic habitats. Fish Springs National Wildlife Refuge is on record as being opposed to chaff use in any airspace and contends that any activity that results in chaff falling on Refuge property is prohibited under Federal law. The document should provide more information on this subject, and DPG should work with the USAF to develop cooperative studies to determine the effects of chaff on the wildlife using Fish Springs National Wildlife Refuge.

2-21

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Section 5.2.11.4, Cumulative impacts, Other Noise Sources from Federal Government Activities, Effects from Exposure to Noise, Impacts to Wildlife, page 5-52: The document discusses noise from explosives, sonic booms, and low-flying aircraft. The last sentence indicates that "noise studies elsewhere indicate that animals do adjust to noise within their habitats, and that impacts are not considered significant." Some studies on raptors have shown that certain individuals and certain species may become habituated to noise (Russell and Lewis, 1993; Andersen and Rongstad, 1989), and short-term startle responses from aircraft noise may not equate to population effects or reproductive success (Ellis, 1981: Delaney et al., 1997). Other studies indicate some species may be less likely to reoccupy nests overflown during the nesting season (Platt, 1977). However, these studies are often for single species and for resident nesting populations not experiencing the immediate stress of the migration journey. Additional questions remain regarding the effects of noise on nesting and transient migratory birds (Bartecchi, 2001). The document should provide more references for this discussion and expand it to address the points raised here.

2-22

Other specific recommendations of our letter are of both programmatic and project scales. They include:

- Postpone the proposed expansion until DPG has completed the documents for and can implement protective and remedial measures in the following: the Integrated Natural Resource Management Plan; the Military Training Management Plan; the Invasive Species Management Plan of the ITAM Program; and the Training Environmental Assessment.
- Continue and expand cooperation with the Partners in Flight Coordinator of the Utah Division of Wildlife Resources to monitor neotropical migrant birds.
- Implement the DPG Natural Resources Program's proposal to form a Cooperative Natural Resources Team as a means of furthering efforts to develop monitoring, restoration, and mitigation plans with broad support and added expertise.
- Work with the USAF to develop cooperative studies to determine the effects of overflights on wildlife using DPG and the effects of chaff on the wildlife using Fish Springs National Wildlife Refuge.
- Work with the Fish and Wildlife Service, Utah Division of Wildlife Resources, and the wildlife experts in Program 52, Environmental Noise of the U.S. Army Center for Health Promotion and Prevention Medicine at Aberdeen Proving Ground to address the knowledge gap regarding the specific impacts of noise and blast overpressure or their significance on DPG's wildlife species.

Summary Comments:

In closing, Dugway Proving Ground is rich in valuable natural resources. The potential exists for DPG to become a demonstration installation for the ability of the Department of Defense to carry out its mission while protecting the environment. However, it will take a firm commitment to that goal and effective partnering with outside agencies and between programs on DPG. We encourage DPG to explore the resources available through the Strategic Environmental Research and Development Program (SERDP) in order to devise mitigation for impacts that is sensitive to your mission needs. We recommend that your plan to implement biomonitoring at the landscape level be consistent with the SERDP Ecosystem Management Project. Four components are key to success at DPG: 1) Ecosystem health or change indicators; 2) Thresholds of disturbance; 3) Biogeochemical cycles and processes; and 4) Ecosystem processes as they relate to multiple temporal and spatial scales.

We appreciate the opportunity to provide these comments. If you need further assistance regarding wildlife resources, please contact Diana Whittington, Ecologist, at U.S. Fish and Wildlife Service, Ecological Services, 2369 Orton Circle, Suite 50, West Valley City, Utah 84119 or (801) 975-3330. For further assistance regarding wild horse management, fire

suppression, and public lands issues, contact Glenn Carpenter, BLM Salt Lake Field Office, 2370 South 2300 West, Salt Lake City, Utah 84119 or (801) 977-4300.

Sincerely,

Robert F. Stewart
Regional Environmental Officer

Literature Referenced

Andersen, D.E. and Rongstad, O.J. 1989. Response of nesting red-tailed hawks to helicopter overflights. Condor, 91: 296-299.

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Utah!

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Major General Brian L. Tarbet, The Adjutant General

September 17, 2002

Environmental Resources Management

SUBJECT: Comments re Draft Environmental Impact Statement for Activities Associated with Future Programs at U.S. Army Dugway Proving Grounds

U.S. Army Dugway Proving Ground
EIS for Activities Associated with Future Programs
c/o AGEISS Environmental, Inc.
P.O. Box 463
Dugway, UT 84022-5000

Comment 3

Dear Sir or Madam:

The UTNG appreciates the opportunity to review Dugway Proving Ground's (DPG) subject Draft Environmental Impact Statement (DEIS) and Draft Major Training Area Management Plan (DMTAMP). We offer the following comments.

The DEIS references other plans neither readily available for public, tenant or customer review (although DPG did mail digital copies of these plans when asked) nor previously validated by the National Environmental Policy Act (NEPA) process.

1. Of most concern is that the DEIS recommends following the requirements of DPG's Fire Management Plan, 2001 Integrated Natural Resource Management Plan (INRMP), and 1996 Maneuver Training Area Management Plan (MTAMP) - all plans that as far as communicated have not been vetted by the NEPA process. It is not appropriate for these plans to be incorporated by reference in the DEIS.
2. It also inappropriately recommends implementation of a Paladin Weapons System Management Plan specific to DPG that is yet to be written, and therefore not available for comment.
3. It does not reference the Paladin Programmatic Environmental Assessment for Fielding the Paladin Weapon System (EA), which addressed fielding of the Paladin to the US Army and reserves, and specifically to DPG, dated October 1997. 3-1

The DEIS recommends collecting compensation for fire control, revegetation and other environmental management activities in accordance with the MTAMP and the lNRMP. These comments may also be found in the Executive Summary in Table ES-7 as Mitigation and Monitoring Measures, specifically at ES-51 row 1, bullet 12, ES-53 row 2, bullet 5, ES-53 row 3, bullet 7, and ES-58 row 3 bullet 5.

1 . Neither collecting compensation nor any formula for doing so was found in either of these documents. The only mention found was that units training during high fire danger might have to pay for a fire department member to be onsite during training.
2. We believe it inappropriate for an EIS to assert contractual agreements, and especially so without the consent of the other party. 3-2

3. The Army National Guard is not funding for costs associated with training damages, and funds obtained for training are not sufficient to both train and pay potential bills levied by DPG. Any potential bills resulting from training activities and paid from training funds would seriously impact future training and unit readiness. Further, this indirect funding to DPG, potentially covered by other programs such as Integrated Training Area Management ([TAM), may have anti-deficiency implications.
4. Lastly, damages are a normal consequence of training and are the responsibility of the host installation permitting the training. DPG receives funds for the Army Deputy Chief of Staff for Operations and Plans (DCSOP) ITAM program to mitigate training damages at US Army installations. 3-2 Cont

Section 3.9.3 of the DEIS, Airports and Airspace, makes no mention of Salt Lake City Municipal Airport #2. General Aviation is based at the airport along with a very large Utah Army National Guard Helicopter training base. The Army Aviation Support Facility (AASF) is located at the southern most end of the property. Two Army Aviation Helicopter Units are housed there; I st Battalion, 211 th Aviation Regiment (AH-64A Apache) and D Company, I st Battalion 189th Combat Support Aviation Battalion (CSAB) (UH-60A Blackhawk). Also, Detachment 50, Headquarters, Utah State Area Command operates a C-12 Beachcraft SuperKing Air at the facility. The Utah Army National Guard currently performs over 3500 sorties per year out of Salt Lake City Municipal Airport #2. 3-3

The training activities of the UTNG Aviation units are not well described in the DEIS. They should be better described in Section 2.1.6, Baseline Training Activities, Section 2.2.2, Proposed Action Training Activities, and/or possibly Section 5.0, Cumulative Impacts. The following on-going activities may be appropriate for inclusion into the DEIS.

1. AH-64 Apache and UH-60 Blackhawk helicopters use Wig Mountain, White Sage, and Wildcat as Missile, Rocket, and Machine Gun ranges. The airspace will accommodate up to 3 battalions of helicopters safely if the need arises. Artillery, Air Force A- I O's, Air Force F- I 6's and AH-64 Apache attack helicopters use the range simultaneously for Joint Air Attack Training (JAAT). UH-60 Blackhawks use the area for Door Gunner Training. The training area is so large that Fuel is the limiting factor in Helicopter training. This area is perfect to train ground troops on Forward Area Rapid Refuel (FARP) procedures. This type of rapid refuel/rearm is important in areas not supported by hard black top roadways.
2. UTNG AH-64 Apache and LTH-60 Blackhawk helicopters use the airspace at all altitudes (Nap of the earth, Contour, Low Level) including hovering operations. This is done at all hours of day and night.
3. UTNG AH-64 Apache and UH-60 Blackhawk helicopters land on the property to practice terrain and confined area approaches and takeoffs.
4. UTNG AH-64 Apache and UH-60 Blackhawk helicopters use Michael Army Airfield (MAAF) and surrounding area for Emergency Procedures Training.
5. UTNG AH-64 Apache and UH-60 Blackhawk helicopters use areas west, south, and north of MAAF, (Wig Mtn, Wildcat Mtn, White Sage) for live gunnery training.
6. UTNG AH-64 Apache and UH-60 Blackhawk helicopters use MAAF and surrounding area for FARP Operations and Re-Arm and De-Arm Operations.
7. The UTNG uses all areas, (Boy Scout Camp, White Rocks area etc.,) to place a 400 person Battalion and Group Headquarters for Field Training Exercises, Battalion Assembly Area operations, Forward Assembly Area operations, and Holding Area Operations training. We must move off road, utilizing terrain for cover and concealment.
8. The UTNG uses the property for FARP operations off roads and in areas used for cover and concealment.
9. The UTNG uses all areas of DPG and the Utah Test and Training Range (UTTR) for UH-60 HAMOTS operations relating to maintenance of Clover Control and associated radar sites.
10. The UTNG uses all areas of DPG and UTTR for helicopter operations day and night, utilizing Night Vision Goggle and Night Vision Systems training. This training can be accomplished with just one aircraft or with multiple aircraft flying formations in blackout conditions. 3-4

Based on our review of the above referenced document, and our discussions with I Corps Artillery officers regarding the requirements of the I Corps Artillery training exercises, the following comments are of concern. The bullets were extracted from the DEIS, section 4.1.6,Mitigation Measures, however, these statements were found scattered throughout the DEIS document.

1 . Bullet #I: "When Possible, limit track vehicle use and prohibit cross-country use". We anticipate that this mitigation measure is, overall, a good measure to be implemented. However, the possibility exists for this statement to be misconstrued and thereby negatively impact the training of the I Corps Artillery to a point that unit readiness, hence national defense, would be unduly impacted.

2. Bullet #2: "Var~ intensity of training and testing seasonally to reduce the impact on vegetation and avoid high fire conditions". Once again we anticipate that this mitigation measure is, overall, a good measure to be implemented. However, based on environmental impact information gathered from training units at the battalion level, it is not typically possible to meet both of the criteria listed. Historical information suggests that during winter months tracked vehicle use greatly impacts soil and vegetation in the maneuver areas. This impact is caused by large ruts created with the repeated thawing and freezing of the ground while traversing the area with heavy vehicles. Winter is the same time when fire danger is typically low and firing into the impact areas is most acceptable. The summer months, when fire danger is high, are typically the best time to conduct maneuver training due to reduced impact in maneuver areas. However, during summer months, impact areas are typically at the highest risk from fire. Spring is the most likely time of the year to correlate a low fire danger time with moderate temperature fluctuations that do not repeatedly thaw and freeze. The following wording may eliminate any paradoxes precluding all training activities: When possible, the intensity of training and testing will be varied seasonally, based on environmental, readiness and feasibility assessments conducted at the battalion or testing facility level, to reduce the impact on vegetation and to avoid high fire conditions. 3-5

3. Bullet #'s 6 and 8: "Rotate use of training areas to allow for a 4 to 7 year rest period and to allow for revegetation within acceptable industry standards" and "Focus ground training in areas with high ground disturbance, such as White Sage Impact Area and Wig Mountain Training Area for training and testing. Other areas that are used should follow compensation guidelines established in the MTAMP and the INRMP". We are in concurrence that maneuver and artillery fire training can be conducted based on a 4 to 7 year rest or rotation period. Weekend training events should be limited to either the White Sage Impact Area or Wig Mountain Training Area, but not both. However, for current tactical training methods to be implemented under current doctrine, more than one artillery firing range is required and extremely beneficial. Therefore, a minimum of two training areas would be required for some training events. Lengthy training events, such as annual training would fall under this category and require additional training areas. To facilitate the rotation of ranges a third range such as the Causeway Impact Area would need to be available for training. Most ground training could be conducted at the White Sage or Wig Mountain areas and Causeway would be used for limited operations (maneuver and artillery firing) required of the unit.

Please address any questions regarding these comments to LTC Robert Dunton at (801) 2535657.

John L. Crane, Jr., Ph.D.
Director, Environmental Resources Management

Comment 4

MR. ERICKSON: My name is Steve Erickson. I'm the director of the Citizen's Education Project. We're a nonprofit organization located in Salt Lake City that deals with educating Utahans and others on issues of social, economic and environmental justice.

First I would like to start by commenting on the process to date the Army has followed with this Environmental Impact Statement. I would say that the Army has performed it's duties perfunctorily, have made no significant effort to inform the public of plans with the significant environmental, social and economic impact potentially upon the public in this state, nationwide and internationally. 4-1

I do appreciate that Colonel Harder has seen fit to extend the written comment deadline in response to our request to do so. It was gracious and appropriate. However, the contractors for the Army and the Army itself have really attempted in our estimation to slip this under the radar screen with the least amount of public participation possible. And the format of this particular hearing is just yet another indicator that the Army does not want the public to participate in any meaningful fashion in this decision making required by law.

Following on that, it's my understanding that the Army has or is preparing now a Programmatic Environmental Impact Statement to deal with its proposals regarding 4-2

expanded biological, chemical and counter terrorism missions. That is not completed and if the tiering process of NEPA is what it is supposed to be then the PEIS ought to be done before the DEIS for any particular project is put forth. 4-2 Cont

So there is a question here that I would like answered by the Army at some point in the process as to whether or not this Environmental Impact Statement that we're commenting on here today is tiering off of the Programmatic Enviromental Impact Statement that is yet to be completed?

In that context there are a variety of new proposed biological safety level 3 and 4 laboratory expansions and new construction across four cabinet level compartments now under consideration. Those being the DOD, the DOE, the Department of Agriculture and the Health and Human Services Department and below them the centers for disease control and other associated HHS agencies. 4-3

The question that comes to mind knowing that we're talking about new BL 3 or 4 laboratories in places like Las Alomos, Livermore, California, Hamilton, Montana, Galveston, Texas, Lubeck, Texas, Plume Island all raise a question of, is this a duplication of effort? Is this an overreaction to the potential for a bioterrorism problem in this country? And wherein lies the oversight for these programs and how do they in the end tie together?

A question that I would like to have answered 4-4

specific to the process with the Environmental Impact Statement before us is the tiering on specific projects that are envisioned in this seven year master plan if we can call it that. And that is should Dugway pursue the preferred alternative, constructing as many as seven separate new buildings, renovating as many as four additional existing buildings for purposes of biological and chemical defense testing? 4-4 Cont

Will there be a process for under an environmental assessment that the public can be involved in each specific new development proposed? What will be the decision making? Where is the cut line on whether an EA will be required or whether it will be considered under the rubric of this master plan to have already been approved and can be done without any additional public input?

The question arises on specific tests that might take place in any one of these given facilities, new, old or currently existing, and that is whether there will be peer review, opportunities for the scientific and medical community around specific testing procedures, protocols, materials and whether there will be any oversight, not only from the state government, but the federal government? We witnessed a complete collapse in my estimation of state oversight under the Leavitt administration over the activities of the Dugway Proving Ground and how will the 4-5

Dugway Proving Ground outreach to the state in order to assure the maximum protection of the public health. 4-5 Cont

I have only had a short opportunity to review the voluminous 1,000 page full EIS. And in it I find no accumulative active impact analysis. This is typical of most environmental impact statements produced by the military. I've read many and have sued over several.

The question arises with the lack of accumulative impact analysis where does the impact come on the proposed wilderness area adjacent to the Dugway Proving Ground under the proposed amendment to Defense Appropriation Act by Congressman Hansen which would preclude presumably the construction of a rail line to the private fuel storage and nuclear waste facility. How does the PFS facility fit into the economics and sociology if nothing else, not to mention the environmental impact of the two proposals in conjunction? 4-6

The same questions could be leveled regarding the use of the Utah Test and Training Range and the Army's lease of facilities to the Air Force and in allowance of the Air Force to use the air space above its facility.

A serious question arises in my mind regarding the potential for Dugway to contract with other agencies wishing to use the Dugway Proving Ground for their purposes. This is not an unusual occurrence at Dugway. Dugway has a long history of granting use permits long term and short term 4-7

to other agencies. The Air Force being the most obvious example.

The question arises when other agencies funded by other departments in the federal government pursue the opportunity to build laboratories on the secured facilities and remote facilities of Dugway for biological level 3 or 4 laboratories. It's my understanding that there is at least one educational institution in this state that is now interested in contracting with Dugway for a biological level 4 laboratory.

4-7 Cont

Dugway states in its Environmental Impact Statement that it not intending as an Army agency to pursue a biological level 4 capability in the next seven years of its master plan. But what if other agencies wish to lease land at Dugway to do that, how does that fit into the environmental impact analysis that we have before us and what will be the policy decision surrounding that? And will there be an adequate public process to address the potential for contracting agencies escalating the mission of Dugway Proving Ground on a lease basis?

Dugway Proving Ground beginning in my memory going to the mid to late 80's consistently denied that any of its biological defense activities involved the production, development or distribution of any pathogens beyond the borders of the Dugway Proving Grounds. That its role was

4-8

simply to test agent against protective gear to perfect detection devises that might have battle field utility and to determine methods for decontaminating equipment and personnel exposed to biological agent.

However, recent admissions by the Dugway Proving Ground reported widely in the national press state that in fact Dugway has produced and developed weaponized agent since at least 1992 and that those weaponized agents, anthrax in particular, have been sent back and forth between not only Dugway and its headquarter agency USAMRIID and Fort Detrick in Maryland, but has shared weaponized anthrax contractors such as Batell Corporation in Ohio.

4-8 Cont

There are questions whether any of that anthrax has gone to additional locations such as the University of New Mexico. And that there are counting discrepancies that have been revealed between the sharing of anthrax in either liquid or dry weaponized form between Dugway and Detrick.

The extraordinary concern we have and the public ought to have the question essentially comes down to where do the anthrax of post 9/11, fall 2001, come from and where was it weaponized. Pending further investigation by the FBI and other authority agencies that still remains a question, but all current publically available information points to the United States Army, USAMRIID, Fort Detrick and Dugway.

That not only raises questions about the

oversight and transparency which are entirely needed in this situation with the proving ground and its proposed development, but raises the question about the need for Dugway to weaponize pathogens in order to test them. Is it not possible for Dugway to fulfill it's mission to protect our military personnel by using similant organisms rather than weaponized pathogens? 4-8 Cont

It leads to further questions given that Dugway has essentially mislead the public over the past 12, 13 years about weaponizing pathogens for testing purposes whether or not we can trust the Army and Dugway Proving Ground not to enter into the realm of genetically engineering micro-organisms, pathogens for additional experimentation.

Given Dugway's past track record dating to 1940's in which Dugway has released to the environment with an untold, undetermined impact upon the public health of people in the vicinity of more than 1,000 open air chemical weapon tests, many dozens of open air biological releases, radiological releases into the several dozens from tellerium to cobalt 60, whether or not we as a public can trust Dugway in light of the fact that this development follows so closely on the heals of serious questions of its participation in weaponizing anthrax that winds up in senators' offices. 4-9

How will in the end Dugway minimize the risk to the public health? It's more than simply a security concern.

And there are certainly security concerns about the operation of the proving ground over the years. Additionally the impacts of proposed doubling of biological and chemical weapons defense programs at Dugway will have an impact beyond the boundaries and beyond Utah. There are impacts not analyzed in this EIS and perhaps outside the scope of it, but must be within the scope of the public discussion around this proposal, and that is what is the impact on the biological weapons convention. 4-9 Cont

The international agreements we have upon the discussion of improving the verification protocols which the United States essentially has walked away from for the time being and what will be the international perception of not only the developments proposed under this EIS, but in the broader view the four plus agency development of BL 3 and 4 capacity around the country. The question arises whether this will be perceived as dual use technology and potential development of an offensive capability particularly in light of the proposed stockpiling of vaccines against potential biological agent use.

Lastly, I have looked at the DEIS sufficiently to determine that the counter terrorism programs proposed under this brand new mission for the proving ground which has been a minimal mission to date are too vaguely described to possibly evaluate. What is meant by this new counter 4-10

terrorism mission that Dugway proposes? Without more specific information it's almost impossible to make any intelligible comments other than to say what are you planning to do here?

We have heard discussions going back to 1997 of potential use of Dugway Proving Ground for counter terrorism training involving such things as even building a subway in which to experiment with how to protect and respond and the rest, but there is no detail in the statement that would give anyone an opportunity to have any way in on it that makes any sense. So the Army really needs to come a little bit cleaner on what they're proposing here.

4-10 Cont

I realize that this is a master plan rather than a specific zoning and permitting kind of process, but please we really need more help to understand what it is the Army is contemplating.

To conclude I would suggest that the Army consider a much higher degree of transparency in their programming than we have seen in the past. I have been informed just as of this evening that the Army is willing to release a list of all the pathogens located in Pandora's Ice Box at the Sulliman's Life Sciences Test Facility. That is something we demanded more than a decade ago and were rebuffed.

