ST. GEORGE ARMORY INTEGRATED NATURAL RESOURCE MANAGEMENT PLAN UPDATE

2021-2026

UTAH NATIONAL GUARD

ENVIRONMENTAL RESOURCES MANAGEMENT

This Integrated Natural Resources Management Plan (INRMP) for lands of the St. George Armory addresses the overarching objectives of responsible stewardship, environmental compliance, and maintenance of a quality training environment in accordance with the Sikes Act (16 United States Code (USC) 670a). The St. George Armory INRMP is a comprehensive planning document incorporating inventory and surveying data, ecosystem management and rehabilitation, and budget needs.

St. George Armory

Integrated Natural Resources Management Plan Update

Approval

This Integrated Natural Resources Management Plan (INRMP) Update meets the requirements of the Sikes Act, Department of Defense Instruction 4715.03, Army regulation 200-1, and the Environmental Conservation Program.

Review and Approved by:

TURLEY.MICHAEL.JAMES.1158421158 Digitally signed by TURLEY.MICHAEL.JAMES.1158421158 Date: 2021.05.13 15:32:08 -06'00'

Date: 13 May 2021

MICHAEL J. TURLEY
Major General
The Adjutant General
Commanding

United States Department of the Interior

FISH AND WILDLIFE SERVICE
2369 West Orton Circle Suite 50
West Valley City, Utah 84119

In Reply Refer to:
FWS/R6
06E23000-20-CPA-0006

FEB 2 5 2019

Memorandum

To: Douglas A. Johnson, Natural Resources Manager
Utah National Guard
12953 Minuteman Drive
Draper, UT 84020-9286

From: Acting Utah Field Supervisor, Ecological Services, U.S. Fish and Wildlife Service, West Valley City, Utah

Subject: St. George Armory 2019 Updated Integrated Natural Resources Management Plan

We reviewed the 2019 Updated Integrated Natural Resources Management Plan (INRMP) for the Utah National Guard St. George Armory. As required by the Sikes Act, the INRMP provides guidance to the natural resource management program at the St. George Armory. Specifically, the document establishes goals and objectives for successful management and monitoring of wildlife and habitat resources at the St. George Armory.

We find that the 2019 INRMP Update is acceptable. This letter conveys our concurrence and support of the implementation of the INRMP.

We appreciate the opportunity to provide these comments. If you require further assistance or have questions about our comments, please contact Joslin Heyward, 385-285-7915.

INTERIOR REGION 5 MISSOURI BASIN	INTERIOR REGION 7 UPPER COLORADO RIVER BASIN
KANSAS, MONTANA*, NEBRASKA, NORTH DAKOTA, SOUTH DAKOTA	COLORADO, NEW MEXICO, UTAH, WYOMING

*PARTIAL

GARY R. HERBERT
Governor
SPENCER J. COX
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES
BRIAN C. STEED
Executive Director
Division of Wildlife Resources
MICHAL D. FOWLKS
Division Director

February 10, 2020

Subject: St. George Armory Integrated Natural Resource Management Plan Review 2019 (UDWR concurrence)

Douglas A. Johnson, Natural Resources Manager
Utah National Guard
Environmental Resources Management
12953 Minuteman Drive
Draper, UT 84020-9286

Dear Mr. Johnson:

We received your November 5, 2019 letter requesting concurrence for the Integrated Natural Resource Management Plan (INRMP) for the St. George Armory. We find that this latest INRMP is acceptable and will continue to serve as suitable guidance for natural resource management at the St. George Armory. The Utah Division of Wildlife Resources (UDWR) appreciates the level of consultation from the Utah National Guard and appreciates the level of effort put forth in terms of biological monitoring. We appreciate the commitment to protecting the natural resources at the installation and the Utah National Guard's willingness to incorporate our suggestions into the final INRMP. Please contact the UDWR Southern Region Office directly at 435-865-6100 if any conflicts with wildlife arise as a result of operations within the St. George Armory.

Thank you for the opportunity to provide comment. If you have any questions, please call Rhett Boswell, Habitat Biologist at our Cedar City office (435-691-2372).

Sincerely,

Kevin D. Bunnell
Regional Supervisor
UDWR Southern Region

KDB/wej/rlb

1594 West North Temple, Suite 2110, PO Box 146301, Salt Lake City, UT 84114-6301
telephone (801) 538-4700 • facsimile (801) 538-4709 • TTY (801) 538-7458 • *www.wildlife.utah.gov*

UTAH DNR WILDLIFE RESOURCES

SIGNATURE PAGE

Integrated Natural Resources Management Plan
St. George - Utah Army National Guard
2021

This Integrated Natural Resources Management Plan (INRMP) meets the requirements of the Sikes Act (16 USC Section 670a et seq.) as amended and has set appropriate and adequate guidelines for conserving and protecting the Natural Resources of the St. George Armory.