4-11

Supposedly that has all been declassified and

only five percent of the information on what pathogens get tested at Dugway are now available to the general public we have yet to see those. I remain sceptical until we do see a list. This is important to know what is in Pandora's Ice Box and what is contemplated to be stored there in the future given the doubling of mission because the public needs to be prepared to protect itself against the potential communicable diseases and/or other pathogens that could infect the population. And to date the only place in the United States where that has happened has been more than likely a direct result of problems within the USAMRIID command.

4-11 Cont

We need to be able to inform the medical community of what the potentials are for diseases they might encounter, where those might come from, what steps they must take in order to diagnosis and treat those potential diseases, whether they are a result of natural occurrences, accidents or mismanagement. The oversight then becomes much more critical and the need for Dugway to provide greater public information is essential. Transparency in this and in the international agreements that we hope will some day be approved so we can avoid the kinds of situations we're facing world wide now.

That's the goal we hope to achieve. If this EIS has any role in it then it would have been a useful exercise. That concludes my comments.

C E R T I F I C A T E

STATE OF UTAH)
:
COUNTY OF SALT LAKE)

I, Melinda J. Andersen, Certified Shorthand Reporter and Notary Public within and for the County of Salt Lake and State of Utah, do hereby certify:

That the foregoing proceedings were taken before me at the time and place herein set forth, and were taken down by me in shorthand and thereafter transcribed into typewritten under my direction and supervision:

That the foregoing 16 pages contain a true and correct transcription of my shorthand notes so taken.

WITNESS MY HAND and official seal at Salt Lake City, Utah this 30th day of September, 2002.

My commission expires:
November 14, 2003

Melinda J. Andersen, C.S.R.

DEPARTMENT OF ARMY

DUGWAY PROVING GROUND

DRAFT ENVIRONMENTAL IMPACT STATEMENT

PUBLIC COMMENTS

-o0o-

Date and Place: September 17, 2002
Dugway Proving Ground
Community Center
Building 5124
Dugway, Utah

September 18, 2002
Martha Hughes Cannon Building
266 North 1460 West, Room 114
Salt Lake City, Utah

September 19, 2002
Utah State Firemen's Museum
2930 West State Route 122
Tooele, Utah

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P R O C E E D I N G S

Comment 5

September 18, 2002

MS. KING: My name is Cindy King. I am representing the Environmental Health Committee, Utah Chapter of the Sierra Club. We are requesting that the public comment period be extended to December 2, 2002. The public notice lacked the required 15 day notice and did not inform the public where the Draft Environmental Impact Statement could be obtained and/or reviewed. I have enclosed and have given a copy of the notice. The voluminous of the Draft Environmental Impact Statement, as implied in a recent article in the Tooele Transcript Bulletin, the public is not able to become educated to make necessary comments without this extension. 5-1

In 1990, the Secretary of Defense, who is now the Vice President of the United States, in a keynote addressed in Bethesda, Maryland at a conference called "Defense and the Environment" that the Department of Defense facilities will follow all federal, state and local environmental statutes and regulations (emphasis added). It should be noted that I am unable to find a reversal of this Secretary of Defense facilities to not comply with the various federal, state and local environmental statutes and regulations.

In 1998, the commanding officer of Dugway, Colonel John A. Como, along with various department heads,

personally informed me that Dugway looks forward to a better relationship in meeting the concerns, needs and values that the public might have in regards to the operations at Dugway. Are we now making a liar of this command officer's commitment to the public? I find it very disturbing that Dugway exhibits arrogance in complying with the basic environmental statutes and regulations, in regard to the requirement of public participation.

The National Environmental Policy Act (NEPA) states in Section 2, the purposes of this chapter are to declare a national policy which will encourage a productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the nation.

Title 42, Section 6974, Subsection b(1) states, public participation in the development, revision, implementation and enforcement of any regulations, guidelines, information or program under this chapter shall be provided for, encouraged and assisted by the administrator and the states.

Congress often speaks about public participation in broad terms, affirming the importance of public participation in the public policy decision-making process.

5-1 Cont

The information is to educate interested parties on the proposed action of the decision-maker. Public participation is two-way communication, with the overall goal of better decisions supported by the public.

I find it ironic that the public notice did not meet the 15 day required notification, nor were copies of the Draft Environmental Impact Statement where they could be obtained and/or viewed. The notice implied that public comments needed to be received on September 9, 2002, which is four days from when the public was notified. The notice does state that public comments would be received during the three public hearings, but the notice does not state if the public comments would be received after these public hearings.

This demonstrates how Dugway has ignored various studies of the National Research Council reports on the various Army's public relations, public outreach and public involvement efforts to avoid problems in public participation. The National Research Council defines public relations component consists of distributing information via mailed, brochures, libraries, radio broadcasts and other media in attempt to reach diverse stakeholders.

Public outreach, the second component, consists of opening channels of communication to the government agency so that the values, concerns and needs of various stakeholders can be heard.

5-1 Cont

Public involvement, the third and by far the most difficult component to establish, is a formal process that provides stakeholders an opportunity to influence decisions without surrounding the agency's legal mandate to make decisions.

The three components of the public affairs program must be closely coordinated. One Department of Army's public outreach and information office defined their mission as to provide a public involvement that supports meaningful public participation and dialogue. And the vision with management support and through a strategic public involvement program, the public office and information office will gain acceptance.

As mentioned earlier, the Secretary of Defense, in 1990, stated that the various Departments of Defense will comply with federal, state and local environmental statutes and regulations. It is not clear to the public how Dugway is complying with the Utah Statute Citing requirements as stated in Utah Code Annotated Title 19, Chapter 6, Section 108.

It is not clear to the public how the most recently mentioned notice of violation stated in the Division of Solid and Hazardous Waste Control Board meeting regarding the Resource Conservation Recovery Act will affect or not affect the proposed action. To name a few of the violations, denying access to state enforcement officers and not allowing

5-1 Cont

standards operations procedures, not following standard operational procedures and cleaning up and sampling equipment.

We realize that a facility of this type will have notices of violations throughout its operational life-span, but what we are questioning is what will be the effects or non-effects to the proposed action. The National Environmental Policy Act requires cooperation between governmental agencies.

In closing, the Utah Chapter of the Sierra Club is requesting the public comment period be extended to December 2, 2002 because of the basic violation of public notification, lacking the 15 day requirement and where the Draft Environmental Impact Statement could not be obtained or reviewed. The voluminous text of the Draft Environment Impact Statement as implied in a recent Tooele Transcript Bulletin article does not allow for the public to become educated on the proposed action, to determine the effects if could have to public health, welfare and the environment. It is not clear how the state statute mentioned is being applied to the proposed action for compliance.

There is a requirement under the National Environmental Policy Act and the Secretary of Defense mandating policy to comply with all federal, state and local environmental statutes and regulations. Thank you.

5-1 Cont

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Certified Decontamination
3431 W. Fenchurch Rd. West Jordan, Utah 84084 (801) 809-6932 fax (801) 984-0058

October 4, 2002

U.S. Army Dugway Proving Ground
EIS for Activities Associated with Future Programs
CIO AGEISS Environmental, Inc.
P.O. Box 463
Dugway Proving Ground, Utah 84022-0463

Comment 6

RE: Draft Environmental Impact Statement for Activities Associated with Future Programs

The purpose of this letter is to express my comments of the above-referenced draft environmental impact statement. As a member of the public and a Utah business owner, I sincerely appreciate this opportunity to participate in the govenment's decision-making process.

Carbon Fiber

Carbon fiber is a strong, light-weight material with many military and commercial uses. Dust is created by cutting carbon fiber when fabricating equipment. Carbon fiber dust may be harmful to humans in the same way as asbestos and can damage electronic equipment due to its conductivity. I recommend carbon fiber be added to the materials list located in Section 3.13.3 and pollution control measures added in the environmental impact statement. 6-1

Pathogenic Mold

Mold is commonly found in homes, schools and office buildings after flooding. Improper building design also causes mold by not allowing the proper escape of airborne moisture. Certain strains of mold produce microtoxins which are carried in the air by spore. Health problems such as allergy symptoms, depression, pneumonia, birth defects, liver damage, heart disease and cancer are caused by over-exposure to the microtoxins of pathogenic mold. I recommend Dugway Proving Ground add pathogenic mold detection, prevention and remediation testing and training to their list of proposed activities. 6-2

7-25

Clandestine Drug Manufacturing

Throughout the United States, tens of thousands of clandestine methamphetamine labs are discovered each year. Methamphetamine, hydriodic acid, and a host of other chemical residues are left in homes, motel rooms, vehicles and other locations used for clandestine manufacturing. Methamphetamine has been found to damage serotonin and dopamine levels in the brain, destroy nerve ending receptors, damage vital organs including the heart, and cause birth defects and Parkinson's disease. Hydriodic 6-3

acid (iodine) has been determined by the National Institute of Safety and Health (NIOSH) to cause damage to the central nervous system in concentrations of only two parts per million. 6-3

No definitive study has been completed regarding the decontamination of clandestine methamphetamine labs. If occupied dwellings are not adequately decontaminated, exposed persons may be harmed. If excessive decontamination efforts are required, property owners pay for unnecessary work and some property owners may seek measures to hide contamination rather than paying for remediation. I recommend Dugway Proving Ground add clandestine drug lab decontamination testing and training to their list of proposed activities.

Counter-terrorism and Police Tactical Training,

In the late 1970's and early 1980's, under the direction of Captain David C. Venable and Lieutenant William A. A. Gawthrup, Dugway Proving Ground conducted counter-terrorism and police tactical training for military and civilian police personnel. Military units trained by Dugway's program included the Utah National Guard, Hill Air Force Base, and installations within the Chemical Test and Evaluation Command. Dugway Proving Ground and Tooele Army Depot security personnel were the most active participants in the program.

Courses included Special Weapons and Tactics (SWAT), Hostage Negotiations, Critical Incident Management and Police Sniper/Counter-sniper. Tactical developments and training materials were shared with the Army, Military Police School and Air Force, Tactics for Emergency Service Teams school. For many Utah police departments, training received at Dugway Proving Ground was the starting point for their SWAT and hostage negotiations teams. The location and facilities at Dugway Proving Ground were found to be ideal for this type of training. 6-4

Although Dugway Proving Ground does not maintain large amounts of chemical agents, large amounts of chemical agents are stored at the Tooele Army Depot, some twenty miles away. Having specialized counter-terrorism and police tactical training at Dugway Proving Ground will greatly improve security and public protection. I strongly endorse counter-terrorism and police tactical training be continued and expanded at Dugway Proving Ground.

Security

One item not addressed in the draft environmental impact statement is Security. It is reasonable to withhold security details from the environmental impact statement. Disclosing too many details may compromise security. Dugway Proving Ground's security model of restricted areas, controlled areas, access lists and exchange badges was copied by the Utah Department of Corrections for security at the Prison during executions. The same security model was used for security at the venues and housing areas of the Salt Lake Olympics. 6-5

Dugway Proving Ground's well proven security measures are regulated in great part by the U. S. Army Chemical Surety Program. Physical security, accountability and personnel reliability is managed by the program and annual qualification inspections and tests ensure strict adherence to the program's standards.

In some instances, the Chemical Surety Program requirements are so strict, materials commonly carried by unarmed, civilian drivers on America's highways are escorted by armed security forces and hazardous material handlers when under military control. I recommend a section be added to the environmental impact statement that states Dugway Proving Ground will adhere to the requirements of the U. S. Army Chemical Surety Program and annually disclose to the public the installation's passing or failing of Chemical Surety Program inspections and tests. 6-5 Cont

Summary

I was stationed at Dugway Proving Ground over twenty years ago. I was very impressed by the operation of the installation and have remained equally impressed. In my decontamination business, I use decontamination measures developed and used at Dugway Proving Ground and have shared this information with others. The Utah community is safer because of the excellence achieved by the employees and soldiers of Dugway Proving Ground. It is my opinion expanding Dugway's mission will further improve the safety and security of Utah and of the United States.

Michael L. Rowzie

(Signature)

7.2 Public Comments and Responses on the DEIS

Comment 1 – United States Environmental Protection Agency, Region 8

Comment 1-1. The FEIS should describe how activities at Dugway have changed or may change as a result of the events of 9/11. In particular it appears likely that counterterrorism training may increase. Will any new facilities be built at Dugway or will there be an increase in use of existing or proposed facilities? Will Dugway obtain biological safety level 4 testing and decontamination capabilities? Are any additional impacts expected as a result of changes made due to the events of 9/11 or will any additional areas be impacted?

Response 1-1. Although the Draft EIS was completed before the events of September 11, 2001, the Proposed Action and alternatives still represent accurate descriptions of potential future actions at DPG. Therefore, no additional impacts are expected beyond those already identified in this EIS.

Currently there are no plans for DPG to obtain BL 4 capabilities. If this plan changes, however, the approach to address unknown future programs or activities at DPG not assessed in the EIS would be to “tier” their own NEPA documentation from this EIS.

Comment 1-2. We recommend that several of Dugway's environmental activities be elevated to be proposed action. This type of planning would help integrate Dugway's mission of environmental stewardship (on page 2-5) with the Army's plans for long-term military use of Dugway. We suggest that following environmental projects be added to the proposed actions in the FEIS:

- Increased rates of cleanup/closure of Solid and Hazardous Waste Management units (SWMU & HWMU). The DEIS identified as of 1996, 160 SWMUs and 45 HWMUs. According to the DEIS only 7 SWMU had been cleaned up as of 1996. Although we are sure that progress has been made since 1996, the number of waste management units and extent of historic activities using hazardous material illustrate the need for accelerating environmental cleanups as part of the facilities' core activities for the next years.

- Closure of abandoned or inactive water wells that are not expected to have future use.

- Increased identification and cleanup of hazardous materials from previous activities such as historic testing sites and ranges

Response 1-2. Solid and hazardous waste management units are addressed in DOD's Defense Environmental Restoration Program (DERP) and DPG's State of Utah Resource Conservation and Recovery Act (RCRA) permit. The DERP and State of Utah RCRA permit establish an Installation Restoration Program (IRP) at active sites, and the Formerly Used Defense Sites (FUDS) program at inactive sites. Since the RCRA permit process is the functional equivalent of NEPA, these DERP and RCRA programs are not open for comment under this NEPA review process.

Identified abandoned wells have been or are scheduled for closure. If inactive wells are abandoned in the future they will be closed at the time of abandonment. While the EIS discusses increased water use as a result of both the Proposed Action and the Maximum Expanded Mission Alternative, Section 3.2.3.3, states that increases in demand can be met by Federal reserved water rights that already exist in inactive water supply wells.

Comment 1-3. Is not clear from the document if Dugway plans to use inactivated pathogens for simulation of biological agents. The FEIS should analyze the potential impacts from this activity if proposed.

Response 1-3. While inactivated pathogens are not proposed for use as simulants, gamma-irradiated vaccine strains of pathogens could be used as described in Section 2.2.1.1. If inactivated pathogens are proposed for use, appropriate NEPA documentation would be required as described in Section 2.1.3.2.

Comment 1-4. The DEIS did a thorough job identifying the general mitigation needed to offset environmental impacts. It appears that much of the mitigation has been incorporated or will be incorporated into various management plans at the facility. However, the impetus for implementation and the level of mitigation are not clear such as thresholds for taking action, standards, or protective goals. For example, are there goals for maintaining or improving soil conditions? Will additional mitigation measures be taken if soil conditions continue to deteriorate? The FEIS should include a description of the events that will trigger mitigation, and the procedures that will be used to determine if additional mitigation is needed. The discussion should also address if there are any factors which will limit mitigation such as a lack of funding, institutional constraints, incomplete approvals or further environmental analysis. Will the activities that require under or unfunded mitigation be postponed until adequate funding becomes available?

Response 1-4. Because this is an installation-wide EIS relevant to many programs over a vast geographic area, program descriptions, potential impacts, and proposed mitigation measures are identified in broad terms. It is therefore

impractical to list specific thresholds, triggers, and mitigation measures for very specific areas.

The following language was added in three locations: Section ES-4.0, Impacts of the Proposed Action and Alternatives, after discussion of mitigation; Section 2.5, Comparison of Environmental Impacts and Mitigation Measures; Section 4.0, Impacts of the Proposed Action and Alternatives, after discussion of mitigation.

DPG's existing mitigation activities would continue under the No Action Alternative. This installation-wide EIS has identified a broad array of proposed mitigation measures that would supplement DPG's existing mitigation activities to avoid or lessen potential future impacts. These proposed mitigation measures are relevant to, and would be implemented for, all action alternatives (the Proposed Action, Decreased Mission Alternative, and the Maximum Expanded Mission Alternative). However, the timing and intensity of these mitigation measures would vary by alternative. For example, if the Decreased Mission Alternative was chosen as DPG's future, the proposed mitigation measures could potentially be implemented at a slower and less intensive manner than for the Proposed Action, because the magnitude, duration, and location of impacts would be different. Concomitantly, if the Maximum Expanded Mission Alternative was chosen, proposed mitigation measures would likely be implemented at a faster and more intensive manner than for the Proposed Action.

Since the EIS broadly assesses the potential environmental impacts, mitigation measures must be somewhat broad as well. These broad mitigation measures can be clarified, if necessary, within the ROD after a decision has been reached. In order for any mitigation measures to be enforceable, they must be clearly defined in the ROD even if they are discussed in the EIS text. Furthermore, any future proposed action requiring case-specific NEPA analysis would likely include more specific mitigation measures that would support the broad mitigation measures identified in this EIS

Comment 1-5. The following management plans are important for protection of existing resources and reducing ongoing impacts from current operations. We recommend that the FEIS more fully describe these plans and their protection measures as well as the proposed mitigation.

- DPG Fire Management Plan (draft in 2000) and Memorandum of Agreement between Dugway and BLM for Controlling Fires controlling fires (draft?) (page 4-55 in DEIS), Integrated Fire Management Plan (BLM, 1998)

- Integrated Cultural Resources Management plan (2001), specifically implementation of "cultural resources inventories on unsurveyed land based on a priority ranking" as described on page 4-108

- Natural Resource Management Plan (1991) and Integrated Testing Area Management Program (ITAM). As described in Section 3.1.4.3, the ITAM program has been in place for more than ten years to monitor and mitigate damage to natural resources. The DEIS describes ongoing significant impacts to soil and deterioration of the vegetative community in the training ground. It appears therefore, that the plan/program may need to be updated to stabilize or slow deterioration of the soil and vegetative community. It is also not clear if the proposed mitigation measures are already implementable under this plan or if revisions are needed before implementation.

Noxious Nuisance Weed Management plan (2000) and Integrated Pesticide Management Plan. In view of the invasive weed (cheatgrass) problem at Dugway and the surrounding area, additional control measures need to be implemented as soon as possible and will need to be ongoing as long as ground training activities continue.

Response 1-5. A variety of management plans have been developed at DPG to ensure Federal and State regulations are complied with, the installation's cultural and environmental features are preserved and managed, and adequate facilities are provided for DPG personnel and the DPG community. These management plans also enable DPG to effectively support the installation's mission and are intended to mitigate any potential environmental impacts from DPG activities. Management plans are updated as necessary. Discussions regarding appropriate management plans take place between DPG, tenants, and customers as necessary. Due to their volume, these management plans have been incorporated into the EIS by reference.

Comment 1-6. The new Paladin howitzers are much more destructive to the land than previous smaller units. We recommend that mitigation be developed to limit the area disturbance for these howitzers such as confining deployment to several specific areas.

Response 1-6. Management of Paladin is included in the Military Test and Training Area Management Plan and in the Paladin Programmatic Environmental Assessment for Fielding the Paladin Weapon System (EA), which addressed fielding of the Paladin to the U.S. Army and reserves, prepared for the Army National Guard and dated October 1997.

Comment 1-7. According to a quote from a BLM report, on page 5-38 of DEIS "Great Basin (including Dugway) is changing more rapidly now than in any other time in the last 150 years. Millions of acres in the basin have changed from healthy functioning ecosystems primarily consisting of native species, to biological systems dominated by annual weeds." We recommend inclusion of additional mitigation for soil compaction and erosion, and impacts to vegetation on pages 4-20 and 4-74. The level of implementation should also be expanded above current levels to reverse the deteriorating trend from current and historic activities. The Army may also want to consider adding offsite mitigation for noxious weed control, as Dugway is unlikely to be successful in adequately controlling noxious weeds because of the ongoing nature of the disturbance from ground training activities.

Response 1-7. Section 4.1.7 states that impacts to soil physical quality from activities under the Proposed Action would be long-term and significant. Section 4.4.6 outlines extensive mitigation measures for impacts to vegetation. As discussed in Section 5.2.7.2, there is a Great Basin Restoration Initiative established to develop methods for restoring the Great Basin habitat.

DPG cannot require offsite mitigation but is coordinating with other relevant Federal and state agencies as necessary on noxious weed control issues. Neither the Army nor DPG may add off-site mitigation for noxious weed control. Adding off-site mitigation would violate the fiscal law of the United States unless authorized by Congress. DPG does not know of any such authorization. Agencies are not authorized to augment the funds of other agencies like the Bureau of Land Management (BLM) or the Air Force. Nor may DPG spend funds to support the communities of Terra, Tooele, or the Skull Valley Band of Goshutes, the bureau of Indian Affairs, or the Department of the Interior. Federal funds can only be spent in accordance with the purpose, time and amount of Title 31 of the U.S. Code. DPG is not aware of any statute that authorizes DPG to spend funds to mitigate noxious weed control off of Dugway land. If the Department of the Interior or the Department of the Air Force wants to spend such funds, they need to apply to Congress for such funds.

Comment 1-8. As new facilities are built or upgraded, we recommend that Dugway adopt power line design that is protective of raptors with broad wingspans such as eagles. We understand that there has been some rapture mortality over time at Dugway.

Response 1-8. Power line design that is protective of raptors with broad wingspans is being implemented at DPG and is scheduled for completion by June 2003.

Comment 1-9. In several areas in the DEIS, compliance with regulations was considered to be equivalent to "no significant impacts." This is of concern, because many significant environmental impacts are not regulated, or significant impacts may be present at or below regulatory levels. In future NEPA analysis, we recommend using regulatory discussions to demonstrate control of impacts and as an indicator of the magnitude of impacts. For example, in a pristine environment, activities which lower water or air quality to the regulated levels would have significant deleterious impacts. In addition, there are many impacts which are not regulated. For one-of-a-kind facilities like Dugway, there are many activities which do not occur with sufficient frequency to be regulated specifically.

Response 1-9. While noncompliance with regulations was identified as a specific significance criterium, other significance criteria were developed for every resource. Within the impact analysis process for this EIS, regulatory compliance was not the only criteria used to determine impact significance.

Comment 2 – United States Department of the Interior, Office of Environmental Policy and Compliance

Comment 2-1. We understand that mission changes may necessitate expansion of activities at DPG, and appreciate the ongoing efforts to implement environmentally sensitive management at the facility. However, we have concerns that the proposed expansion will result in significant impacts to fish and wildlife resources for which there is insufficient mitigation. Increases in bivouac areas in remote sites, increases in firing points, increases in troops in off-road areas, and increases in off-road vehicle use will significantly contribute to further invasion and dispersion of invasive vegetation, destruction of cryptobiotic soils, and the degradation of wildlife habitat. Of special concern are potential impacts to migratory birds and their habitat. The Department of Interior recommends a more extensive discussion specific to migratory birds and their habitat in the document, as well as more suitable mitigation measures. Federal agencies have a responsibility to migratory birds under authority of the Migratory Bird Treaty Act (MBTA)(16 U.S.C. §703_712), a strict liability law which makes it unlawful to take, kill, or possess migratory birds, their parts, nests, or eggs. Executive Order 13186, issued on January 11, 2001, re-instituted the responsibilities of Federal agencies to comply with the MBTA. Migrant and resident species of DPG that are on the Partners in Flight Priority List for Conservation Measures include sage thrasher (Oreoscoptes montanus), sage sparrow (Amphispiza belli), and gray flycatcher (Empidonax wrightii). We are also concerned about potential indirect effects from DPG activities on Fish Springs National Wildlife Refuge, adjacent to the southern boundary of DPG,

which provides habitat vital to migrating and resident birds. We recommend addressing migratory birds in the DEIS and programmatically as follows:

- Address the potential short-term and long-term effects of the proposal on migratory bird populations. Habitat changes can be used to measure these effects.
- Identify conservation and mitigation measures in the proposal aimed at conserving migratory bird habitats and populations. At present, the only measure proposed as mitigation for impacts to migratory birds is monitoring. Commitments to habitat protection and restoration should also be made.
- Address cumulative effects and relationships of proposed and past projects, and their resulting effects, on migratory birds.

We recommend you continue and expand the ongoing cooperation with the Partners in Flight Coordinator of the Utah Division of Wildlife Resources to monitor neo-tropical migrant birds. Implementation of the DPG Natural Resources Program's proposal to form a Cooperative Natural Resources Team will further efforts to develop monitoring, restoration and mitigation plans with broad support and added expertise.

Response 2-1. There are no fish present on DPG. Avian species historically and currently present at DPG and their habitats are listed in Table I-3. DPG will continue cooperation with Partners In Flight Coordinator of the Utah Division of Wildlife Resources.

As stated in Section 4.4.2.2, Impacts to Wildlife, DPG recognizes that changes in habitat will result in changes of migratory bird species. DPG will mitigate these changes to the extent possible as described in the Integrated Natural Resources Management Plan, which is incorporated by reference.

DPG's land management philosophy is that of "dominant use" which ensures that military-related land uses at DPG priority over all other potential land uses.

Cumulative impacts to biological resources, including those identifiable impacts beyond DPG boundaries, are discussed in Section 5.2.4 and include migratory birds.

DPG will continue cooperation with Partners In Flight Coordinator of the Utah Division of Wildlife Resources. A Cooperative Natural Resources Team is being developed, object to charter approval by the Installation Commander.

Comment 2-2. Land-based training is already contributing to the rapid expansion of exotic annual weeds. The current document notes (page 4-50) that 54 percent of the training areas are dominated by cheatgrass. In addition to the increased fire frequency and loss of vegetative diversity, the resultant shift in habitat may be affecting wildlife populations and diversity. Overall trends of migratory bird populations on DPG already indicate declines in shrubsteppe-migrant species with replacement by grassland-adapted species (Martin et al., 2001). There may be similar effects to pollinator species dependent on the shrubsteppe habitat, as well as population shifts in small mammals and insects that are prey for raptors and other predators. We do not believe that the issue of invasive vegetation within the context of increased training has been adequately addressed within this document. It should describe measures to ensure that vehicles moving from "sacrifice sites" do not distribute invasive species parts or seeds. It should also note measures to remediate where invasion has inadvertently occurred. We believe that completion and implementation of the Integrated Natural Resources Management Plan and an Invasive Species Management Plan will improve the ability of DPG to mitigate for current and proposed impacts.

Response 2-2. Specific mitigation measures are being developed in the Integrated Natural Resources Management Plan and the Integrated Exotic Species Management Plan. DPG is completing and implementing these plans.

Comment 2-3. The presence and management of wild horses under the Wild Horse and Burro Act received little discussion in the DEIS. The Salt Lake Field Office, Bureau of Land Management (BLM), has revised the map showing the herd areas, wild horse herds found on both the Cedar Mountain and the Onaqui Mountains. Both herds are known to utilize areas on Dugway. None of the maps in the draft EIS identified the herd use areas or addressed their management under the proposed plan. BLM is willing to enter into an agreement addressing herd management.

Response 2-3. Feral horse herds are discussed more fully in the Integrated Natural Resources Management Plan. As discussed in Section 3.4.4.3, feral horses are managed by DPG in cooperation with BLM. Nonetheless, DPG is willing to enter into and maintain agreements for herd management.

Comment 2-4. The proposed action in section 2.2.2.2, Counterterrorism Training, identified the potential construction of a Chemical and Biological Mock City, and states that the Cedar Mountain Site is the most viable. There was no specific discussion of environmental consequences from this action, nor their potential conflicts with wild horses or nearby recreational uses.

Response 2-4. As stated in Section 2.2.2.2, a suitable site has not been selected for the Chemical and Biological Mock City. The Chemical and Biological Mock City is subject to availability of funding. After a definitive decision has been made, appropriate NEPA documentation will be produced. The approach to address unknown activities not assessed in the EIS is that they will be "tiered" from this EIS to their own NEPA documentation. An accepted NEPA practice, "tiering" uses specific program documentation to build upon environmental analysis presented in this EIS, to prepare a NEPA document that provides detailed environmental analysis for programs once they are better defined.

Comment 2-5. The document does not identify which mitigating measures would be implemented, and when they would be implemented.

Response 2-5. Because this is an installation-wide EIS relevant to many programs over a vast geographic area, program descriptions, potential impacts, and proposed mitigation measures are identified in broad terms. It is therefore impractical to list specific thresholds, triggers, and mitigation measures for very specific areas. As required by law, DPG mitigation will continue on a case-by-case basis. DPG will attempt to secure funding beyond what is required by law, but there is no guarantee that such requested funding would be approved as part of the Record of Decision or any request.

The following language was added in three locations: Section ES-4.0, Impacts of the Proposed Action and Alternatives, after discussion of mitigation; Section 2.5, Comparison of Environmental Impacts and Mitigation Measures; Section 4.0, Impacts of the Proposed Action and Alternatives, after discussion of mitigation.

DPG's existing mitigation activities would continue under the No Action Alternative. This installation-wide EIS has identified a broad array of proposed mitigation measures that would supplement DPG's existing mitigation activities to avoid or lessen potential future impacts. These proposed mitigation measures are relevant to, and would be implemented for, all action alternatives (the Proposed Action, Decreased Mission Alternative, and the Maximum Expanded Mission Alternative). However, the timing and intensity of these mitigation measures would vary by alternative. For example, if the Decreased Mission Alternative was chosen as DPG's future, the proposed mitigation measures could potentially be implemented at a slower and less intensive manner than for the Proposed Action, because the magnitude, duration, and location of impacts would be different. Concomitantly, if the Maximum Expanded Mission Alternative was chosen, proposed mitigation measures would likely be implemented at a faster and more intensive manner than for the Proposed Action.

Since the EIS broadly assesses the potential environmental impacts, mitigation measures must be somewhat broad as well. These broad mitigation measures can be clarified, if necessary, within the ROD after a decision has been reached. In order for any mitigation measures to be enforceable, they must be clearly defined in the ROD even if they are discussed in the EIS text. Furthermore, any future proposed action requiring case-specific NEPA analysis would likely include more specific mitigation measures that would support the broad mitigation measures identified in this EIS.

Comment 2-6. The subject of fire was mentioned several times in the document, but the maps in the document did not show the fires which have burned off Dugway onto adjacent public lands. BLM and Dugway have a positive history of coordination regarding wildfire suppression. However, suppression costs for human-caused fires burning onto adjacent public lands have not previously been shared. The document's projection of additional human-caused fires escaping Dugway should also include a mitigating measure which acknowledges Dugway's commensurate responsibility to share suppression expenses with BLM. This would also be a logical extension to the current working relationship between Dugway and BLM.

Response 2-6. As discussed in Section 5.2.4.2, wildland fires that begin off DPG have the potential of moving onto DPG and vice versa. A Memorandum of Agreement between BLM and DPG is being drafted to deal with multi-jurisdictional fires. Any shared suppression expenses should be described in that memorandum.

DPG cannot augment the funds of other federal agencies or state and local government without specific authorization from Congress. DPG is not aware of any such specific authorization and would welcome identification of such authorization and appropriations by Congress. The fiscal laws of the nation must be followed and the fiscal law doctrine of augmentation of funds generally prohibits DPG from spending funds for agencies – whether federal, state or local – outside the boundaries of DPG. DPG does not have the funds to pay for suppression of off-DPG fires. If the fires occur on BLM land, there may not be a “commensurate responsibility to share suppression expenses with BLM.” DPG firefighters have a primary responsibility to protect against fires that might jeopardize command property including ammunition igloos and other military property. When in the best interest of the command as decided by the Commander, DPG will suppress fires on DPG and will work to mitigate the creation of conditions that will enhance the potential for range fires. DPG follows many procedures that protect adjacent property. The lands off of DPG and surrounding DPG (BLM lands) are a monoculture of cheatgrass. This makes it difficult for DPG to reduce the spread of cheatgrass on DPG. The summer climate is arid. Dry lightening storms do occur and ignite about one-half of all fires on DPG. Dugway contains around 1200 square miles of land. So DPG will

not be able to prevent fires from occurring altogether. DPG will require some measures by training units and test personnel during the fire season as a way of mitigating the risk of fire. But sometimes training units and test personnel will have to use equipment and material that may cause fires. The alternative might involve less realistic training that would reduce the combat efficiency of units and put missions and soldiers at risk of being less than fully combat ready. Such an alternative could put American lives at increased risk and is very undesirable.

Comment 2-7. Our review did not find any statement about safety which clearly states Dugway's obligation to not undertake activities posing threats to the public, livestock, or wildlife that use adjacent public lands. At a minimum, it seems reasonable to acknowledge there is a responsibility to safeguard adjacent public use.

Response 2-7. Section 4.12.2.2 demonstrates that DPG clearly recognizes the existence of potential impacts to public health and safety. Section 4.7 recognizes that much of the land around DPG is used for agriculture, ranching, farming, grazing, and recreation on public lands and discusses impacts to regional land uses and appropriate mitigation measures.

Nothing in this response to public comments should be considered to commit to obligations not expressed in law. DPG will address any claims or grievances it receives. The DPG community (including residents), the public, the state and other federal agencies must consider DPG to be at least a partial national sacrifice area when it comes to natural resources. Natural resource impacts by military training and some military testing may be unavoidable. But the public has other nearby alternatives in which to enjoy the local natural resources like the Simpson Buttes, the Wasatch National Forest in the Quirrh Mountains, The Cedar Mountains off DPG, Stansbury Island, the Deep Creek Range, and other locations. DPG land has been withdrawn from public domain and is dedicated to military use. DPG will first endeavor to execute its assigned mission and to attract customers to fund DPG resources and maintain the defense mobilization base. The mission comes from the DoD and the Secretary of the Army. When the Congress, DoD, the Secretary of the Army, and the higher commands of DPG fund mitigation and sustainment of the natural resources of DPG, the latter will use the funds accordingly. When those funds are unavailable, there may be an adverse impact on the natural resources of DPG.

Comment 2-8. The section on Large Mammals only discusses wild horses in their interaction with pronghorn. The document should address wild horses as their own entity, as well as interactions and conflicts with other wildlife species. Herd

areas should be disclosed on a map to reduce conflicts between the wild horses and ground training exercises.

Response 2-8. Feral horse herds are discussed more fully in the Integrated Natural Resources Management Plan. As discussed in Section 3.4.4.3, feral horses are managed by DPG in cooperation with BLM. DPG will not commit to mitigation in excess of available resources allocated to DPG by higher headquarters.

Comment 2-9. Section 3.11.3, Affected Environment, Noise, DPG Noise Sources and Characterization, page 3-237: The document states that, with the exception of aircraft noise, the amount of reliable noise data analysis generated from activities by DPG tenant units is limited because noise levels are not typically measured during testing activities. This does not mean that noise levels and frequency are not an issue for wildlife. Activities involving loud noise levels during sensitive seasons or times of day should be identified to determine if they exceed threshold levels and necessitate remediation/mitigation efforts. Remediation/mitigation plans should contain monitoring to determine effectiveness of remediation measures

Response 2-9. Effects of noise on wildlife are discussed in Sections 4.4.2.2 and 4.11.2.4. Mitigation measures for noise are discussed in Section 4.11.6. DPG is not aware of the threshold levels to which the commenter refers. DPG would welcome more specific information on these threshold levels. DPG does not have any evidence of impacts on animals caused by noise. If mission noise was to pose a threat to wildlife, DPG would consider the use of available resources to mitigate impacts on natural resources. The wildlife at DPG is thriving and dynamic and in better stead than the wildlife in Salt Lake City or Tooele. DPG intends to comply with all NCPA provisions applicable to DPG for which higher headquarters have provided funding. DPG will not take action on noise beyond that required by law, unless directed by higher authority to do so. As always, any action is subject to available funding and subject to the needs of other natural resource funding priorities.

Comment 2-10. Section 4.1.6, Impacts of the Proposed Action and Alternatives, Impacts to Soil Physical Quality, Mitigation Measures, page 4-20: We are concerned by the statement “when possible limit track vehicle use and prohibit cross country travel.” We are aware that there are currently frequent examples of failure to abide by existing restrictions on cross country travel. Without adequate enforcement, the problem can only increase under the proposed expansion. The document should detail who will decide, in any individual case, when and how such activity will be limited. It should also note whether or not it involves individuals who can assess both the tactical and environmental impacts of limiting or not limiting this activity in

any one case. There should also be a commitment to provide for a conservation enforcement team.

The DEIS should clarify the statement "revegetate affected areas and have training units contribute finances for this effort" by detailing revegetation plans. Reestablishment of historical native communities is preferred. Use of non-native species would likely dilute native biotic diversity. If it is necessary to use non-natives, they should be species that do not naturalize, spread, or impede the natural re-establishment of native species.

The document proposes rotating training areas to allow for 4-7 years rest and to allow for revegetation within acceptable industry standards. Please provide additional specifics regarding the level of revegetation expected prior to continued operation of an area.

Response 2-10. The Military Testing and Training Area Management Plan addresses the issues described in the first paragraph of the comment. Since September 11, 2001, however, track vehicle use has been greatly reduced for security purposes.

Revegetation plans and procedures will be specifically addressed in the Integrated Exotic Species Management Plan. The Military Testing and Training Area Management Plan contains specifics regarding rotation of training areas and revegetation.

Soldiers and testers on exercises and tests are instructed to only engage in traversing approved areas. This mitigates the impact on the vegetation and soil of the ranges on DPG. The Commander, DPG, will decide and be responsible for when and how restrictions on cross country transport will be allowed to occur. DPG has a conservation enforcement team consisting of natural resource personnel from the Directorate, Environmental Programs, DPG, and the director of that organization. Furthermore, the DPG point of contact for dealing with training units briefs those units on the way they can operate their equipment on DPG ranges. Violations of the standard operating procedures subject the soldiers and DPG employees to punitive disciplinary action and subject contractors to claims by the government to reimburse for the damage. DPG will continue to assertively seek integrated Training Area Management (ITAM) funds. DPG will continue to seek creative ways of requiring training units to mitigate the cost of natural resource impacts. National and departmental policy make it difficult to obtain funding to fully mitigate the training impacts. National and departmental policy are beyond the control of DPG. The comment makes reference to "industry standards." DPG is not in "industry," but

rather national defense and security. DPG concludes that "industry" standards, which are not further explained by the commenter, do not apply to DPG. The goal of revegetation by DPG is always subject to the availability of funding, which in the broadest sense is determined by Congress, and to a lesser extent by DOD and the Army, but not DPG. By choosing the land area of DPG in 1942 for military missions, President Roosevelt committed the natural resources now part of DPG to a potentially irreversible and irretrievable impact. Now DPG seeks under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) section 107(f) to make an irreversible and irretrievable commitment of natural resources to national defense and national security use. DPG and the higher headquarters of DPG will continue to take action to mitigate the impact of that irreversible and irretrievable commitment of the lands of DPG to the national defense and national security needs.

Comment 2-11. Section 4.1.6, Impacts of the Proposed Action and Alternatives, Impacts to Soil Physical Quality, Mitigation Measures, page 4-21: The statement "restrict future development/use of mineral resources at Granite Peak" is confusing. The document should state whether this means restricting private use in the form of mineral rights. Too little information is presented to assess what this statement means and how it provides mitigation.

Response 2-11. Mitigation measure was changed to read: "Continue to prohibit any development and/or use of mineral resources at Granite Peak."

DPG does not have plans to allow private development of mineral resources, if any, of Granite Peak. DPG is not aware of any private entities, which have shown interest in developing DPG mineral resources. Existing DPG gravel pits are sometimes used as a source of gravel and sand for construction on DPG. None of those gravel pits exist at Granite Peak. Development of geothermal energy resources has been considered and discussed in the past. But there is not any current action to develop geothermal resources.

Comment 2-12. This section only discusses wild horses in relation to their impact to pronghorn. There should be more discussion on the impacts of the proposed action and alternatives directly on the wild horses.

Response 2-12. Section 4.4.2.2 recognizes that feral horses could potentially be impacted by activities in the Cedar Mountains. Mitigation measures for potential impacts to wildlife are presented in Section 4.4.6.

Comment 2-13. Section 4.2.2.2, Impacts of the Proposed Action and Alternatives, Impacts to Surface Water Quality, page 4-27: The document mentions a water analysis of Fish Springs NWR surface water. Please identify the specific water source for the analyses; i.e., whether samples were collected from Fish Springs NWR or from adjacent DPG property. Additionally, there is wide variability in water chemistry throughout the Refuge, so sampling at the end of the system may give a worst case scenario. The document should more clearly explain the source of this data.

Response 2-13. The text on page 4-27 has been changed to read, "Impacts to surface water quality of Fish Springs National Wildlife Refuge, adjacent to the southern boundary of DPG, were also analyzed due to its proximity to DPG." No surface water samples were collected and chemically analyzed for this EIS.

Comment 2-14. Section 4.4.2.2, Impacts of the Proposed Action and Alternatives, Impacts to Wildlife, page 4-64: The document states that no data are available to determine the specific impacts of noise and blast overpressure or their significance on DPG's wildlife species. As this type of noise would increase under the proposed expansion, we are concerned that failures to ascertain the impacts and provide mitigation may lead to long-term impacts to wildlife species on DPG. We recommend you work with the Service, Utah Division of Wildlife Resources, and the wildlife experts in Program 52, Environmental Noise of the U.S. Army Center for Health Promotion and Prevention Medicine at Aberdeen Proving Ground to address this knowledge gap.

Response 2-14. Mitigation measures for noise are provided in Section 4.11.6. Thank you for the recommendation. DPG is not familiar with Program 52. Congress funds the Army to keep DPG open and the proving ground operating. However, the Test Center is only funded by customer funds. The Test Center must compete for projects in order to have its employees and test contractor employees on the payroll. Those funds can only be used to keep the Test Center operating. So there are legal constraints on the uses to which DPG can put customer funds.

Comment 2-15. Section 4.4.2.2, Impacts of the Proposed Action and Alternatives, Impacts to Wildlife, page 4-65:The document states that wildlife responses to overflights have not been documented on DPG. It further states that reaction to overflights is not believed to be a significant impact because it would not cause a decrease in the entire population. If overflights reduce reproductive success or cause stress that results in species making long distance migrations in insufficient condition to do so, the total population could, in fact, be decreased. For some of the Partners in Flight Priority Species, a small population loss could be significant.

Many of the animals residing under the UTTR airspace on Dugway are likely affected by overflight. The degree to which they are affected has not been documented, and the only data referenced to support the contention of no affect is for large ungulates, a group which is, numerically speaking, a very minor portion of the DPG fauna. Response to overflights varies by species, by individual, and by season. The document should provide more information on this subject, and DPG should work with the USAF to develop cooperative studies to determine the effects of overflights on the wildlife using DPG.