REVIEWED:

HAMMETT.ANTHONY.SCOTT.1116575562 Digitally signed by HAMMETT.ANTHONY.SCOTT.1116575562 Date: 2021.09.17 10:35:13 -06'00'

Anthony Hammett
Colonel, U.S. Army
Chief, G-9 Army National Guard

How to Read This Document

The document has a “document map” that acts as a digital table of contents. Most cross-references (“See Section #.#” or “Table x-x”) are enabled and you can follow the link by ctrl-left mouse button on the text. Updates made between Annual Reviews will show as “Tracked Changes,” under the Review Menu until accepted the following year. However, it is messy when viewed this way and the Review menu View option can be set to “Final” for a clean copy.

Specific locations of endangered species, other sensitive resources and sensitive military information have purposely not been made available. Generally only common names are used; for scientific names refer to Appendix E. Plants.usda.gov is the standard for scientific nomenclature, except as noted through footnotes.

Facilities managers will be interested in Chapters 3, Installation Overview, 5, Ecosystems and the Biotic Environment, and 7, Natural Resource Program Management. Military trainers will be most interested in Chapters 6, Mission Impacts, and 7. Wildlife and migratory bird information and management are found in Sections 5.3 and 7.3, respectively. Endangered species information and management is found in Sections 5.4 and 7.4.

Environmental Resource Management (UT-ERM) will make the final version of this yearly updated document available on the UT-ERM public website. It is available internally on the SharePoint: Portal home – Directorates – ERM – Natural Resources – St. George INRMP

We welcome written comments from any interested party; please note the section, page number and line number with your comments and send to:

Utah National Guard

Environmental Resources Management

ATTN: INRMP Coordinator, Douglas Johnson

12953 S Minuteman Drive

Draper, UT 84020

Or douglas.a.johnson86.nfg@mail.mil

Comments will be addressed in the next annual review in Appendix A.

CONTRIBUTORS:

Douglas A. Johnson, Natural Resource Manager, Utah National Guard

Sean Hammond, Integrated Training Area Management Program (ITAM) Coordinator, Utah National Guard

Carly Anderson, Natural Resource Technician, Utah State University

Brian Meisman, Geographic Information System (GIS) Program Manager, Utah National Guard

Shaun Nelson, Cultural Resource Manager, Utah National Guard

Eric Sewell, Environmental Program Manager, Utah National Guard

Chapter 7, Ecosystem Management and much of chapter 2 were adapted from the Camp Williams INRMP, written and edited by Dr. James Long.

UPDATED IN 2019-20 BY:

Douglas A. Johnson, Natural Resource Manager, Utah National Guard

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1 SUMMARY

1.1 COMMANDER'S SUMMARY

This Integrated Natural Resources Management Plan (INRMP) for lands of the St. George Armory addresses the overarching objectives of responsible stewardship, environmental compliance, and maintenance of a quality training environment. The St. George Armory INRMP is a comprehensive planning document incorporating inventory and survey data, land rehabilitation, and budget needs. The previous stand-alone Endangered Species Management Plan (ESMP) is now a component of this plan. The Environmental Resources Management Office (UT-ERM) of the Utah National Guard (UTNG) is the proponent for development and implementation of the INRMP. The Utah Division of Wildlife Resources (UDWR) and the U.S. Fish and Wildlife Service (USFWS) are signatory cooperators for initial development, implementation and program review.

The 69.3-acre St. George Armory[1] is found within the Fort Pierce Industrial Park, in St. George, in southern Washington County, in the southwest corner of Utah. The land was withdrawn from the Bureau of Land Management (BLM) for military use as an armory and training ground. It currently houses Battery B of the 222nd Field Artillery (FA), 213th Forward Support Company (FSC), Detachment 1 of Company D of the 141st Military Intelligence (MI), and a Field Maintenance Shop (FMS), who use the training ground for weekend Individual Duty Training (IDT). The City of St. George and surrounding areas have some of the highest growth rates in the nation, as reflected by the rapidly developing industrial park.

The St. George area has a unique set of soil and climate characteristics that support many endemic plants and animals. Three endangered plants (the dwarf bear-poppy[2] (*Arctomecon humilis*), Siler's pincushion cactus (*Pediocactus sileri*), and Holmgren milkvetch[3] (*Astragalus holmgreniorum*) are found on or near the Armory and are the reason for creation of this INRMP. Critical habitat for Holmgren milkvetch is found nearby to the west. The Nature Conservancy (TNC) set up the White Dome Nature Preserve, found just south of the Armory, to protect the poppy and cactus.