Response 2-15. Air Force air testing and training activities at the UTTR are not part of the Proposed Action because DPG is not the proponent of these activities and has no control over the scope, timing, and frequency of air activities. Overhead motion associated with UTTR airspace is discussed with the cumulative impacts in Section 5.2.4.4. DPG is not aware of evidence supporting the stated assumption that the testing and training noise affects wildlife.

Comment 2-16. Page, 4-71: The DEIS states that the leading cause of mortality for DPG pronghorns is vehicular collision. The document should provide details on measures you are taking to minimize the problem. Migratory birds are also frequently lost to vehicle collisions, particularly at night. We recommend you expand your discussion accordingly.

Response 2-16. No specific data on migratory birds loss to vehicle collisions at DPG are available as these occur infrequently. Details of the measures to minimize the problem are to enforce speed limits as stated in Section 4.4.6. The number of deaths of pronghorn antelope is only a few a year, for example, nine in the year 2001. To mitigate the impact on the pronghorn antelope, DPG staff regularly encourages employees, soldiers, and contractor employees to drive within the posted speed limits and to watch for and avoid wildlife. The 55 mph speed limit between English Village and Ditto Technical Area, a distance of 10 miles, remains 10 mph below the State's posted speed limit on State Highway 196 in Skull Valley. The speed limit between Ditto and the Life Sciences Test Facility, a distance of 6 miles, remains at 45 mph. These speeds are enforced strictly, unlike speed limits on state and federal highways in Utah.

Comment 2-17. Section 4.4.2.4, Impacts of the Proposed Action and Alternatives, Impacts to Wildlife, Compliance with Regulations and Management Plans, page 4-73: The document states that it has been difficult to mitigate damage to the ranges, and that DPG may be out of compliance with the Sikes Act. We have concerns that expansion of ground disturbing activities, especially the Paladin system may lead to further unmitigated damage to ecosystems. The document should

discuss how DPG proposes to remedy past unmitigated damages and ensure that future damages are mitigated. We recommend that the proposed expansion not occur until DPG has completed the documents for and can implement protective and remedial measures in the following: the Integrated Natural Resource Management Plan; the Military Training Management Plan; the Invasive Species Management Plan of the ITAM Program; and the Training Environmental Assessment.

Response 2-17. A delay in implementation of the Proposed Action or alternative is not necessary or appropriate. This EIS will comply with all NEPA procedural and substantive requirements. This will insure full compliance with the Sikes Act.

DPG is working to complete and implement the Integrated Natural Resources Management Plan, Military Testing and Training Area Management Plan, Integrated Exotic Species Management Plan of the Integrated Training Area Management Program and the Training Environmental Assessment.

DPG is not sure exactly how the commenter concludes that DPG is out of compliance with the Sikes Act. The commenter should feel free to provide additional specifics on this claim. Certainly, training with the Paladin artillery vehicle has been authorized by Congress, because Congress approved the funding for the Paladin. The Congress has also funded the Utah National Guard, which contains the elements of I Corps artillery, which is equipped with the Paladin. Some damage caused to the environment has gone unmitigated, but only due to a lack of funding, not due to a lack of requests for funds by DPG. DPG will continue to attempt to implement protective and remedial measures, which will be subject to available funding. DPG will continue to support national security through test and evaluation and training and support to industry engaged in national defense and national security and to other agencies and allies and friendly countries engaged in cooperative international security.

Comment 2-18. Section 4.4.6, Impacts of the Proposed Action and Alternatives, Impacts to Wildlife, Mitigation Measures, pages 4-75 and 76: We commend DPG for proposing temporary closures to avoid training and testing in areas of high wildlife population concentration, nesting sites, or wintering ranges. We believe DPG should also commit to habitat protection and restoration activities that will maintain and enhance wildlife populations and their habitat. Severely impacted habitat may be unavailable for wildlife until restoration is completed. Even if there is alternate habitat to which the wildlife are displaced, it is unlikely that the area to which they are displaced is not inhabited by other wildlife. Depending on the season, displacement could lead to nest abandonment, inter and intra-specific competition, reproductive failure, and possible mortality.

We strongly support the proposals to implement a bio-monitoring program at the landscape level, and to conduct much-needed biological inventories and monitoring. These efforts should be fully integrated into the pending Military Training Area Management Plan with commitments to alter or mitigate actions determined to be negatively impacting wildlife resources.

Response 2-18. DPG's mission-related activities are in support of its "dominant use" land management philosophy, which ensures that military-related land uses at DPG have ultimate priority over all other potential land uses. DPG's military-related land uses meet the Army's congressionally mandated goals, but also result in long-term adverse impacts to the quality of land and its use. Mitigation will continue to be applied but some residual impacts after mitigation are unavoidable given mission requirements and objectives.

Comment 2-19. Section 4.4.7, Impacts of the Proposed Action and Alternatives, Impacts to Wildlife, Residual Impacts, page 4-77: The document states that if wildlife populations become extremely depressed, more management practices over an extended period of time would be necessary after the initial mitigation measures, in order to allow the population to fully recover. Wildlife populations should not be allowed to become "extremely depressed". You should determine the numbers necessary to maintain viable populations on DPG, set thresholds, and commit to change activities when they approach that threshold.

Response 2-19. DPG's mission-related activities are in support of its "dominant use" land management philosophy, which ensures that military-related land uses have priority over other land uses. Wildlife populations would only become extremely depressed with significant unforeseen disturbances. At that time, DPG would attempt to use adaptive management techniques to ensure recovery.

Comment 2-20. The document states that "increased firing at the White Sage Impact Area would increase the probability of munitions missing their target and striking BLM land." "The increase in public safety risk would be considered significant." Exposing the public to the risk of munitions missing their target does not seem to be consistent with the responsibilities of an agency to avoid actions which may threaten the public. The total of over 1,000,000 acres of DOD land currently dedicated to military purposes seems to be an area better suited to absorb munitions which may miss their target. Of Dugway's over 798,000 acres, there are vast acreages west and northwest which could be used as impact areas for artillery, mortars, and missiles which, if they missed their targets, would impact land presently dedicated to Dugway. Scheduled increases in use may occur on impact areas not adjacent to the Dugway boundary. An alternative would be to not increase the use of

White Sage, and relocate target locations to avoid flying over BLM land and areas close to the boundary. For example, the portion of UTTR adjacent to the north of Dugway includes about 460,000 acres which is primarily an impact area now.

Response 2-20. Section 4.12.6 recommends two mitigation measures for artillery, mortar, and missiles impacting public health and safety. They are:

- Thoroughly review all target locations in the White Sage Impact Area
- Explore the potential need to obtain additional land around the White Sage Impact Area from BLM to act as a buffer for existing targets.

As of 2000, about 23% of DPG land holding are designated for training activities. Military training requires varying terrain to ensure the most realistic training experience. The portion of the Utah Test and Training Range adjacent to the north of DPG includes about 460,000 acres of Air Force land and DPG does not control it. If the use recommended by the commenter is needed by DPG, the command would consider asking the Air Force for permission to make the use.

Comment 2-21. Section 5.2.4.6, Cumulative Impacts, Cumulative Impacts to Biological Resources, Use of Chaff, page 5-31: The impacts to wildlife of the continued use of chaff, or any expansion in the use of chaff on any portion of DPG, is not sufficiently documented in the science that UTTR staff has presented to date. Nearly all of the negligible impacts presented for terrestrial fauna are based on consumption of chaff by large ungulates. We disagree that these results can be extended to any other terrestrial vertebrates. In addition, the 1999 report, "Environmental Effects of RF Chaff: A Select Panel Report to the Undersecretary of Defense for Environmental Security" (Naval Research Laboratory, Washington DC 20375-5320), noted there were unanswered questions regarding: a review of threshold metal toxicity values in humans, animals, and fresh and marine organisms: respirability of fibrous particles in avian species; chaff accumulation on water bodies and its affect on animals; and the potential for impacts on highly sensitive aquatic habitats. Fish Springs NWR is on record as being opposed to chaff use in any airspace and contends that any activity that results in chaff falling on Refuge property is prohibited under Federal law. The document should provide more information on this subject, and DPG should work with the USAF to develop cooperative studies to determine the effects of chaff on the wildlife using Fish Springs NWR.

Response 2-21. This is an Air Force activity (use of chaff) for which that agency is the proponent. DPG has no control over the scope, timing, and frequency of Air Force air activities. Cooperative studies for the effects of chaff on wildlife using Fish

Springs National Wildlife Refuge should be performed by the U.S. Air Force and the U.S. Fish and Wildlife Service. Since DPG is not the proponent, DPG does not have any comment on the suggestion.

Comment 2-22. Section 5.2.11.4, Cumulative Impacts, Other Noise Sources from Federal Government Activities, Effects from Exposure to Noise, Impacts to Wildlife, page 5-52: The document discusses noises from explosives, sonic booms, and low-flying aircraft. The last sentence indicates that "noise studies elsewhere indicate that animals do adjust to noise within their habitats, and that impacts are not considered significant." Some studies on raptors have shown that: certain individuals and certain species may become habituated to noise (Russell and Lewis, 1993; Andersen and Rongstad, 1989); and short-term startle responses from aircraft noise may not equate to population effects or reproductive success (Ellis, 1981: Delaney et al., 1997). Other studies indicate some species may be less likely to reoccupy nests overflown during the nesting season (Platt, 1977). However, these studies are often for single species and for resident nesting populations not experiencing the immediate stress of the migration journey. Additional questions remain regarding the effects of noise on nesting and transient migratory birds (Bartecchi, 2001). The document should provide more references for this discussion and expand it to address the points raised here.

Response 2-22. In Section 5.2.11.4, the EIS states that data are not available to determine impacts to wildlife populations and recognizes that the startle effect is likely for these populations. DPG is unaware of any studies that more clearly define the possible effects of cumulative noise impacts.

Comment 3 – Utah National Guard

Comment 3-1. The DEIS references other plans neither readily available for public, tenant or customer review (although DPG did mail digital copies of these plans when asked) nor previously validated by the National Environmental Policy Act (NEPA) process.

- Of most concern is that the DEIS recommends following the requirements of DPG's Fire Management Plan, 2001 Integrated Natural Resource Management Plan (INRMP), and 1996 Maneuver Training Area Management Plan (MTAMP) - all plans that as far as communicated have not been vetted by the NEPA process. It is not appropriate for these plans to be incorporated by reference in the DEIS.

- It also inappropriately recommends implementation of a Paladin Weapons System Management Plan specific to DPG that is yet to be written, and therefore not available for comment.

- It does not reference the Paladin Programmatic Environmental Assessment for Fielding the Paladin Weapon System (EA), which addressed fielding of the Paladin to the US Army and reserves, and specifically to DPG, dated October 1997.

Response 3-1. DPG has developed a variety of management plans to ensure Federal and State regulations are complied with, the installation's cultural and environmental features are preserved and managed, and adequate facilities are provided for DPG personnel and the DPG community. These management plans also enable DPG to effectively support the installation's mission and are intended to mitigate any potential environmental impacts from DPG activities. Management plans are updated as necessary. Discussions regarding appropriate management plans take place between DPG, tenants, and customers as necessary. These plans have been incorporated by reference into the EIS.

Because these plans are intended to mitigate environmental and other impacts, further NEPA evaluation of management plans will be determined on a case-by-case basis.

A Paladin Weapons System Management Plan specific to DPG will not be written. Management of the Paladin will be addressed in DPG's Military Testing and Training Area Management Plan. Reference to the Paladin Programmatic Environmental Assessment for Fielding the Paladin Weapon System (EA), dated October 1997, has been added to the EIS. EIS text has been changed to read, "Management of the Paladin is included in DPG's MTAMP and the Programmatic Environmental Assessment for Fielding the Paladin Weapon System (U.S. Army Corps of Engineers Mobile District, 1997)."

Comment 3-2. The DEIS recommends collecting compensation for fire control, revegetation and other environmental management activities in accordance with the MTAMP and the INRMP. These comments may also be found in the Executive Summary in Table ES-7 as Mitigation and Monitoring Measures, specifically at ES-51 row 1, bullet 12, ES-53 row 2, bullet 5, ES-53 row 3, bullet 7, and ES-58 row 3 bullet 5.

- Neither collecting compensation nor any formula for doing so was found in either of these documents. The only mention found was that units training during high

fire danger might have to pay for a fire department member to be onsite during training.

- We believe it inappropriate for an EIS to assert contractual agreements, and especially so without the consent of the other party.

- The Army National Guard is not funding for costs associated with training damage, and funds obtained for training are not sufficient to both train and pay potential bills levied by DPG. Any potential bills resulting from training activities and paid from training funds would seriously impact future training and unit readiness. Further, this indirect funding to DPG, potentially covered by other programs such as Integrated Training Area Management (ITAM), may have anti-deficiency implications.

- Lastly, damages are a normal consequence of training and are the responsibility of the host installation permitting the training. DPG receives funds for the Army Deputy Chief of Staff for Operations and Plans (DCSOP) ITAM program to mitigate training damages at US Army installations.

Response 3-2. Damages are a normal consequence of training and are the responsibility of the training unit to mitigate at U.S. Army installations. Therefore, the Army National Guard should fund for costs associated with training damage.

Comment 3-3. Section 3.9.3 of the DEIS, Airports and Airspace, makes no mention of Salt Lake City Municipal Airport #2. General Aviation is based at the airport along with a very large Utah Army National Guard Helicopter training base. The Army Aviation Support Facility (AASF) is located at the southern most end of the property, Two Army Aviation Helicopter Units are housed there, 1st Battalion, 211th Aviation Regiment (AH-64A Apache) and D Company, 1st Battalion 189th Combat Support Aviation Battalion (CSAB) (UH-60A Blackhawk). Also, Detachment 50, Headquarters, Utah State Area Command operates a C-12 Beachcraft SuperKing Air at the facility. The Utah Army National Guard currently performs over 3500 sorties per year out of Salt Lake City Municipal Airport #2.

Response 3-3. Text regarding the SLC Municipal Airport #2 has been included in the EIS in Section 3.9.3.

Comment 3-4. The training activities of the UTNG Aviation units are not well described in the DEIS. They should be better described in Section 2.1.6, Baseline Training Activities, Section 2.2.2, Proposed Action Training Activities, and/or possibly Section 5.0, Cumulative Impacts. The following on-going activities may be appropriate for inclusion into the DEIS.

- AH-64 Apache and UH-60 Blackhawk helicopters use Wig Mountain, White Sage, and Wildcat as Missile, Rocket, and Machine Gun ranges. The airspace will accommodate up to 3 battalions of helicopters safely if the need arises. Artillery, Air Force A-10's, Air Force F-16's and AH-64 Apache attack helicopters use the range simultaneously for Joint Air Attack Training (JAAT). UH-60 Blackhawks use the area for Door Gunner Training. The training area is so large that Fuel is the limiting factor in Helicopter training. This area is perfect to train ground troops on Forward Area Rapid Refuel (FARP) procedures. This type of rapid refuel/rearm is important in areas not supported by hard black top roadways.

- UTNG AG-64 Apache and UH-60 Blackhawk helicopters use the airspace at all altitudes (Nap of the earth, Contour, Low Level) including hovering operations. This is done at all hours of day and night.

- UTNG AH-64 Apache and UH-60 Blackhawk helicopters land on the property to practice terrain and confined area approaches and takeoffs.

- UTNG AH-64 Apache and UH-60 Blackhawk helicopters use Michael Army Airfield (MAAF) and surrounding area for Emergency Procedures Training.

- UTNG AH-64 Apache and UH-60 Blackhawk helicopters use areas west, south, and north of MAAF, (Wig Mtn, Wildcat Mtn, White Sage) for live gunnery training.

- UTNG AH-64 Apache and UH-60 Blackhawk helicopters use MAAF and surrounding area for FARP Operations and Re-Arm and De-Arm Operations.

- The UTNG uses all areas, (Boy Scout Camp, White Rocks area etc.,) to place a 400 person Battalion and Group Headquarters for Field Training Exercises, Battalion Assembly Area operations, Forward assembly Area operations, and Holding Area Operations training. We must move off road, utilizing terrain for cover and concealment.

- The UTNG uses the property for FARP operations off roads and in areas used for cover and concealment.

- The UTNG uses all areas of DPG and the Utah Test and training Range (UTTR) for UH-60 HAMOTS operations relating to maintenance of Clover Control and associated radar sites.

- The UTNG uses all areas of DPG and UTTR for helicopter operations day and night, utilizing Night Vision Goggle and Night Vision Systems training. This training can be accomplished with just one aircraft or with multiple aircraft flying formations in blackout conditions.

Response 3-4. Text regarding these activities was added to the EIS in Section 2.1.6.

Comment 3-5. Based on our review of the above referenced document, and our discussion with I Corps Artillery officers regarding the requirements of the I Corps Artillery training exercises, the following comments are of concern. The bullets were extracted from the DEIS, Section 4.1.6, Mitigation Measures, however, these statements were found scattered throughout the DEIS document.

- Bullet #1: "When possible, limit track vehicle use and prohibit cross-country use". We anticipate that this mitigation measure is, overall, a good measure to be implemented. However, the possibility exists for this statement to be misconstrued and thereby negatively impact the training of the I Corps Artillery to a point that unit readiness, hence national defense, would be unduly impacted.

- Bullet #2: "Vary intensity of training and testing seasonally to reduce the impact on vegetation and avoid high fire conditions". Once again we anticipate that this mitigation measure is, overall, a good measure to be implemented. However, based on environmental impact information gathered from training units at the battalion level, it is not typically possible to meet both of the criteria listed. Historical information suggest that during winter months tracked vehicle use greatly impacts soil and vegetation in the maneuver areas. This impact is cause by large ruts created with the repeated thawing and freezing of the ground while traversing the area with heavy vehicles. Winter is the same time when fire danger is typically low and firing into the impact areas is most acceptable. The summer months, when fire danger is high, are typically the best time to conduct maneuver training due to reduced impact in maneuver areas. However, during summer months, impact areas are typically at the highest risk from fire. Spring is the most likely time of the year to correlate a low fire danger time with moderate temperature fluctuations that do not repeatedly thaw and freeze. The following wording may eliminate any paradoxes precluding all training activities: When possible, the intensity of training and testing will be varied seasonally, based on environmental, readiness and feasibility assessments conducted at the battalion or testing facility level, to reduce the impact on vegetation and to avoid high fire conditions.

- Bullet #'s 6 and 8: "Rotate use of training areas to allow for a 4 to 7 year rest periods and to allow for revegetation within acceptable industry standards" and "Focus ground training in areas with high ground disturbance, such as White Sage Impact Area and Wig Mountain training Area for training and testing. Other areas that are used should follow compensation guidelines established in the MTAMP and the INRMP". We are in concurrence that maneuver and artillery fire training can be conducted based on a 4 to 7 year rest or rotation period. Weekend training evens should be limited to either the White Sage Impact Area or Wig Mountain Training Area, but no both. However, for current tactical training methods to be implemented under current doctrine, more than one artillery firing range is required and extremely beneficial. Therefore, a minimum of two training areas would be required for some training events. Lengthy training events, such as annual training would fall under this category and require additional training areas. To facilitate the rotation of ranges a third range such as the Causeway Impact Area would need to be available for training. Most ground training could be conducted at the White Sage or Wig Mountain areas and Causeway would be used for limited operations (maneuver and artillery firing) required of the unit.

Response 3-5. Unit readiness and national defense would not be unduly impacted by this mitigation statement due to DPG's land management philosophy of "dominant use" which ensures that military-related land uses at DPG have ultimate priority over all other potential land uses.

Change to "When possible, without jeopardizing realistic training, vary the intensity of training and testing seasonally to reduce impact on vegetation and to avoid high fire conditions."

Comment 4 Citizen's Education Project

Comment 4-1. My name is Steve Erickson. I'm the director of the Citizen's Education Project. We're a nonprofit organization located in Salt Lake City that deals with educating Utahans and others on issues of social, economic and environmental justice. First I would like to start by commenting on the process to date the Army has followed with this Environmental Impact Statement. I would say that the Army has performed it's duties perfunctorily, have made no significant effort to inform the public of plans with the significant environmental, social and economic impact potentially upon the public in this state, nationwide and internationally. I do appreciate that Colonel Harder has seen fit to extend the written comment deadline in response to our request to do so. It was gracious and appropriate. However, the

contractors for the Army and the Army itself have really attempted in our estimation to slip this under the radar screen with the least amount of public participation possible. And the format of this particular hearing is just yet another indicator that the Army does not want the public to participate in any meaningful fashion in this decision making required by law.

Response 4-1. Chapter 6 of the Draft EIS describes DPG's consultation and coordination with stakeholders and the public through release of the EIS. Appendix L presents the initial Distribution List of the Executive Summary and the full EIS. In addition, DPG responded in a timely manner to all additional requests for the EIS.

Public meetings were scheduled more than two months after the publication of the Notice of Availability to support public participation in the NEPA process. As a result, DPG did not "slip this EIS under the radar screen." Public involvement has been and will continue to be a major goal of this EIS process.

Comment 4-2. Following on that, it's my understanding that the Army has or is preparing now a Programmatic Environmental Impact Statement to deal with its proposals regarding expanded biological, chemical and counter terrorism missions. That is not completed and if the tiering process of NEPA is what it is supposed to be then the PEIS ought to be done before the DEIS for any particular project is put forth. So there is a question here that I would like answered by the Army at some point in the process as to whether or not this Environmental Impact Statement that we're commenting on here today is tiering off of the Programmatic Environmental Impact Statement that is yet to be completed?

Response 4-2. This EIS only addresses DPG's future mission through descriptions of the Proposed Action and alternatives. Any tiering relationships of other NEPA documents to this EIS will be identified in these other NEPA documents. Tiering relationships of this EIS to other NEPA documents is identified in Section 1.5.3.

Comment 4-3. In that context there are a variety of new proposed biological safety level 3 and 4 laboratory expansions and new construction across four cabinet level compartments now under consideration. Those being the DOD, the DOE, the Department of Agriculture and the Health and Human Services Department and below them the centers for disease control and other associated HHS agencies. The question that comes to mind knowing that we're talking about new BL 3 or 4 laboratories in places like Las Alamos, Livermore, California, Hamilton, Montana, Galveston, Texas, Lubeck, Texas, Plume Island all raise a question of, is this a duplication of effort? Is this an overreaction to the potential for a bioterrorism

problem in this country? And wherein lies the oversight for these programs and how do they in the end tie together?

Response 4-3. DPG's mission is established by Congress, DOD, and national security requirements. The purpose of this EIS is not to examine or question these requirements. Rather, the purpose is to identify future proposed actions and alternatives associated with reasonably foreseeable future mission programs at DPG, identify and disclose potential impacts of these actions, and identify appropriate mitigation measures.

Currently there are no plans for DPG to obtain BL 4 capabilities. Unknown future programs or activities at DPG not assessed in the EIS would be "tiered" from this EIS to separate NEPA documentation.

Any evaluation of the potential need for BL 3 or 4 laboratory expansions or new constructions at other locations is beyond the scope of this EIS.

Comment 4-4. A question that I would like to have answered specific to the process with the Environmental Impact Statement before us is the tiering on specific projects that are envisioned in this seven year master plan if we can call it that. And that is should Dugway pursue the preferred alternative, constructing as many as seven separate new buildings, renovating as many as four additional existing buildings for purposes of biological and chemical defense testing?

Will there be a process for under an environmental assessment that the public can be involved in each specific new development proposed? What will be the decision making? Where is the cut line on whether an EA will be required or whether it will be considered under the rubric of this master plan to have already been approved and can be done without any additional public input?

Response 4-4. The implementation of the Summary Development Plan is included in this EIS. It is likely that mission activities could occur at DPG over the next 7 years that cannot be identified in this EIS. The approach to address these unknown components is that future programs or activities at DPG not assessed in the EIS will be "tiered" from this EIS to their own NEPA documentation. An acceptable NEPA practice, "tiering" uses specific program documentation to build upon environmental analysis presented in this EIS, to prepare a NEPA document that provides detailed environmental analysis for programs once they are better defined.

Comment 4-5. The question arises on specific tests that might take place in any one of these given facilities, new, old or currently existing, and that is whether there will be peer review, opportunities for the scientific and medical community around

specific testing procedures, protocols, materials and whether there will be any oversight, not only from the state government, but the federal government? We witnessed a complete collapse in my estimation of state oversight under the Leavitt administration over the activities of the Dugway Proving Ground and how will the Dugway Proving Ground outreach to the state in order to assure the maximum protection of the public health.

Response 4-5. As described in Section 2.1.3.2, to ensure each test is properly planned and that potential environmental impacts are considered, test process planning and management is conducted by the West Desert Test Center, according to the Test Coordination and Conduct Manual.

Comment 4-6. I have only had a short opportunity to review the voluminous 1,000 page full EIS. And in it I find no accumulative active impact analysis. This is typical of most environmental impact statements produced by the military. I've read many and have sued over several. The question arises with the lack of accumulative impact analysis where does the impact come on the proposed wilderness area adjacent to the Dugway Proving Ground under the proposed amendment to Defense Appropriation Act by Congressman Hansen which would preclude presumably the construction of a rail line to the private fuel storage and nuclear waste facility. How does the PFS facility fit into the economics and sociology if nothing else, not to mention the environmental impact of the two proposals in conjunction?

The same questions could be leveled regarding the use of the Utah Test and Training Range and the Army's lease of facilities to the Air Force and in allowance of the Air Force to use the air space above its facility.

Response 4-6. An extensive analysis of potential cumulative impacts is included in Chapter 5, based on information available during this EIS process through March 2001. UTTR activities are described in Section 5.1.1 and PFS is described in Section 5.1.12. Impacts from these activities and other regional projects are described in Section 5.2.

Comment 4-7. A serious question arises in my mind regarding the potential for Dugway to contract with other agencies wishing to use the Dugway Proving Ground for their purposes. This is not an unusual occurrence at Dugway. Dugway has a long history of granting use permits long term and short term to other agencies. The Air Force being the most obvious example.

The question arises when other agencies funded by other departments in the federal government pursue the opportunity to build laboratories on the secured facilities and

remote facilities of Dugway for biological level 3 or 4 laboratories. It's my understanding that there is at least one educational institution in this state that is now interested in contracting with Dugway for a biological level 4 laboratory.

Dugway states in its Environmental Impact Statement that it not intending as an Army agency to pursue a biological level 4 capability in the next seven years of its master plan. But what if other agencies wish to lease land at Dugway to do that, how does that fit into the environmental impact analysis that we have before us and what will be the policy decision surrounding that? And will there be an adequate public process to address the potential for contracting agencies escalating the mission of Dugway Proving Ground on a lease basis?

Response 4-7. Currently, there are no plans for a BL 4 facility at DPG. The EIS broadly assesses the potential environmental impacts of DPG mission activities and tenant activities which DPG exercises some reasonable control over, such as the Utah Army National Guard and other reserve components. Installation decisions including any mitigation measures identified within the EIS apply to both DPG and tenant activities. Tenant activities at DPG require NEPA documentation and approvals for the specific proposed actions.

Customer testing at DPG is coordinated through U.S. Army Developmental Test Command. U.S. Army Developmental Test Command test centers, including DPG, are not authorized to conduct tests without prior coordination with U.S. Developmental Test Command Headquarters in Aberdeen, MD.

Comment 4-8. Dugway Proving Ground beginning in my memory going to the mid to late 80's consistently denied that any of its biological defense activities involved the production, development or distribution of any pathogens beyond the borders of the Dugway Proving Grounds. That its role was simply to test agent against protective gear to perfect detection devises that might have battlefield utility and to determine methods for decontaminating equipment and personnel exposed to biological agent.

However, recent admissions by the Dugway Proving Ground reported widely in the national press state that in fact Dugway has produced and developed weaponized agent since at least 1992 and that those weaponized agents, anthrax in particular, have been sent back and forth between not only Dugway and its headquarter agency USAMRIID and Fort Detrick in Maryland, but has shared weaponized anthrax contractors such as Batell Corporation in Ohio.

There are questions whether any of that anthrax has gone to additional locations such as the University of New Mexico. And that there are counting discrepancies that have been revealed between the sharing of anthrax in either liquid or dry weaponized form between Dugway and Detrick.

The extraordinary concern we have and the public ought to have the question essentially comes down to where do the anthrax of post 9/11, fall 2001, come from and where was it weaponized. Pending further investigation by the FBI and other authority agencies that still remains a question, but all current publicly available information points to the United States Army, USAMRIID, Fort Detrick and Dugway.

That not only raises questions about the oversight and transparency which are entirely needed in this situation with the proving ground and its proposed development, but raises the question about the need for Dugway to weaponize pathogens in order to test them. Is it not possible for Dugway to fulfill it's mission to protect our military personnel by using simulant organisms rather than weaponized pathogens?

Response 4-8. As discussed in Section 2.1.5.1, DPG uses biological simulants instead of biological agents to the greatest extent possible, although biological agents within engineering controlled laboratory facilities often must be used to ensure that the defense systems perform as expected with the actual biological agents. Further questions should be addressed to the Department of Army Public Affairs Office, (703) 697-7592.

Comment 4-9. It leads to further questions given that Dugway has essentially mislead the public over the past 12, 13 years about weaponizing pathogens for testing purposes whether or not we can trust the Army and Dugway Proving Ground not to enter into the realm of genetically engineering micro-organisms, pathogens for additional experimentation.

Given Dugway's past track record dating to 1940's in which Dugway has released to the environment with an untold, undetermined impact upon the public health of people in the vicinity of more than 1,000 open air chemical weapon tests, many dozens of open air biological releases, radiological releases into the several dozens from tellerium to cobalt 60, whether or not we as a public can trust Dugway in light of the fact that this development follows so closely on the heals of serious questions of its participation in weaponizing anthrax that winds up in senators' offices.

How will in the end Dugway minimize the risk to the public health? It's more than simply a security concern. And there are certainly security concerns about the operation of the proving ground over the years. Additionally the impacts of proposed doubling of biological and chemical weapons defense programs at Dugway will have an impact beyond the boundaries and beyond Utah. There are impacts not analyzed in this EIS and perhaps outside the scope of it, but must be within the scope of the public discussion around this proposal, and that is what is the impact on the biological weapons convention.

The international agreements we have upon the discussion of improving the verification protocols which the United States essentially has walked away from for the time being and what will be the international perception of not only the developments proposed under this EIS, but in the broader view the four plus agency development of BL 3 and 4 capacity around the country. The question arises whether this will be perceived as dual use technology and potential development of an offensive capability particularly in light of the proposed stockpiling of vaccines against potential biological agent use.

Response 4-9. Section 3.13.3.2 describes how biological agents are handled at DPG. Impacts of these activities are included as appropriate in Chapter 4 of the EIS.

The scope of the EIS is identified in Section 1.3, and the EIS presents an accurate disclosure of activities occurring at DPG, or proposed to occur at DPG in the future. DPG conducts all of its test activities in accordance with the International Convention on Prohibition of the Development, Production, and Stockpiling of Bacteriological and Toxic Weapons and the Chemical Weapons Convention which became enforceable under international law on April 29, 1997.

Comment 4-10. Lastly, I have looked at the DEIS sufficiently to determine that the counter terrorism programs proposed under this brand new mission for the proving ground which has been a minimal mission to date are too vaguely described to possibly evaluate. What is meant by this new counter terrorism mission that Dugway proposes? Without more specific information it's almost impossible to make any intelligible comments other than to say what are you planning to do here?

We have heard discussions going back to 1997 of potential use of Dugway Proving Ground for counter terrorism training involving such things as even building a subway in which to experiment with how to protect and respond and the rest, but there is no detail in the statement that would give anyone an opportunity to have any way in on it that makes any sense. So the Army really needs to come a little bit cleaner on what they're proposing here.

I realize that this is a master plan rather than a specific zoning and permitting kind of process, but please we really need more help to understand what it is the Army is contemplating.

Response 4-10. Currently the only counterterrorism program identified for DPG is counterterrorism training. No activities beyond those in Section 2.2.2.2 have been proposed. Future counterterrorism activities not identified in this EIS would require their own NEPA review process.

Comment 4-11. To conclude I would suggest that the Army consider a much higher degree of transparency in their programming than we have seen in the past. I have been informed just as of this evening that the Army is willing to release a list of all the pathogens located in Pandora's Ice Box at the Lothar Salomon Life Sciences Test Facility. That is something we demanded more than a decade ago and were rebuffed.

Supposedly that has all been declassified and only five percent of the information on what pathogens get tested at Dugway are now available to the general public we have yet to see those. I remain skeptical until we do see a list. This is important to know what is in Pandora's Ice Box and what is contemplated to be stored there in the future given the doubling of mission because the public needs to be prepared to protect itself against the potential communicable diseases and/or other pathogens that could infect the population. And to date the only place in the United States where that has happened has been more than likely a direct result of problems within the USAMRIID command.

We need to be able to inform the medical community of what the potentials are for diseases they might encounter, where those might come from, what steps they must take in order to diagnosis and treat those potential diseases, whether they are a result of natural occurrences, accidents or mismanagement. The oversight then becomes much more critical and the need for Dugway to provide greater public information is essential. Transparency in this and in the international agreements that we hope will some day be approved so we can avoid the kinds of situations we're facing world wide now.

That's the goal we hope to achieve. If this EIS has any role in it then it would have been a useful exercise. That concludes my comments.

Response 4-11. A list of biological agents used from 1996 through 1998 at DPG are presented in Appendix C of the EIS. New materials could be required for testing purposes in the future as a result of national security concerns. The use of any new

material at DPG must undergo an environmental review process. DPG has programs in place to safeguard occupational and public health and safety as described in Section 3.12.

Comment 5 – Environmental Health Committee, Utah Chapter of the Sierra Club

Comment 5-1. My name is Cindy King. I am representing the Environmental Health Committee, Utah Chapter of the Sierra Club. We are requesting that the public comment period be extended to December 2, 2002. The public notice lacked the required 15 day notice and did not inform the public where the Draft Environmental Impact Statement could be obtained and/or reviewed. I have enclosed and have given a copy of the notice. The voluminous of the Draft Environmental Impact Statement, as implied in a recent article in the Tooele Transcript Bulletin, the public is not able to become educated to make necessary comments without this extension.

In 1990, the Secretary of Defense, who is now the Vice President of the United States, in a keynote addressed in Bethesda, Maryland at a conference called "Defense and the Environment" that the Department of Defense facilities will follow all federal, state and local environmental statutes and regulations (emphasis added). It should be noted that I am unable to find a reversal of this Secretary of Defense facilities to not comply with the various federal, state and local environmental statutes and regulations.

In 1998, the commanding officer of Dugway, Colonel John A. Como, along with various department heads, personally informed me that Dugway looks forward to a better relationship in meeting the concerns, needs and values that the public might have in regards to the operations at Dugway. Are we now making a liar of this command officer's commitment to the public? I find it very disturbing that Dugway exhibits arrogance in complying with the basic environmental statutes and regulations, in regard to the requirement of public participation.

The National Environmental Policy Act (NEPA) states in Section 2, the purposes of this chapter are to declare a national policy which will encourage a productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the nation.

Title 42, Section 6974, Subsection b(1) states, public participation in the development, revision, implementation and enforcement of any regulations,

guidelines, information or program under this chapter shall be provided for, encouraged and assisted by the administrator and the states.

Congress often speaks about public participation in broad terms, affirming the importance of public participation in the public policy decision-making process. The information is to educate interested parties on the proposed action of the decision-maker. Public participation is two-way communication, with the overall goal of better decisions supported by the public.

I find it ironic that the public notice did not meet the 15 day required notification, nor were copies of the Draft Environmental Impact Statement where they could be obtained and/or viewed. The notice implied that public comments needed to be received on September 9, 2002, which is four days from when the public was notified. The notice does state that public comments would be received during the three public hearings, but the notice does not state if the public comments would be received after these public hearings.

This demonstrates how Dugway has ignored various studies of the National Research Council reports on the various Army's public relations, public outreach and public involvement efforts to avoid problems in public participation. The National Research Council defines public relations component consists of distributing information via mailed, brochures, libraries, radio broadcasts and other media in attempt to reach diverse stakeholders.

Public outreach, the second component, consists of opening channels of communication to the government agency so that the values, concerns and needs of various stakeholders can be heard.

Public involvement, the third and by far the most difficult component to establish, is a formal process that provides stakeholders an opportunity to influence decisions without surrounding the agency's legal mandate to make decisions.

The three components of the public affairs program must be closely coordinated. One Department of Army's public outreach and information office defined their mission as to provide a public involvement that supports meaningful public participation and dialogue. And the vision with management support and through a strategic public involvement program, the public office and information office will gain acceptance.

As mentioned earlier, the Secretary of Defense, in 1990, stated that the various Departments of Defense will comply with federal, state and local environmental statutes and regulations. It is not clear to the public how Dugway is complying with

the Utah Statute Citing requirements as stated in Utah Code Annotated Title 19, Chapter 6, Section 108. It is not clear to the public how the most recently mentioned notice of violation stated in the Division of Solid and Hazardous Waste Control Board meeting regarding the Resource Conservation Recovery Act will affect or not affect the proposed action. To name a few of the violations, denying access to state enforcement officers and not allowing standards operations procedures, not following standard operational procedures and cleaning up and sampling equipment. We realize that a facility of this type will have notices of violations throughout its operational life-span, but what we are questioning is what will be the effects or non-effects to the proposed action. The National Environmental Policy Act requires cooperation between governmental agencies.

In closing, the Utah Chapter of the Sierra Club is requesting the public comment period be extended to December 2, 2002 because of the basic violation of public notification, lacking the 15 day requirement and where the Draft Environmental Impact Statement could not be obtained or reviewed. The voluminous text of the Draft Environment Impact Statement as implied in a recent Tooele Transcript Bulletin article does not allow for the public to become educated on the proposed action, to determine the effects if could have to public health, welfare and the environment. It is not clear how the state statute mentioned is being applied to the proposed action for compliance.

Response 5-1. Public notification was given 15 days prior to the meetings. A printed flyer announcing the meetings was mailed to the parties on the distribution list on August 28, 2002. A subsequent flyer was mailed on September 9, 2002 announcing the meetings and informing the public of the locations of the public reading rooms. Advertisements for the public meetings were published three times in the Salt Lake City Tribune and the Deseret News and four times in the Tooele Transcript, first appearing on September 1, 2002. The first public meeting was held at DPG on September 17, 2002. Copies of either the Executive Summary of the full EIS had been mailed to the initial distribution list prior to public notification. Initially the comment period was to end on August 9, 2002. On July 26,2002 the comment period was extended to September 9, 2002. It was again extended until September 19, 2002 the last date of the public meetings. At the public meetings, the comment period was further extended until October 10, 2002. In an effort to accommodate one more time the comment period was extended until October 25, 2002. In an attempt to receive and take into consideration all comments without unduly delaying the process, no further extensions were given.

DPG has worked with the Division of Solid and Hazardous Waste to resolve all issues identified in notices of violation (NOVs) as they arise. The NOV mentioned in the comment will not affect the Proposed Action.

Comment 5-2. The proposed action seem to constitute the following general described areas: Continuation of baseline mission components; Diversification of Dugway Proving Ground Operations, which would include new types of testing, training and technology development activities and the implementation of an Summary Development Plan. The discussion regarding Dugway's mission description states: "DPG does not conduct any nuclear testing and there are no plans to do so in the future." In another section which discusses Dugway's organization it states: "U.S. Army Development Test Command's mission is to support the materiel acquisition process for defense materiel by: Planning and conducting tests and simulations across the full spectrum of environments (arctic, tropic, desert, shock, vibration, electromagnetic, nuclear, underwater, live fire)…" It is not clear if the tenants of Dugway have to follow the Dugway's mission, which does not allow any nuclear testing currently and/or in the future, or if tenants will be allowed to follow their own missions independent of Dugway's mission?

Response 5-2. The EIS broadly assesses the potential environmental impacts of DPG mission activities and tenant activities which DPG exercises some reasonable control over, such as the Utah Army National Guard and other reserve components. Installation decisions including any mitigation measures identified within the EIS apply to both DPG and tenant activities. Tenant activities at DPG require NEPA documentation and approvals for the specific proposed actions.

Comment 5-3. There is discussion of Resource Conservation Recovery Act permits being a "functional equivalent" of National Environmental Policy Act of the Defense Environmental Restoration Programs and therefore are not open for comments under the National Environmental Policy Act review. I will concur with the analysis that Resource Conservation Act can be a "functional equivalent" of the National Environmental Policy Act, in so far as the Resource Conservation Recovery Act goes (e.g., in regards to the treatment, storage and/or disposal of solid and/or hazardous waste), but "functional equivalent" does not negate Dugway of other responsibilities of the National Environmental Policy Act.

Response 5-3. DPG agrees and has produced this EIS as part of its responsibilities of NEPA. Other environmental assessments and EISs will continue to be prepared, as required by NEPA, for future activities not covered by this EIS. Additionally, in February 2000, DPG established a Restoration Advisory Board for the Installation Restoration Program.

Comment 5-4. The implementation of the Summary Development Plan, stated to be part of report done by AGEISS and Higginbotham/Briggs and Associates (August 2000), states that there are deficiencies that will have to be addressed prior to this Draft Environmental Impact Statement to be used as a tool as implied.

Response 5-4. Activities described in the SDP as baseline deficiencies do not require NEPA documentation before they are performed.

Comment 5-5. The chapter regarding effects of the proposed action affected environment (chapter 3) is misleading in regards to the section discussing radioactive materials, being only in the Lothar Salomon life Science Test Facility. When discussing Dugway's operation it stated that Dugway does not conduct any nuclear testing and makes no plans to do so in the future. This section states that tracer materials will be used again in the future. This implies that some radioactive materials were use in the past. It also states that Dugway is responsible for maintaining a current Nuclear Regulatory Commission license to store and use radioactive materials. Nuclear material always has some radionuclides, which would imply radioactive.

Response 5-5. The Nuclear Regulatory Commission has determined that the use of radioactive tracer materials and radioactive components within equipment is not nuclear testing.

Comment 5-6. As vide, the "functional equivalence" of the Resource Conservation and Recovery Act, as implies in the discussion of the "Chemical Agent Waste Management Plan," is in the discussion related to chemical agent-related waste, as this section implies. There is some obfuscation of regulatory compliance regarding "functional equivalence" requirements. "Functional equivalence" means that it is equivalent to National Environmental Policy Act stated statutory requirements. In this instance there is questionable and/or possible obfuscation of "functional equivalence," as made by the following statement: "Chemical agent-related waste is not regulated by Federal RCRA requirements. However, the State of Utah regulates it as a hazardous waste." The federal Resource Conservation Recovery Act has "listed classes" and/or "types of wastes." For example: ignitable, corrosive, reactive, toxicity characteristic, acute and toxic, which is incorporated by reference into the State of Utah hazardous waste rules (40 CFR 261, appendix VII). By this definition, chemical agent waste has one or more of "listed classes " and/or "types of waste." Utah has been granted primacy from the U.S. Environmental Protection Agency, which means that Utah is responsible to regulate, enforce and comply with the federal Resource Conservation Recovery Act, as well as the State hazardous rules, in granting permits to facilities. Granted, the State of Utah has

developed specific listed hazardous waste codes for non-specific sources as one of its authorized regulatory requirements of the Federal Resource Conservation Recovery Act, which has been incorporated be reference. The same goes for any residues from the demilitarization, treatment and testing of chemical agent.