The City of St. George lies at the north end of the Mojave Desert, classified as a semi-arid to arid region. Annual precipitation is low and is the major influence on vegetation establishment and community types. The St. George Armory straddles the Colorado Plateau and Basin Range Physiographic Provinces. The dominant feature within the area is the White Dome summit that is partially present within The Nature Conservancy's

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[1] The term "Armory" often refers to just the buildings and developed area, but in this document refers to both the developed and undeveloped grounds.

[2] Called "Common bear-poppy" in the USDA Plants Database (plants.usda.gov) and dwarf bearclaw poppy elsewhere; where "poppy" is found in this document, it refers to this plant.

[3] Although this species is called paradox milkvetch in the PLANTs database, it is called Holmgren milkvetch here to be consistent with endangered species literature and plans.

Dwarf Bear-poppy Preserve. There are two main grades of soil in the boundaries of the installation: badlands consisting of barren shale with gypsum; and the LaVerkin Series of well-drained, alluvial soils. The badland gypsum soil is essential habitat for the endangered dwarf bear-poppy. There are no natural surface water resources on the Armory.

The St. George Armory is within Major Land Resource Area (MLRA) 30 – Mojave Desert of the D-Western Range and Irrigated Region. This MLRA is characterized by isolated, short mountain ranges separated by aggraded desert plains, low precipitation, high temperatures and low vegetative production. The Vegetation Planning Level Survey (PLS) elaborated three plant communities based on Natural Resource Conservation Service (NRCS) Ecological Site Descriptions (ESD)(Johnson, 2010). The Armory's northern portion is characterized by R030XY110UT – Desert Loam (Creosotebush); a type characterized by moderately deep soils, but sensitive to disturbance and invasive plants. Most of the training grounds are R030XB213AZ – Gypsum Upland 6-9" p.z. Alkaline, with deep soils and low vegetation production. The low hills in the southeastern corner are a related type, R030XB222AZ – Gypsum Hills 6-9" p.z. Alkaline; soils are a poor gypsite, with a high erosion hazard.

This land supports thin stands of vegetation (Johnson, 2010). The dominant vegetation is native shrubs, especially Torrey's jointfir, creosotebush, shadscale saltbush, and greasewood. There is a diverse but sparse understory of native forbs and grasses, but it is being invaded and overcome by several invasive weeds: African mustard, redstem stork's bill, and red brome. All three ecological sites should have a well-developed biological crust but it is only intact with the enclosure.

The Armory's small size, desert ecosystem and surrounding land use (i.e. industrial) limits wildlife diversity compared to more mesic or undisturbed areas. The Wildlife PLS and subsequent surveys have documented 7 species of lizards, 28 species of birds, and 7 species of mammals. Long-nosed leopard lizards, a Tier III species in the Utah Comprehensive Wildlife Conservation Strategy, were found on bordering land (Gorrell, et al., 2005). Utah banded gecko were detected during other field work.

Seventeen avian species were initially identified on the Armory, the now defunct Local Training Area (LTA) and neighboring State Institutional Trust Land Administration (SITLA) lands. ERM staff have detected 11 additional birds during avian monitoring. Two state sensitive species, long-billed curlew and western burrowing owl, were detected on bordering land – not on the Armory itself. Both are on the USFWS's Birds of Conservation Concern list (USFWS, 2008) and Tier II species by the state. Of the 29 birds detected on the installation, 26 have legal management requirements as migratory birds (50 Code of Federal Regulations [CFR] 10). Recently (2015), a Bird of Conservation Concern, the Brewer's sparrow, was thought detected on the Armory, though the identification was tentative.

Four species of mammals, coyotes, desert cottontails, grey fox and white-tailed antelope squirrels, have been confirmed on the Armory. The remaining 3 mammal species are domestic. Signs of kit fox were found on a bordering, now developed parcel.

The impetus for development of this INRMP is the presence of the endangered dwarf bear-poppy. Habitat needs – it is an obligate gypsophile on Shnabkaib members of the Moenkopi Formation (USFWS 1985; Nelson and Welsh 1993), from 2,700 to 3,300 feet elevation - restrict the poppy to the St. George area. The poppy was not known to be on the Armory grounds when they were withdrawn, but were found soon afterwards. Habitat of the White Dome land feature extends onto the Armory's southeast corner. The UTNG, in consultation with the USFWS, decided to fence the area to restrict it to foot traffic and training, which at modest levels can benefit the poppy by breaking the microbiotic crust to aid seedling establishment. The poppy died back region-wide from the late 1990's until about 2006, when it reappeared on the Armory. Such diebacks are seemingly part of its cycle and make protecting the long-lived seed bank important. More recently (2016), a small population of Holmgren milkvetch was found on the Armory and in nearby areas. No other threatened, endangered or state-sensitive species are known to occur on the installation, although several, including Siler's pincushion cactus are found nearby.