The Division of Solid and Hazardous Waste, Department of Environmental Quality, State of Utah has developed an "unwritten" policy that allows for chemical agent residues to be treated and/or disposed as a solid waste. The Environmental Protection Agency has NOT APPROVED THIS POLICY. This means that the chemical agent residue maintains a "hazardous waste" status, just as the chemical agent has a "listed hazardous waste," under the Federal Resource Conservation Recovery Act, but not necessary State of Utah hazardous waste rules. Federal government statutes, regulations, etc. are supreme to that of States statutes, regulation, etc. This also means that there is no "functional equivalence" of the Resource Conservation and Recovery Act as implied by this section, and could also possibility allow for violation under the International Treaty.

Response 5-6. DPG concurs that treatment of solid and hazardous waste is covered by the State of Utah's hazardous waste rules. DPG knows of no unwritten policy that allows chemical agent residues to be treated as a solid waste. All decontaminated chemical agent residue at DPG is currently treated as a hazardous waste. DPG has appropriate permits from the Utah Division of Solid and Hazardous Waste.

Comment 5-7. In the discussion of alternatives there seems to be no distinction between the "no action" and actual alternatives. For example: the "no action" section discussion states that there would be no major changes in activity level and no new missions or new facilities. The only alternative actually given some analysis was "decreased mission alternative" which states that the scope of activities will be lessened similar to the "no action" alternative. Chemical and biological defense testing and training would continue, which is the same as the "no action alternative". All of the other alternatives mentioned were dismissed outright. In reality there was no analysis of alternatives as National Environmental Policy Act requires, in addition to the "no action" alternative.

Response 5-7. Section 2.3 describes the alternatives to the Proposed Action analyzed in the EIS. Table 2.3-1 demonstrates the quantitative evaluation for each alternative presented. Impact analysis of each alternative is discussed in Chapter 4.

Alternatives analysis for this EIS was extensive, and meets all procedural and substantive requirements of NEPA. As stated in the EIS text, the No Action

Alternative is not a closing of the facility; rather it is a continuation of baseline activities. Since closure of DPG is not a realistic alternative based on current information, no alternative to close DPG is relevant to this EIS.

Comment 5-8. In discussion with "Outreach office" regarding O-ethyl-S-(2-diisopropylaminoethyl) methylphonothioate (VX) toxicity information. The "outreach office" never returned calls on how and/or if the information provided allowed for the "new" proposed standard, which is approximately 30 to 60 times higher than the current standard for toxicity purposes. The "outreach office" informed me that Dugway would use whatever the standard was at the "time." This could imply the current standard, or it could imply the "new" standard, but we are not sure which standard is to be used. The analysis given for relative toxicity would not allow for the window of toxicity for the "new" standard for the purpose doing analysis of environmental, and/or human health effects, for the purpose of determining if there are adverse impacts as required by National Environmental Policy Act. The "window" means what the governmental agency is using to determine an implied "acceptable risk" for exposure in relationship to long and short term effects to the environment and human health. The "Outreach office" had no understanding of the relationship between toxicity level and that of exposure levels. Ergo, the analysis of the affected environmental and human health problems is questionable. We do have information that other branches of the Department of Army will be using the "new" standard for toxicity of VX prior to exact approval. It is not clear if Dugway would be required to do so.

The analysis of exposure risk has not taken into consideration new data regarding the change in ideology of commutative effects in the relationship of chemical agent exposure and biological agents and/or pathogens. The new ideology of lower dose does not necessarily mean a safer than higher dose. Currently, the U.S. Environmental Protection Agency is investigating unexpected low dose effects. The National Environmental Policy Act requires interdisciplinary interaction between other governmental agencies.

Response 5-8. There is no analysis of a "safe level" exposure to chemical or biological agents in this EIS. As shown in Table 4.12-1, a review of literature demonstrated that catastrophic accidents might result in impacts outside the DPG boundary. Although the probability of such an accident is low, it is not zero nor would it ever reach zero.

Comment 5-9. There seem to be little data on the actual commitment of actual dollar amounts to the proposed action of "reasonable foreseeable" activities as of March 2001. There could be additional increase in the proposed action due to the

terrorist act of September 11, 2001 which was not necessary part of the "reasonable foreseeable" of March 2001. It is possible that Dugway will be requested to assist in any anti-terrorist acts if necessary and/or any activities necessary to combat any threat from chemical and/biological agent to military personnel and/or civilians. Actual dollar amounts might not be to be confirmed, but the National Environmental Policy Act does require approximation of actual dollar amounts. The possible of change in ideology in regards to unacceptable low level exposure risk might require an additional dollar cost for necessary protection of workers, civilians, and the environment if exposure does occurs from chemical and/or biological agents and/or pathogens.

Response 5-9. Currently unknown budget constraints could restrict or delay future activities described within this EIS.

Even with the events of September 11, 2001, this EIS still presents an accurate description of DPG's proposed activities and alternatives to the Proposed Action. Any future activities not identified and proposed in this EIS would require associated NEPA analysis and documentation.

Comment 6 – Certified Decontamination

Comment 6-1. Carbon fiber is a strong, lightweight material with many military and commercial uses. Dust is created by cutting carbon fiber when fabricating equipment. Carbon fiber dust may be harmful to humans in the same way as asbestos and can damage electronic equipment due to its conductivity. I recommend carbon fiber be added to the materials list located in Section 3.13.3 and pollution control measures added in the environmental impact statement.

Response 6-1. Carbon fiber is categorized as a smoke and obscurant in the EIS. Smokes, obscurants, and interferents are listed in Section 3.13.3 and are discussed in Section 3.13.3.11.

Comment 6-2. Mold is commonly found in homes, schools and office buildings after flooding. Improper building design also causes mold by not allowing the proper escape of airborne moisture. Certain strains of mold produce microtoxins which are carried in the air by spore. Health problems such as allergy symptoms, depression, pneumonia, birth defects, liver damage, heart disease and cancer are caused by over-exposure to the microtoxins of pathogenic mold. I recommend Dugway Proving Ground add pathogenic mold detection, prevention and remediation testing and training to their list of proposed activities.

Response 6-2. The Proposed Action includes only those proposed tests, training exercises, and technology development activities that are believed to be "reasonably foreseeable" as of March 2001, and for which DPG is the proponent or has a high level of control. Any future activities that are implemented but not foreseen within the scope of this EIS would require appropriate NEPA review.

Comment 6-3. Throughout the United States, tens of thousands of clandestine methamphetamine labs are discovered each year. Methamphetamine, hydriodic acid, and a host of other chemical residues are left in homes, motel rooms, vehicles and other locations used for clandestine manufacturing. Methamphetamine has been found to damage serotonin and dopamine levels in the brain, destroy nerve ending receptors, damage vital organs including the heart, and cause birth defects and Parkinson's disease. Hydriodicacid (iodine) has been determined by the National Institute of Safety and Health (NIOSH) to cause damage to the central nervous system in concentrations of only two parts per million.

No definitive study has been completed regarding the decontamination of clandestine methamphetamine labs. If occupied dwellings are not adequately decontaminated, exposed persons may be harmed. If excessive decontamination efforts are required, property owners pay for unnecessary work and some property owners may seek measures to hide contamination rather than paying for remediation. I recommend Dugway Proving Ground add clandestine drug lab decontamination testing and training to their list of proposed activities.

Response 6-3. The Proposed Action includes only those proposed tests, training exercises, and technology development activities that are believed to be "reasonably foreseeable" as of March 2001, and for which DPG is the proponent or has a high level of control. Any future activities that are implemented but not foreseen within the scope of this EIS would require appropriate NEPA review.

Comment 6-4. In the late 1970's and early 1980's, under the direction of Captain David C. Venable and Lieutenant William A. A. Gawthrup, Dugway Proving Ground conducted counterterrorism and police tactical training for military and civilian police personnel. Military units trained by Dugway's program included the Utah National Guard, Hill Air Force Base, and installations within the Chemical Test and Evaluation Command. Dugway Proving Ground and Tooele Army Depot security personnel were the most active participants in the program.

Courses included Special Weapons and Tactics (SWAT), Hostage Negotiations, Critical Incident Management and Police Sniper/Countersniper. Tactical developments and training materials were shared with the Army, Military Police

School and Air Force, Tactics for Emergency Service Teams school. For many Utah police departments, training received at Dugway Proving Ground was the starting point for their SWAT and hostage negotiations teams. The location and facilities at Dugway Proving Ground were found to be ideal for this type of training.

Although Dugway Proving Ground does not maintain large amounts of chemical agents, large amounts of chemical agents are stored at the Tooele Army Depot, some twenty miles away. Having specialized counterterrorism and police tactical training at Dugway Proving Ground will greatly improve security and public protection. I strongly endorse counterterrorism and police tactical training be continued and expanded at Dugway Proving Ground.

Response 6-4. Comment acknowledged.

Comment 6-5. One item not addressed in the draft environmental impact statement is Security. It is reasonable to withhold security details from the environmental impact statement. Disclosing too many details may compromise security. Dugway Proving Ground's security model of restricted areas, controlled areas, access lists and exchange badges was copied by the Utah Department of Corrections for security at the Prison during executions. The same security model was used for security at the venues and housing areas of the Salt Lake Olympics.

Dugway Proving Ground's well proven security measures are regulated in great part by the U. S. Army Chemical Surety Program. Physical security, accountability and personnel reliability is managed by the program and annual qualification inspections and tests ensure strict adherence to the program's standards.

In some instances, the Chemical Surety Program requirements are so strict, materials commonly carried by unarmed, civilian drivers on America's highways are escorted by armed security forces and hazardous material handlers when under military control. I recommend a section be added to the environmental impact statement that states Dugway Proving Ground will adhere to the requirements of the U. S. Army Chemical Surety Program and annually disclose to the public the installation's passing or failing of Chemical Surety Program inspections and tests.

Response 6-5. Appendix A presents a list of environmental laws, permits, and management plans that are applicable to operations at DPG. Appendix A includes the Chemical Weapons and Material Chemical Surety Army Regulation 50-6 and Chemical Surety Program DPG Regulation 50-1. These regulations are also briefly described in Section 3.12.2.1, Occupational Health and Safety Requirements. DPG will continue to adhere to the requirements of the U.S. Army Chemical Surety Program.

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8.0 List of Preparers

DPG is the lead Federal agency for the preparation of this EIS. DPG is being supported by resource specialists from AGEISS Environmental, Inc. The EIS interdisciplinary team members are identified in Table 8.0-1, List of Preparers for Future Programs EIS.

Table 8.0-1. List of Preparers for Future Programs EIS.

Name	Qualifications	Responsibility
U.S. Army Dugway Proving Ground		
	Commanders	
COL Fisher, Edward A.	COL, U.S. Army, U.S. Army War College M.S. – Systems Management B.A. – Chemistry 27 years of experience	Commander, U.S. Army Dugway Proving Ground Management Review and Consultation
Lt. COL Coker, David	M.B.A. – Master of Business Administration M.S. – Contract & Acquisition Management B.S. – Business Management 20 years of experience	Commander, West Desert Test Center Baseline Activities; Proposed Action and Alternatives; Management Review and Consultation
	NEPA Support	
Barnett, Jimmie	25 years of experience	Baseline Activities; Proposed Action and Alternatives; Materials and Wastes
Biltoft, Chris	M.S. – Meteorology B.S. – Meteorology B.S. – Engineering 30 years of experience	Baseline Activities; Proposed Action and Alternatives
Black, R. J.	M.S. – Information Science B.S. – University Studies – Math/Chemistry A.A. – Chemistry 32 years of experience	Baseline Activities; Proposed Action and Alternatives
Bridges, Scot	M.B.A. – Master of Business Administration B.S. – Accounting, Business Management/Economics 33 years of experience	Summary Development Plan
Bullet, Mike	B.S. – Physical Science 12 years of experience	Baseline Activities; Proposed Action and Alternatives
Callister, Kathleen	M.A. – Anthropology B.S. – Anthropology 16 years of experience	Cultural Resources
Chapin, Gale	37 years of experience	Baseline Activities; Proposed Action and Alternatives

Table 8.0-1. List of Preparers for Future Programs EIS.

Name	Qualifications	Responsibility
Craig, John	B.S. – Geological Engineering 21 years of experience	Air Resources
Dement, William	Ph.D. – Biology B.A. – Biology 26 years of experience	Baseline Activities; Proposed Action and Alternatives
Gearo, Joseph	M.S. – Environmental Science B.S. – Environmental Science/Human Ecology 23 years of experience	Management Review and Consultation
Gibson, Rand	21 years of experience	Materials and Wastes
Glass, Mike	Ph.D. – Microbiology B.S. – Microbiology and Public Health 8 years of experience	Baseline Activities; Proposed Action and Alternatives
Klauser, Steve	B.A. – Business Management A.A. – Geology 32 years of experience	NEPA Coordinator; Project Management; Environmental Justice; Land Use; Noise; Socioeconomics; Traffic and Transportation; Visual Resources
Lemire, George	Ph.D. – Physical Chemistry B.S. – Chemistry 10 years of experience	Baseline Activities; Proposed Action and Alternatives
Lewis, Tom	M.E. – Civil/Environmental Engineering B.S. – Mathematics/Physics 18 years of experience	Materials and Wastes
Marshall, Marty	Ph.D. – Electrical Engineering M.S. – Physics B.S. – Physics 14 years of experience	Baseline Activities; Proposed Action and Alternatives
Martin, John	M.S. – Wildlife & Range Resources B.S. – Zoology 20 years of experience	NEPA Coordinator; Biological Resources
McBride, Clair	M.S. – Safety/Industrial Safety B.S. – Education/Health 29 years of experience	Health and Safety
Mohr, Alan	Ph.D. – Microbiology M.S. – Meteorology B.S. – Biology 21 years of experience	Baseline Activities; Proposed Action and Alternatives; Materials and Wastes

Table 8.0-1. List of Preparers for Future Programs EIS.

Name	Qualifications	Responsibility
Neafsey, Andrew	M.S. – Chemistry B.S. – Business/Chemistry 11 years of experience	Baseline Activities; Proposed Action and Alternatives
Nicholson, Paula	B.S. – Business Administration/Management A.S. – Business 17 years of experience	Baseline Activities; Proposed Action and Alternatives
Pendley, Martin	B.S. – Civil Engineering 32 years of experience	Summary Development Plan
Radel, Bob	Ph.D. – Organic Chemistry B.S. – Chemistry 22 years of experience	Baseline Activities; Proposed Action and Alternatives
Reed, Scott	25 years of experience	Geology and Soils; Water Resources
Rindlisbacher, Wayne	B.S. – Social Science 33 years of experience	Security Review
Skeen, Jack C.	J.D. – Juris Doctor L.L.M. – Environmental Law 16 years of experience	Purpose and Need; Environmental Justice; Legal Review
Steelman, Jerry	M.B.A. – Master of Business Administration B.S. – Chemistry 26 years of experience	Baseline Activities; Proposed Action and Alternatives
Turley, Shayes	Ph.D. Candidate – Civil and Environmental Engineering B.S. – Mechanical Engineering 13 years of experience	Baseline Activities; Proposed Action and Alternatives; Materials and Wastes
Wheeler, Jim	M.S. – Biological Sciences B.S. – Biological Sciences 28 years of experience	Baseline Activities; Proposed Action and Alternatives
Woffinden, John	B.S. – Geology 22 years of experience	Water Resources
AGEISS Environmental, Inc.		
Arjo, Wendy	Ph.D. – Fish and Wildlife Biology M.S. – Biology B.S. – Biology 10 years of experience	Biological Resources; Cumulative Impacts Analysis

Table 8.0-1. List of Preparers for Future Programs EIS.

Name	Qualifications	Responsibility
Bartels, Tonya	M.S. – Analytical Chemistry B.S. – Chemistry 6 years of experience	Technical Editing, Project Management
Cubbison, Douglas	B.A. – History 20 years of experience	Baseline Activities; Proposed Action and Alternatives; Technical Reviewer Impacts Analysis
Daus-Weber, Theresa	M.S. – Technical Communications B.S. – Social Work 20 years of experience	Technical Editing
Dutton, Ron	M.S. – Economics B.S. – Economics 16 years of experience	Socioeconomics; Traffic and Transportation
Hanson, Lisa	M.S. – Environmental Policy and Management B.A. – Speech Communication 10 years of experience	Environmental Justice
Heyer, Dennis	A.S. – Hazardous Materials Management 23 years of experience	Research Assistance
Hildebrand, Alex	B.S. – Biology 6 years of experience	Materials and Wastes
Jones, Christine	M.S. – Ecology B.S. – Biology 8 years of experience	Health and Safety
Langenfeld, Matt	M.S. – Geochemistry B.S. – Chemistry A.S. – Engineering 19 years of experience	Project Management; Baseline Activities; Proposed Action and Alternatives; Summary Development Plan
Lau, Jessica	M.A. – Natural Science B.S. – Geology B.A. – Botany 12 years of experience	Air Resources
Matkovits-Leaf, Monika	M.S. – Public Health B.S. – Mechanical Engineering 8 years of experience	Materials and Wastes, Baseline Activities; Proposed Action and Alternatives; Project Management
Miyagishima, Joyce	M.S. – Environmental Science B.S. – Biology B.A. – Chemistry 17 years of experience	Materials and Wastes
Neely, Bryan	M.S. – Environmental Science B.S. – Geology 17 years of experience	Materials and Wastes
Priske, Amy	M.S. – Environmental Science B.S. – Environmental Biology 6 years of experience	Cultural Resources; Land Use

Table 8.0-1. List of Preparers for Future Programs EIS.

Name	Qualifications	Responsibility
Reibold, Debbie	10 years of experience	Document Production
Russ, Melissa	M.S. – Geology B.S. – Geology 18 years of experience	Geology and Soils; Water Resources; Technical Review
Shaser, Leroy	M.S. – Geology B.S. – Geology 19 years of experience	GIS Support
Smith, Greg	M.S. – Geology B.S. – Environmental Biology 21 years of experience	Baseline Activities; Proposed Action and Alternatives; Technical Review
Sobczak-Bryan, Sue	M.E. – Geological Engineering B.S. – Geological Engineering 12 years of experience	Geology and Soils; Water Resources
Stanwood, Mike	M.S. – Economics B.A. – Psychology 21 years of experience	Visual Resources; Environmental Justice; Land Use; Cultural Resources; Noise; Cumulative Impacts Analysis; Technical Review
Turko, Julianne	M.A. – Geology B.S. – Geological Sciences 17 years of experience	DPG Program Oversight
Walker, Susan	Ph.D. – Pathology B.S. – Zoology 24 years of experience	Health and Safety; Technical Review
Whitehall, Alicia	M.S. – Environmental Policy and Management (In Progress) B.S. – Chemistry 12 years of experience	Technical Editing

A.A. Associate of Art
A.S. Associate of Science
B.A. Bachelor of Arts
B.S. Bachelor of Science
DPG U.S. Army Dugway Proving Ground
GIS Geographical Information System
L.L.M. Master of Law
M.A. Master of Arts
M.E. Master of Engineering
M.S. Master of Science
NEPA National Environmental Policy Act
Ph.D. Doctor of Philosophy

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Glossary

This glossary lists in alphabetical order many of the terms used in the EIS and their definitions to assist readers in understanding discussions in the EIS.

A

above ground storage tank (AST) – an above ground device, designed to contain an accumulation of petroleum products, oil, regulated substances, waste oil, and/or hazardous wastes, which is constructed primarily of non-earthen materials (e.g. steel or polymers) which provides structural support.

acre-foot – the volume of water that covers 1 acre to a depth of 1 foot; approximately 326,000 gallons

activity center – area where major administrative, testing, training, mission support, and/or installation support activities occur at DPG. Avery Technical Center, Baker Area, Carr Facility, Ditto Technical Center, and English Village are activity centers in this EIS.

administrative record – the body of documents that forms the basis for selecting an action, which could include workplans, reports, meeting minutes, responses to comments, fact sheets, etc.

adsorb – to take up or hold in a thin layer of molecules on the surface of a solid substance.

aerobatics – the performance of airplane stunts, such as rolls and loops.

aerosol – a dispersion of very fine colloidal particles suspended in the air or in some other gas.

agent – see biological agent and chemical agent.

agent breakdown product (ABP) – a chemical substance obtained from a chemical reaction involving a chemical agent.

airshower – the result of collisions of high energy particles with gas molecules.

airspace – the space occupied by an aircraft formation or used in a maneuver.

air-to-air mission – a tactical operation by aircraft to engage air-based targets with guns, rockets, and missiles.

air-to-ground mission – a tactical operation by aircraft to engage ground-based targets with guns, rockets, and bombs.

alkali – any strong base or hydroxide that is soluble in water, neutralizes acids, and forms salts with them, and turns red litmus blue.

alluvial – of or like sand, clay, etc. deposited by moving water.

alternatives – courses of action other than proposed action that would meet the purpose and need for action, as stated in a NEPA document.

ambient air – that portion of the atmosphere, external to buildings, to which the general public air has access.

American Indian Religious Freedom Act (AIRFA) – enacted in 1978, this U.S. law guarantees the protection and preservation of the right of Native Americans Indians to practice their religion.

anaerobic – able to live and grow without air or free oxygen, such as certain bacteria.

anthrax – an infectious disease of cattle, sheep, etc. which can be transmitted to humans.

antibody – a protein found in the blood or tissues that destroys or weakens bacteria or neutralizes poisons of organic origin. Antibodies are formed in response to specific antigens.

antigen – any substance that causes the body to produce antibodies to counteract this substance. Antigens include toxins, bacterial cells, foreign blood cells, etc.

approval order (AO) – permits issued and required by the Utah Division of Air Quality, since 1969, for

most new or modified operations that emit any contamination into the air. These permits may include limits on both construction and operation activities.

aquifer – a stratum of earth or permeable rock that contains water.

armament – the weapons and supplies of war with which a military unit is equipped.

artillery – military weapon systems capable of both high trajectory and low trajectory indirect fire, including mortars, rockets, missiles, guns and howitzers. Artillery weapon systems may be self-propelled or towed.

asbestos – incombustible, chemical-resistant, fibrous mineral forms of impure magnesium silicate. Some forms of asbestos have historically been used for water pipes, fireproofing, electrical insulation, building materials, brake linings, and chemical filters and are often found in older buildings. Asbestos is a carcinogenic substance.

assay – to analyze; the determination of the strength of a drug or other substance by comparing its effects on an organism with those of a standard substance.

Assembled Chemical Weapons Assessment (ACWA) – demilitarization program covering chemical agent weapons and bulk chemical agents that had been stockpiled by the U.S. to deter enemies.

attainment – a designation by the EPA for an air quality control region, in whole or in part, that the area meets the national primary or secondary ambient air quality standard for an air pollutant.

autoclave – a chamber, usually of cylindrical shape, provided with a door or gate at one end that can be securely closed during operation and can accommodate high steam pressures. Used for sterilization processes.

A-weighting scale – a scale designed to predict the response of the human ear to noise. It corrects for the inherent frequency response of the ear. This scale approximates the relative noisiness of different sounds and is the most commonly used measurement scale. Decibels on the A-weighted scale are abbreviated dBA.

B

bacteriophage – a virus that infects various bacteria.

BangBox™ – ™DPG facility officially named the Propellant, Explosive, and Pyrotechnic Thermal Treatment Evaluation Test Facilities, which consists of two igloo-shaped test chambers, a command post, two storage containers, and an instrumentation building. It was designed to identify and quantify the emissions released when test materials such as conventional munitions and energetics are burned or detonated within the controlled environment of its test chambers.

baseline data – environmentally related information collected from a site to provide a reference point to compare future changes in the environment resulting from an action.

battalion – a military term for a unit composed of a military/army headquarters and two or more companies or batteries. It may be part of a regiment, brigade or division and be charged with only tactical functions, or it may be a separate unit and be charged with both administrative and tactical functions.

battery – tactical and administrative artillery unit or sub-unit corresponding to a company or similar unit in other branches of the Army.

berm – a narrow ledge or shelf such as along a slope.

billet – housing for troops.

binary chemical munition – munition which chemical substances, held in separate containers, react when mixed or combined as a result of being fired, launched or otherwise initiated to produce a chemical agent.

biological agent – a pathogenic microorganism and any naturally occurring, genetically manipulated, or synthesized component of biological origin that is capable of causing:

- Death, disease, or other biological malfunction in humans, animals, or plants
- Deterioration of food, water, equipment, or supplies

biological simulant – a biological substance, or microorganism that shares at least one physical or biological characteristic of a biological agent, has been shown to be non-pathogenic, and can be used for biological defense testing to replace the agent under study.

Biological Weapons Convention (BWC) – convention on the prohibition of the development, production, and stockpiling of bacteriological and toxin weapons and on their destruction.

biomonitoring – see monitoring. Biomonitoring specifically relates to collecting wildlife data.

Biomonitoring efforts consist of wildlife data collection.

biosafety cabinet – most commonly used primary containment device in laboratories working with infectious agents. Primary containment is the protection of personnel and the immediate laboratory environment from exposure to infectious agents.

biosafety level (BL) – a category developed by the CDC that consists of combinations of laboratory practices and techniques, safety equipment, and laboratory facilities. Each combination is specifically appropriate for the operations performed, the documented or suspected routes of transmission of the infectious agents, and for the laboratory function or activity.

biota – living components of an ecosystem such as plants and animals.

biotic – pertaining to life or specific life conditions.

bivouac – a temporary encampment in the open for soldiers.

blast chamber – component of the Suppressive Shield and ODOBi facilities at DPG. A shrapnel containment detonation chamber that is housed inside of a vapor containment inner core.

bomber – a military aircraft that is designed to carry and drop bombs.

brigade – a unit usually smaller than a division to which are attached groups and/or battalions and smaller units tailored to meet anticipated requirements.

Bureau of Land Management (BLM) – an agency within the U.S. Department of the Interior, that administers 264 million acres of America's public lands, located primarily in 12 western states.

C

calcareous – of or like limestone, calcium, or lime.

calibrate – to determine, check, or adjust the scale of a measuring instrument.

candidate species – species identified by the U.S. Fish and Wildlife Service as appropriate for listing as threatened or endangered.

cantonment – temporary quarters for troops. An area of residential and administrative use.

catastrophic event – an event, such as release of biological or chemical agent, that may have an adverse impact (possibly fatal) to the health of individuals.

Cenozoic – the present geological era, characterized by the abundance and diversity of mammals and flowering plants. The Cenozoic era began about 75 million years ago and is thus far composed of two periods, the Tertiary and the Quaternary.

Center for Disease Control (CDC) – an agency of the Department of Health and Human Services, located in Atlanta, GA. The mission of the CDC is to promote health and quality of life for citizens of the United States by preventing and controlling disease, injury, and disability.

chaff – radar deception reflectors, which consist of thin, narrow metallic and other material strips of various lengths and frequency responses, used to reflect echoes for confusion purposes.

Change House – provides clothing made of cloth including pants, shirts, coveralls, socks, underwear, parkas, and chemical protective units to DPG staff, contractors and visitors. It also furnishes lockers, changing areas, and showers for DPG personnel. The Change House is located in Ditto Technical Center.

chemical agent – a chemical substance which is intended for use in military operations to kill, seriously injure, or incapacitate persons through its physiological effects. Excluded from consideration are riot control agents, chemical herbicides, smoke, obscurants, and flame retardants.

chemical simulant – a chemical substance that shares at least one characteristic of a chemical agent but with a reduced physiological effect.

Chemical Weapons Convention (CWC) – international treaty that bans the production, acquisition, stockpiling, transfer, and use of chemical weapons for offensive measures. The CWC does not prohibit the manufacture and use of small amounts of chemical agent for defensive testing purposes.

classified information – official information which has been determined to require, in the interests of national security, protection against unauthorized disclosure and which has been so designated.

Clean Air Act (CAA) – law that requires facilities to comply with all Federal, state, interstate, and local air-pollution requirements.

clean closure assessment – a study leading to closure of a site requiring no further environmental clean-up or monitoring.

Clean Water Act (CWA) – law that amended the Federal Water Pollution Control Act first passed in 1956. Its objective is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." The major compliance and enforcement tool is the National Pollution Discharge Elimination System permit. Administered by EPA or by states with an approved system.

climate – a description of aggregate weather conditions; the sum of all statistical weather information that help describe a place or region.

collective protection equipment – protection equipment that will sustain life and allow for continued operational capability in biological agent or chemical agent contaminated areas including shelters for command posts, medical facilities, rest and relief areas, and vehicles.

colloidal – fine particles especially in a gaseous, liquid, or solid substance, which do not settle out of the substance rapidly and are not easily filtered.

colluvial – of or like loose material deposited at the base of a slope mainly by gravity.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) – A Federal law passed in 1980 that creates a special fund, commonly known as Superfund, to investigate and cleanup abandoned or uncontrolled hazardous waste sites. This law was modified in 1986 by the Superfund Amendments and Reauthorization Act.

confining layer – a lithologic layer of impermeable or less permeable material adjacent to one or more aquifers.

Consent Order – a legal document that formalizes an agreement reached between a regulatory agency such as the EPA or State agencies and potentially

responsible parties (PRPs) through which PRPs will conduct all or part of a cleanup action at a site; cease or correct actions or processes that are polluting the environment; or otherwise comply with regulatory enforcement actions to resolve the contamination at the site involved. The consent order describes the actions PRPs will take and may be subject to a public comment period.

contaminant – an undesirable substance (physical, chemical, biological, or radiological) not normally present, or an unusually high concentration of a naturally occurring substance in water or soil.

contiguous – in close proximity, neighboring, adjoining, near in succession, in actual close contact, touching at a point or along a boundary, bounded or traversed by.

contingency plan – a plan for major contingencies that can reasonably be anticipated in the principal geographic subareas of the command.

conventional munitions – a weapon which is neither nuclear, biological, nor chemical. Typical conventional munitions could include artillery, mortar, tank or machine gun projectiles, explosives, hand grenades, rockets, or missiles.

corrective action investigation – sampling and analysis of SWMUs that stopped receiving wastes before November 1980 and are being addressed as part of a corrective action program covered by DPG's RCRA permit issued by the State of Utah on March 15, 1994.

cosmic ray – radiation of great penetrating power that comes to earth from outer space, consisting of nuclei or nuclear particles traveling at very high speeds.

Council on Environmental Quality (CEQ) – Executive Office of the President of the U.S. established by the NEPA. CEQ regulations establish two levels of environmental analyses, the EA and the EIS.

countermeasures – the form of military science that employs devices and/or techniques to impair the operational effectiveness of enemy activity.

counterterrorism – offensive measures taken to prevent, deter, and respond to terrorism.

critical habitat – portions of the habitat of a wildlife population that, if destroyed or adversely modified, would result in a reduction of the population to a greater extent than would destruction of other portions of the habitat. Such areas may be officially designated by the U.S. Fish and Wildlife Service for listed species.

cruise missile – guided missile, the major portion of whose flight path to its target is conducted at approximately constant velocity; depends on the dynamic reaction of air for lift and upon propulsion forces to balance drag.

cryofracture – demilitarization method involving freezing a munition in a liquid nitrogen bath followed by fracture of the embrittled items in an hydraulic press.

cryptobiotic soil – a living soil crust, typically found in arid regions, which include soil lichens, mosses, green algae, microfungi, and bacteria.

cultural resources – an aspect of a cultural system that is valued by or significantly representative of a culture, or that contains significant information about a culture. A cultural resource may be a tangible thing, or a cultural practice. This includes archeological resources, cultural landscapes, historic buildings and structures, museum objects and archival materials, and ethnographic resources.

cumulative impact – the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

customer – governmental or private entity that has either been approved by the Developmental Test Command to use DPG as a test center to support its

military equipment, weapons, or other testing objective or to conduct training activities at DPG.

C-weighted sound level – a quantity, in decibels, read from a sound level meter with C-weighing circuitry. The C-scale incorporates slight de-emphasis of the low and high frequency portion of the audible spectrum. The C-weighted sound level measures the additional annoyance caused by the low frequency vibration of structures.

D

day-night average sound level (DNL) – the energy basis average sound level with a 10 dB penalty applied to sound that occurs between 10 p.m. and 7 a.m. for the purpose of allowing for the additional annoyance produced by sounds that occur during normal sleeping hours.

decibel (dB) – a unit of measurement of sound pressure level.

decision-maker – person who is legally responsible for making a given decision.

decontamination – the removal, destruction, or neutralization of contamination.

Defense Environmental Restoration Program (DERP) – enacted by Congress in 1986 to clean up military sites that may pose a threat to human health and the environment.

demilitarization – the act of destroying the offensive and/or defensive characteristics inherent in certain types of equipment and material. The term comprehends mutilation, dumping at sea, scrapping, burning, or alteration designed so as to prevent the further use of such equipment and material for its originally intended military or lethal purpose.

Department of Defense (DOD) – an executive department of the U.S. Government, with the primary missions to provide the military forces needed to deter war, and to protect the security of the U.S.

depleted uranium (DU) – uranium from which most of the uranium-235 isotope has been removed. It has high structural strength coupled with high density and is used for balance weights for aircraft, high-speed rotors in gyro-compasses, in general as structural material.

deploy – to station forces over an area; to spread out troops to form an extended front.

deterrence – a defense policy in which a country ensures that it has sufficient military power to deter a potential enemy from making an attack.

detonation – a chemical reaction that propagates with such rapidity that the rate of advance of the reaction zone into the unreacted material exceeds the velocity of sound.

Developmental Test Command – command that DPG reports to; subordinate command of the U.S. Army Test and Evaluation Command which is under direct command of the Secretary of Army.

dioxin – refers to a group of hundreds of chlorinated chemicals that are highly persistent in the environment. The most toxic compound is 2,3,7,8-tetrachlorodibenzo-p-dioxin or TCDD. The toxicity of other dioxins and chemicals like PCBs that act like dioxin are measured in relation to TCDD.

direct impact – impact to an environmental resource that is solely attributable to an action.

disease vector – an organism, such as a mosquito or tick that transmits disease-causing microorganisms.

disking – to plow or to till a strip of land, thereby removing vegetation; used as a method to control the advancement of wildland fires.

dispersion – the act or process of dispersing, being spread widely, as a consequence of wind.

dissemination – widely spread or scattered.

diversity – the relative degree of abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area.

dominant species – those species that are most extensive in and characteristic of a plant community.

dosimetry – the measurement of the amount of medicine or the intensity and length of radiation.

downgradient – the direction that groundwater flows; similar to "downstream" for surface water.

Draft EIS (DEIS) – preliminary environmental impact statement document circulated for comment from other agencies and the public. It is prepared to satisfy, to the fullest extent possible, the requirements of a Final EIS.

drawdown – the distance between the static water level and the temporarily depressed water level caused by well pumpage.

E

ecosystem – a complex, self-sustaining natural system that includes living and nonliving components of the environment and the circulation of matter and energy between organisms and their environment.

effluent – wastewater discharge from a wastewater treatment facility.

emergency response – the efforts to minimize the risks created in an emergency by protecting the people, the environment, and property, and the efforts to return the scene to normal pre-emergency conditions.

emission – a release of a pollutant.

endangered species – any species in danger of extinction throughout all or a significant portion of its range.

Endangered Species Act – an act of the U.S. Congress of 1972 that requires Federal agencies to ensure that their actions do not jeopardize the existence of endangered or threatened species.

energetic – propellants, explosives, and pyrotechnics.

engineering controls – refers to the design and mechanisms of a facility that prevent hazardous materials from escaping and adversely affecting the environment.

environmental assessment (EA) – a concise public document published by a Federal agency that provides sufficient evidence and analysis for determining whether to prepare an EIS or a FONSI. It provides an agency's compliance with NEPA when no EIS is necessary and facilitates preparation of an EIS when one is necessary.

Environmental Impact Statement (EIS) – a document required by NEPA when a major Federal action could significantly affect the quality of the human environment. An EIS discloses to the public a detailed analysis of alternative actions, their associated environmental impacts, and mitigation measures.

Environmental Noise Management Plan (ENMP) – a program adopted by the U.S. Army in recognition that noise can be harmful to an individual's physiological and psychological health and can degrade the quality of life. ENMP is a process to analyze noise generated by Army activities and the impact of this noise on surrounding communities. In the ENMP, present and future incompatible land uses on lands adjoining Army installations are identified.

Environmental Protection Agency (EPA) – an independent government agency responsible for establishing and enforcing environmental protection standards consistent with national environmental goals, conducting research on the adverse effects of pollution and on methods and equipment for controlling it; gathering information on pollution; and using this information in strengthening environmental protection programs and recommending government policy changes.

eolian – of, produced by, or carried by the winds.

ephemeral stream – a short-lived or transitory body of running water.

erosion – the set of all processes by which soil and rock are loosened and moved downhill or downwind.

et seq. – Latin term which means "and the following one."

Executive Order (EO) – official documents, numbered consecutively, through which the President of the U.S. manages the operation of the Federal government.

exotic annual – an annual plant species not native to a locality or region.

explosive – chemical that undergoes a rapid chemical change when ignited resulting in a release of large quantities of energy.

explosive ordnance disposal (EOD) – the detection, identification, field evaluation, rendering safe, recovery, and final disposal of UXO or munitions containing chemical agents.

F

fate and transport – term used in reference to a chemical's movement through environmental media such as soil.

fault scarp – a cliff or steep slope that sometimes forms along the fault at the surface.

fauna – the animals or animal life of a particular place or time.

Federal Facility Compliance Act – enforces Federal facilities to adhere to RCRA regulations and to pay fines and penalties for violations of RCRA. Prior to its passage, Federal facilities were required to comply with RCRA regulations, but had sovereign immunity from fines and penalties for certain violations.

Federal Register – U.S. government publication that officially publishes all Federal rules and regulations and other public notices and statements covering Federal agency actions.

feral – domesticated animals that have been allowed to exist in an essentially wild or undomesticated state.

finding of no significant impact (FONSI) – a document by a Federal agency briefly presenting the reasons why an action not covered by a categorical exclusion, will not have a significant impact on the human environment. This action will not require an environmental impact statement.

fixed environmental chamber – a type of enclosed space or compartment such as the salt fog, fungus, and altitude chambers, used for survivability testing.

flare – a pyrotechnic item designed to produce a single source of intense light for purposes such as target and/or airfield illumination, signaling, countermeasures, etc.

flora – the plants or plant life of a particular region or time.

fluorescence – giving off of light by a substance exposed to x-rays, ultraviolet rays, or certain other rays, which continues only as long as exposure to these rays continues.

flux – a rate of flow of energy across a unit surface or area per unit time.

Fly's Eye (FE) – detection telescopes which are designed to measure the flux, energy, spectrum, and composition of cosmic rays.

forage – all browse and herbaceous foods that are available to grazing animals.

Forage is plant food for grazing animals.

forb – a broad, leafed herbaceous plant as distinguished from grasses, sages, shrubs, and trees.

Formerly Used Defense Sites (FUDS) – the part of DOD's Defense Environmental Restoration Program that addresses inactive sites no longer under DOD ownership.

fume hood – an enclosed ventilation device, usually in a laboratory, that contains and expels chemical vapors to the outside of the facility or into a carbon or HEPA filter.

furan – heterocyclic compounds; similar to dioxin compounds; flammable, colorless liquid turning brown on standing which is used in organic synthesis.

G

gamma ray – an electromagnetic wave of very high frequency given off in the reactions of nuclei or nuclear particles; a high-energy photon. Gamma rays are like X rays, but have a shorter wavelength. Gamma rays are emitted when a nucleus in an excited state changes to a more stable state.

Geneva Protocol – protocol for the prohibition of the use in war of asphyxiating, poisonous, or other gases, and of bacteriological methods of warfare.

geographic information system (GIS) – an organized collection of computer hardware, software, and geographic data designed to capture, store, update, manipulate, analyze, and display all forms of geographically referenced information. This system allows users to perform difficult, time consuming, or otherwise impractical spatial analyses.

global exercise – joint exercise between various National Guard units.

greenstripping – placement of strips of fire-resistant vegetation at strategic locations on the landscape to slow or stop the advancement of wildfires.

groundwater monitoring well – a deep hole or shaft used to obtain groundwater for the purposes of analyzing its quality and characteristics.

gunnery – the art and science of constructing and operating guns; the use of guns.

H

habitat – a specific set of physical conditions that surround a single species, group of species, or large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

half-life (lives) – *physics*. The length of time it takes for half of any number of unstable nuclei or subnuclear particles to disintegrate. *biology*. The length of time it takes for half of a given substance deposited in a living organism to be metabolized or eliminated. *chemistry*. The time required for a given chemical reaction to affect half of the reactants present.

halogen – any of the group of elements that includes fluorine, chlorine, bromine, iodine, and astatine. The halogens are electronegative, nonmetallic elements and combine directly with most metals to form salts.

hazardous air pollutants (HAPs) – HAPs are pollutants, identified by Congress, which present or may present a threat of adverse effects to human health and/or the environment. HAPs are regulated under Section 112 of the CAA. As of January 1, 1999, 188 air pollutants were listed as HAPs.

hazardous waste – a waste or mixture of wastes that has the capability to either cause or significantly contribute to an increase in mortality or an increase in serious irreversible or reversible but incapacitating illness; it may pose a threat of substantial current or potential risk to human health or the environment.

hazardous waste management unit (HWMU) – an area that is under a Consent Order investigation and

has been used to manage hazardous waste at DPG since 1980.

hazardous waste storage – the holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere.

heavy metals – metallic or semimetallic elements of high molecular weight, such as mercury, chromium, cadmium, lead, and arsenic, that are toxic to plants and animals at known concentrations.

high efficiency particulate air (HEPA) filter – type of filter which is 99.93 percent efficient at filtering particles of 0.3 micrometers in diameter.

howitzer – a field artillery weapon system which combines certain characteristics of guns and mortars. The howitzer delivers projectiles with medium velocities, either by low or high trajectories.

hung ordnance – situation when the ordnance does not properly dislodge from the aircraft.

hydric – characterized by or requiring moisture.

hydrocarbon – any of a large group of organic compounds containing only hydrogen and carbon, obtained principally from petroleum and coal tar.

hydrophytic – of or like a plant that can grow only in water or very wet soil.

I

igloo – earth-covered structure of concrete and/or steel designed for the storage of ammunition and explosives.

igneous – produced by solidification from a molten state.

illuminant – mixture of materials used in pyrotechnic devices to produce high intensity light for signaling, warning, and lighting purposes.

impact – the effect, influence, alteration, or imprint on the natural or human environment caused by an action.

impact area – an area having designated boundaries within the limits of which all ordnance will detonate or impact.

incendiary – designed to cause fires.

indigenous – occurring or living naturally in a particular area or environment; native.

indirect impact – impacts that are reasonably foreseeable and may be attributable to a particular action, but they occur later in time or farther removed in distance from the action than a direct impact.

inert ordnance – ordnance, or components of ordnance, that contains no explosives, pyrotechnics, or chemical agents.

infrastructure – A term generally applicable to all fixed and permanent installations, fabrications, or facilities for the support and control of military forces.

ingress – the right or permission to enter.

installation – a grouping of facilities, located in the same general vicinity, over which the Installation Commander has authority.

Installation Compatible Use Zone (ICUZ) – a land use planning procedure employed to reduce the impact and annoyance of environmental noise through compatible land uses. This procedure is incorporated into and replaced by the ENMP.

Installation Restoration Program (IRP) – the part of the DOD's Defense Environmental Restoration Program that addresses sites owned by DOD and in this case by the Army.

integrated management – the management of actual and potential resource problems using a combination of available preventive and corrective control measures. The effectiveness, environmental

acceptability, regulatory requirements, and costs of the measures must be considered before such measures can be approved for use on Army-controlled property. Integrated management plans have been prepared for a number of programs at DPG.

Integrated Training Area Management Plan (ITAM) – a program designed to monitor and mitigate damage to natural resources caused by military activity. Monitoring is essential to identify trends in rangeland conditions and determine progress in rehabilitation activities.

intelligence – 1. The product resulting from the collection, processing, integration, analysis, evaluation, and interpretation of available information concerning foreign countries or areas. 2. Information and knowledge about an adversary obtained through observation, investigation, analysis, or understanding.

interferent – materials used to interfere with the intended function of a piece of equipment.

interim status requirements – State of Utah RCRA requirements applicable to sites that are in the process of being permitted; at DPG, these requirements also apply to HWMUs until they are fully closed.

interwell statistical analysis – comparison of water quality data between upgradient and downgradient monitoring wells.

IRP wastes – generated as a result of SWMU cleanup activities. Consist primarily of environmental media such as soil and groundwater and potentially contaminated debris such as concrete, wood, and metal. Can include used personal protective equipment.

irradiation – the act of subjecting an object or person to some form of radiant energy, such as x-rays.

J

Joint Contact Point – division in DPG's WDTC responsible for providing chemical and biological defense information to the Joint Services.

Joint Services – activities conducted by more than one of the U.S. armed services (the Army, Air Force, and Navy including the Marine Corps).

Joint Vaccine Acquisition Program (JVAP) – joint effort authorized in 1996 to produce and refine vaccines to protect military forces and civilians in the event of a biological agent incident.

L

lacustrine – of, having to do with, or originating in lakes; of or having to do with layers that originated by deposition at the bottom of a lake.

lead agency – the Federal government agency responsible for the NEPA analysis and ROD for a specific proposed action.

linear peak sound level (dBP) – sound level in decibels, measured using the unweighted peak network of a sound level meter. The dBP weights all frequencies of noise equally.

lithologic – concerning the nature or composition of rock.

logistics – the procurement, distribution, maintenance, and replacement of materiel and personnel.

lot acceptance test (LAT) – type of conventional munition test in which a specific manufactured series (a lot) of munition is tested for approval for use by DOD.

M

magazine – a warehouse or military supply depot; a space in which explosives are stored.

manifest – a list of cargo or hazardous materials that are being transported.

materiel – all items including ships, tanks, self-propelled weapons, aircraft, etc., and related spares, repair parts, and support equipment necessary to equip, operate, maintain, and support military activities without distinctions as to its application for administrative or combat purposes.

mean sea level – the average height of the surface of the sea for all stages of the tide over a 19-year period, usually determined from hourly height readings.

memorandum of agreement – a record between government agencies agreeing upon a specific action item.

memorandum of understanding – accord between government agencies agreeing upon a specific approach.

micron – is one-millionth of a meter. It can also be expressed as one 25-thousandth of an inch. A human hair is about 50 microns wide.

military operating area – airspace which is authorized through the FAA for military air operations, and in which commercial air traffic may be excluded.

mineral prospect – a place showing signs of containing a mineral deposit.

mitigation – in an EIS, refers to activities that decrease negative environmental impacts. By avoiding, minimizing, rectifying, reducing, eliminating, or otherwise compensating for an environmental impact.

mixed waste – waste that contains both hazardous waste, as defined under RCRA, and source, special nuclear, or by-product material subject to the Atomic Energy Act.

monitoring – orderly process of collecting, analyzing, and interpreting resource data to evaluate progress toward meeting management objectives.

montane – the biogeographic zone of relatively moist cool upland slopes below timberline dominated by large coniferous trees.

mortar – a short-barreled cannon which hurls shells in a high trajectory.

munitions – all types of armament, including weapons utilized during combat or designed for training of the armed forces for inflicting or aiding in inflicting damage to the neutralization of enemy personnel, equipment, or facilities. It includes such items as bombs, rockets, missiles, small arms and ammunition, bulk explosives, smokes, incendiaries, and non-explosive practice, and training devices.

Munitions include rockets.

N

National Ambient Air Quality Standards (NAAQS) – those standards established according to the CAA to protect health and welfare.

National Environmental Policy Act (NEPA) – U.S. statute that requires all Federal agencies to consider the potential impacts of proposed actions on the human and natural environment.

National Priorities List (NPL) – EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under CERCLA of 1980, as amended.

National Register of Historic Places (NRHP) – a list of architectural, historical, archaeological, and

cultural sites of local, state, or national significance. This list of sites was first established by the National Historic Preservation Act of 1966, and is currently maintained and updated by the National Park Service, U.S. Department of Interior.

Native American Graves Protection and Repatriation Act (NAGPRA) – law enacted in 1990 that states that any remains of American Indians (and associated objects) must be professionally curated and made available to any descendants for a traditional tribal burial.

noble gas – a gas that is relatively inactive or inert. The noble gases include helium, neon, argon, krypton, xenon, and radon.

noise contours – lines on a map that indicate different noise zones or land use planning areas for the purpose of maintaining uses that are compatible with the existing and future noise environments.

North Atlantic Treaty Organization (NATO) – alliance of nations who have signed the 1949 North Atlantic Treaty, committing the nations to each other's defense.

notice of availability – notification placed in the *Federal Register* by an agency announcing that an environmental impact statement or other environmental document is available for public review.

notice of intent (NOI) – notification placed in the *Federal Register* that an EIS will be prepared.

noxious weeds – plants that may be injurious or harmful to health.

nuclear – of or having to do with atoms or atomic energy.

Nuclear Regulatory Commission (NRC) – Federal agency that ensures that the uses of nuclear materials and facilities are consistent with National Security, public health and safety, environmental quality and Anti-Trust Laws.

O

obscurant – smoke, particulate matter, fiber or other material used directly on or near the enemy with the primary purpose of suppressing observers and minimizing the enemy's vision both within and beyond their position area.

Occupational Safety and Health Administration (OSHA) – organization whose mission is to save lives, prevent injuries and protect the health of America's workers. To accomplish this, Federal and state governments must work in partnership with the more than 100 million working men and women and their six and a half million employers who are covered by the Occupational Safety and Health Act of 1970.

open burning – operations used to destroy excess or obsolete materials such as propellants, pyrotechnics, and smokes by combustion.

open detonation – operations used to destroy excess or obsolete materials, such as propellants, pyrotechnics, and smokes by combustion.

Open Detonation/Open Burn, Improved (ODOBi) – test facility used for emission characterization of energetics. The ODOBi is used for combustion and detonation studies of thermally active materials that cannot be feasibly tested in the BangBox™ or the Suppressive Shield Facility. The ODOBi is designed to withstand detonations of up to 11 kg (25 lb) of net explosive weight.

operating procedure – specific steps or instruction to conduct an activity, or operate an instrument or piece of machinery. Many standing operating procedures (SOPs) at DPG are site specific.

ordnance – military explosives, chemicals, pyrotechnics, and similar stores, e.g., bombs, guns and ammunition, flares, smoke, napalm.

ozone – a form of oxygen with a sharp, pungent odor, produced by electricity and present in the air, especially after a thunderstorm. Ozone is the

principal substance that shields the surface of the earth from ultraviolet radiation from outer space.

P

paleontologic resource – a site containing non-human life of past geological periods, usually in the form of fossil remains.

Paleozoic – the era after the Proterozoic and before the Mesozoic, characterized by the development of the first fishes, land plants, amphibians, reptiles, insects, and forests of fern-like trees.

particulates – small separate particles in the air.

pathogen – any biological organism capable of producing disease, especially a living microorganism.

pegmatite – a coarse variety of granite occurring in veins.

per capita – a measure of an item derived by dividing the measured amount by the total population.

permeability – the condition of being permeable, allowing the passage or diffusion of liquids or gases through it.

personal protective equipment (PPE) – protection equipment that prevents injury, sustains life, and allows for continued operational capability in environments that would be potentially hazardous to human health. Equipment may include protective masks and clothing used by individual soldiers and/or civilians.

photopoint – a point overlooking a specific area where photographs are taken at different times to detect changes.

photosynthetic – of or having to do with the process by which plant cells make carbohydrates by combining carbon dioxide and water in the presence of chlorophyll and light, and the release of oxygen as a by-product.

physiographic – of or having to do with physical geography.

playa – the basin floor of an undrained desert which contains water at irregular periods; a plain of silt or mud, covered with water during the wet season.

pleistocene – the epoch before the present period; the ice age.

plume – an elongated band that may contain pollutants, which may result from the release and movement of a chemical in the air or soil.

point-source test – type of outdoor test that involves the use of munitions and dissemination systems.

polychlorinated biphenyls (PCBs) – any of a family of industrial compounds produced by chlorination of biphenyl. These compounds are environmental pollutants. They accumulate in organisms and concentrate in the food chain. PCBs are carcinogenic and are known to cause reduced reproduction in birds and mammals. They also decompose very slowly.

polymerase chain reaction – a series of changes involving the rearrangement of molecules caused by an enzyme that forms nucleic acid from nucleotides.

Portable Isotopic Neutron Spectroscopy (PINS) – method used to identify specific chemical agents within a closed munition by analyzing its gamma rays.

potable – water which is suitable for drinking.

Potential Contamination Source (PCS) – an area or facility that contains or produces chemicals or chemical waste which may be adversely impacting or corrupting other areas.

Precambrian – the earliest era in geological time, encompassing all the time before the Cambrian period. The Precambrian covers 85 percent of the total length of geological time.

preferred alternative – the NEPA alternative that the lead agency believes would best fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors.

programmatic EIS – an EIS that evaluates environmental impacts of broad agency action such as the development of programs.

propellant – that source which provides the energy required for propelling a projectile. Specifically, an explosive charge for propelling a projectile; also a fuel, either solid or liquid, for propelling a rocket or missile.

proponent – the government agency or organization proposing an action.

proposed action – Federal action identified by the proponent that could potentially affect the environment.

public land – any land or interest in land whose surface and/or subsurface is owned by the U.S. and administered by the Secretary of the Interior through the BLM.

pyrotechnics – materials that react to produce light, smoke, sound, or gas including flares, illuminants, and smoke devices used for sending signals and/or warnings.

Q

Quality Assurance Specialist Ammunition Surveillance (QASAS) – trained ammunition specialists responsible for the safety and serviceability of munitions and energetics; proper storage and management of munitions, energetics, and chemical agents; and the accountability of all munitions, energetics, and chemical agents.

quaternary – the present geological period, the later of the two periods currently making up the Cenozoic era, and including the Pleistocene and Recent epochs.

R

radiological – of or having to do with x-rays or the rays from radioactive substances.

radionuclide – a nuclide that exhibits radioactivity.

range – area equipped for practice in shooting at targets. In this meaning, also called target range.

Range Control – the organization at DPG responsible for scheduling, assignment, and control of the range to maximize safety and minimize interference between adjacent tests and training activities.

rangeland – land used for grazing by livestock and big game animals on which the vegetation is dominated by grasses, grasslike plants, forbs, or shrubs.

raveling – refers to cracked or damaged condition of a roadway or runway.

RCRA facility investigation – The second phase of an environmental investigation conducted under RCRA for an operating facility. The RCRA facility investigation involves collecting and analyzing information about the site to determine the nature and extent of contamination that may be present and the risks of exposure to this contamination to humans and the environment to determine appropriate corrective action.

real property – lands, buildings, structures, utilities systems, improvements, and their additions. Includes equipment attached to and made part of buildings and structures such as heating systems but not movable equipment such as plant equipment.

record of decision (ROD) – a concise document prepared and published in the *Federal Register* documenting the final decision made at the conclusion of an environmental impact statement process.

record of environmental consideration (REC) – a document used to document an action is covered by a categorical exclusion or by an existing EA or EIS.

remediation – clean-up or other methods used to remove or contain a toxic spill or hazardous materials.

repository – a place where things may be put for safekeeping such as a library.

residual impacts – impacts that are projected to remain even after mitigation efforts are applied.

Resource Conservation and Recovery Act of 1976 (RCRA) – the law that established a variety of standards for generators, transporters, and waste treatment, storage, and disposal facilities dealing with hazardous wastes, to control hazardous wastes from "cradle to grave." Substantially enhanced by the Hazardous and Solid Wastes amendments of 1984.

restricted airspace – airspace designated by the Federal Aviation Administration, within which the flight of aircraft while not wholly prohibited, is subject to restriction.

risk – a measure of the probability that damage to life, property, or the environment will occur if a hazard manifests itself. This measures includes the severity of anticipated consequences to people.

S

scintillator – a device for counting radioactive particles by detecting the number of scintillations when ionizing radiation strikes a fluorescent material. A scintillation is a flash or spark of visible or ultraviolet light produced by ions in a phosphor when it is struck by a charged particle or high-energy photon.

scope of statement – a declaration of the range of actions, alternatives, and impacts to be considered in an EIS.

scoping – an early and open process for determining the scope of issues to be addressed in an EIS and for identifying the significant issues related to a proposed action. The process requires appropriate public participation.

secondary containment – a structure such as a berm that prevents a spill, coming from the primary container such as an AST, from impacting adjacent areas.

seismicity – susceptibility of earthquakes; relative frequency and distribution of earthquakes in a given area.

semivolatile organic compound – a chemical which can evaporate, but not as rapidly as volatile organic chemicals. Semivolatile organic chemicals can be soluble in water. These characteristics allow these chemicals to be introduced into an organism through inhalation or ingestion.

shrapnel – bomb, mine, or shell fragments.

significant impact – NEPA requires consideration of both context and intensity to identify significant impacts. The significance of an action must be analyzed in several contexts such as the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. Both short- and long-term impacts are relevant. Intensity refers to the severity of impact.

significance criteria – specific criteria used to determine whether an impact may be significant.

simulant – see biological simulant and chemical simulant.

small arms – portable, individual, and crew-served weapon systems used mainly against personnel and lightly armored or unarmored equipment.

small arms ammunition – ammunition for small arms, i.e., all ammunition up to and including 20 millimeters (0.787 inches).

smart munitions – munition that can be guided to its target by a laser beam or radio waves.

Smokes are tested at DPG.

smoke – small solid or liquid particles which become hydrated in contact with air and then intercept or diffuse light to act as screening, signaling, and decoy mechanisms.

socioeconomics – a range of characteristics that affect the social and economic environment of a geographic area including employment, population, housing, income, public infrastructure and services, fiscal conditions, and quality of life.

solar conditioning – a type of portable equipment that can be used indoors and outdoors to assess the effect of the sun on a test item.

solid waste – any discarded material that is not excluded by section 261.4(a) or that is not excluded by variance granted under sections 260.30 and 260.31 (40 CFR 216.2).

solid waste management unit (SWMU) – an area used to manage hazardous waste at DPG prior to 1980 that is under RCRA facility investigation by the Army Corps of Engineers.

sonic boom – noise made when an aircraft or space vehicle (e.g. airplane) is traveling faster than the speed of sound.

sortie – in air operations, an operational flight by one aircraft.

species extinction – the condition of a species having no living members.

spotting charge – small amounts of explosive sufficient to cause a flash to determine the accuracy of the weapons delivery.

standing operating procedure (SOP) – a set of instructions for military operations which lead to standardization without loss of effectiveness. The procedure is applicable unless ordered otherwise.

stockpile – rockets, bombs, artillery, shells, mines, and bulk chemical storage containers originally created to discourage other countries from using chemical weapons against the U.S. and its allies.

strafe – air-to-ground target engagement with an aircraft's gun system.

subchamber – totally enclosed glove boxes operated within a test chamber. DPG's Chemical Agent Test Chamber contains 2 subchambers.

Summary Development Plan (SDP) – an initiative designed to reinvigorate the Army's Real Property Master Plan program. It was developed to be comprehensive, affordable, flexible, value-added, and easily maintained by installation personnel to meet the Installation Commander's needs. The SDP is a concise summary of the essential elements of the real property management plan. It provides an overview of future development.

sump – any low area which receives drainage; a cesspool.

Suppressive Shield Facility – test facility used for emissions characterization of large shrapnel producing detonations and weapons.

T

tactical – pertaining to the employment of units in combat.

tantalum – a hard, ductile, lustrous, grayish-white metallic element that is very resistant to corrosion.

Technical Escort Unit (TEU) – group of technically qualified and properly equipped personnel to accompany designated materiel

requiring a high degree of safety or security during shipment.

telemeter – a device for measuring heat, radiation, pressure, and speed, determining location, etc., and transmitting the information to a distant receiving station.

telemetry – the use of telemeters for measuring and transmitting information. Used at DPG to measure target accuracy.

Television Ordnance Scoring System (TOSS) – system which electronically monitors and evaluates target accuracy.

tenant – organization (that is not necessarily a customer) that uses DPG on a regular basis to conduct testing or training activities, or to provide installation support activities.

Tertiary – the earlier of the two periods making up the Cenozoic era, immediately following the Mesozoic. During this time, the great mountain systems, such as the Alps, Himalayas, Rockies, and Andes, appeared, and rapid development of mammals occurred.

test chamber – an enclosed space that is designed for smoke, obscurant, and illuminant; chemical defense; or biological defense testing and has specific engineering controls that prevent any test materials from escaping.

Test Execution Directive – document issued by the Developmental Test Command that authorizes a test center to proceed with a test.

test grid – or grid, designated area where outdoor tests are performed most often involving chemical or biological simulants, smokes, and conventional weapons.

Test Resource Management System (TRMS) – computerized system in use at DPG that tracks the progress of test programs.

thermally active material – see explosive.

threatened species – any species or significant population of that species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. This category usually includes only those species that have been recognized and listed as threatened by Federal and state governments but may include species categorized as rare, very rare, or depleted.

tiering – process of assessing the impacts of broad actions in one NEPA document such as the Future Programs EIS, followed by more narrow analyses of actions in subsequent NEPA documents.

tolerance limit – statistically determined upper limit for a particular groundwater constituent. Used in interwell or intrawell analysis to compare groundwater data from downgradient wells to the upper limit and determine if a statistically significant increase of the constituent has occurred.

Toxic Substance Control Act (TSCA) – law enacted in 1976 to protect human health and the environment from unreasonable risk due to exposure, and manufacture, distribution, use or disposal of, toxic substances such as PCBs.

toxin – any chemical causing an adverse effect on a living organism.

trace fossils – burrows, as well as tracks and trails, in rocks

tracer – an element or atom that can be traced and observed as it passes through a body, plant, or other system in order to study biological processes or chemical reactions within the system; can be in gaseous form as well.

training area – area designated for training activities consisting of undeveloped rangeland with "developed" areas that include unimproved roads and firing positions for concentrated artillery activity.

U

underground storage tank (UST) – Any one or combination of tanks including underground pipe connections that is used to contain an accumulation of regulated substances, and the volume of which is 10 percent or more beneath the surface of the ground.

understory vegetation – low growing plants that can be found beneath other plants.

undertaking – a project, activity or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency.

unexploded ordnance (UXO) – explosive ordnance that has been primed, fused, armed, or otherwise prepared for action, and which has been activated by some means such as firing, dropping, launching, or projection, but remains unexploded, thereby presenting a hazard to operations or personnel.

ungulate – any group of mammals that have hoofs, including the ruminants, horses, rhinoceroses, elephants, and pigs.

Utah Test and Training Range (UTTR) – both airspace and land withdrawn from public use by DOD. Some land under DOD controlled airspace belongs to non-DOD entities, such as the BLM and private parties. The UTTR is managed by the Air Force.

V

vegetation treatments – methods used to control the growth and spread of undesirable vegetation. Control can be by chemical or mechanical means or by fire.

viewshed – the area within view from a defined observation point; a physiographic area composed of land, water, biological, and cultural elements which may by viewed and mapped from one or more veiwpoints and which has inherent scenic qualities and/or aesthetic values as determined by those who view it.

virology – the study of viruses and viral diseases.

visual resources – include natural and constructed physical features that provide the landscape its character and value as an environmental resource. Landscape features that form a viewer's overall impression about an area include landform, vegetation, water, color, adjacent scenery, scarcity, and constructed modifications to the natural setting.

volatile organic compound – a chemical which evaporates rapidly or can be very soluble in water. This allows these chemicals to be introduced into an organism through inhalation or ingestion.

W

wafer – a component of space equipment used for NASA's Genesis mission to collect particles of the solar wind.

warfare – the waging of war; armed conflict.

waste stream – terminology used to refer to waste leaving a facility or operation.

waters of the State – all streams, lakes, ponds, marshes, water courses, waterways, wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private, which are contained within, flow through, or border upon the State of Utah does not include bodies of water confined to and retained within the limits of private property, and which do not develop into or constitute a nuisance, a public health hazard, or a menace to fish and wildlife.

waters of the U.S. – all waters that are currently used, or were used in the past, for interstate or foreign commerce, including all waters that are subject to the ebb or flow of the tide. All interstate waters including interstate wetlands, and all other waters such as intrastate lakes, rivers, streams intermittent streams, mud flats, sandbars, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds. All impoundments of waters otherwise defined as waters of the U.S., tributaries

of these waters, and the territorial seas and wetlands adjacent to these waters.

watershed – the total area above a given point on a waterway that contributes runoff water to the stream flow at that point.

West Desert Test Center (WDTC) – group that provides management control of DPG's testing efforts.

wetland – areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support and that, under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions.

wildlife – all species of mammals, birds, invertebrates, amphibians, reptiles, or their progeny or eggs that, whether raised in captivity or not, are normally found in a wild state.

wildlife guzzlers – water dispensers constructed at DPG to collect precipitation and then store and dispense this water for wildlife use.

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