The Armory is about 70 acres; 11 are developed as a "cantonment" area and of the remaining 58 acres of undeveloped land, 4.7 are fenced for the poppy. The tenant military units use the wildland for tracked-vehicle (Paladin and support vehicle) driver familiarization and individual soldier skills training. The largest impact to natural resources and training has been the development of the surrounding industrial park, isolating the Armory environment and reducing training opportunities. Armory training use is heavy and the environment is not resilient. No impacts to the endangered poppy or fenced area have been noted. The main drawback of the Armory is that it is too small for effective tracked vehicle maneuver training.

The UT-ERM office is responsible for INRMP development, maintenance and implementation. Primary stakeholders include the tenant units, the USFWS, and the UDWR. The Geographic Information System (GIS) is used to support natural resource management.

The primary goal for wildlife management is to preserve habitat to continue native species through ecosystem management. Some animals recorded on or near the Armory have management significance and need individual consideration; though management for a particular species is not carried out without consideration of their impact on the whole. Many migratory birds have been noted on the Armory and management focuses on Birds of Conservation Concern and others identified by UDWR and the Utah Partners in Flight. Management will survey before potential disturbances, avoid pesticide use within their breeding habitat, control exotic plants, and reestablish native plants as needed.

Managing endangered species is the primary legal driver for this INRMP, which will replace the previous stand-alone ESMP. Management of the dwarf bearclaw-poppy addresses three goals, though on a limited scale, of the species Recovery Plan: remove threats; monitor and sustain populations; and develop public awareness. Fencing helps to manage military use and removes all-terrain vehicle (ATV) impacts. The poppy and Holmgren milkvetch are monitored both on and adjacent to the Armory. An awareness

board and incorporation of needs within training plans support endangered species management and protection (See 7.4.1.1).

The Utah Army National Guard's Water Quality Management program ensures that care is taken for Utah's water resources.

Because effective land-based training depends on the continued availability of suitable training areas, the National Guard has a basic commitment to preserving healthy ecosystems. A major challenge to preserving intact native ecosystems is the rapid expansion of invasive weeds. The weed management plan has the following management objectives: Prevention; Detection; Rapid Response; Containment and Control; and Site Rehabilitation.

There are no known cultural resources[4] within the Armory grounds. The UT-ERM has contacted the tribes asking for comments and input regarding this INRMP (See Appendix A). All natural resource activities will comply with the Integrated Cultural Resources Management Plan (ICRMP).

UT-ERM is responsible for regulation of UTNG activities as far as they concern natural resources law enforcement. The USFWS is responsible for enforcement of federal statutes (including the Endangered Species Act, Bald and Golden Eagle Protection Act, and Migratory Bird Treaty Act [MBTA]). The Washington County Sheriff or St. George City Police are responsible for all other legal enforcement.

The Sustainable Range Awareness (SRA) Program has the primary goal of educating soldiers to conduct environmentally responsible training both on the Armory and on other lands. Education of soldiers and training units is mainly the responsibility of the SRA component of Integrated Training Area Management (ITAM). It is carried out by staff and in-coming unit briefings, posters, the UT-ERM website, written material (for example, pamphlets and handouts), and articles in the Utah Guard magazine.

The goals of this INRMP are to:

- Support the military training mission by conserving, protecting and strengthening natural ecosystems and biodiversity
- Administer the INRMP to ensure all land uses and management is compatible with the military mission and meets environmental compliance responsibilities
- Comply with the Endangered Species Act and Sikes Act

[4] Cultural Resources are defined as historic properties as defined by the National Historic Preservation Act (NHPA), cultural items as defined by the Native American Graves and Repatriation Act (NAGPRA), archeological resources as defined by Archaeological Resources Protection Act (ARPA), sacred sites as defined in EO 13007 to which access is afforded under American Indian Religious Freedom Act (AIRFA), and collections and associated records as defined in 36 CFR 79.

Integrated natural resource management is the responsibility of the Natural Resource Manager, helped by other UT-ERM staff. The UT-ERM will conduct annual and 5-year reviews in coordination with the UDWR and USFWS to reflect agreement and check INRMP implementation through internal and Army metrics.

1.2 SUMMARY OF 2020 UPDATE

The Review for Operation and Effect (ROE) was initiated with the 2018 Annual Review, informing stakeholders of the intent to do the ROE and asking for preliminary input. Stakeholder offices included:

- Construction Facilities Maintenance (UT-CFM)
- Tenant Units, represented by representatives of the 222nd FA and the 65th MIB
- Environmental Resources Management (UT-ERM)
- Range Control and the Integrated Training Area Management program (UTC-RC)
- Utah Division of Wildlife Resources (UDWR)
- US Fish and Wildlife Service (USFWS)

Representatives of the stakeholders met on 10 January 2019. A summary can be found in Appendix E. Key issues identified by stakeholders included:

- Changes to the procedure for Annual Reviews
- The purpose of the ROE
- Changes to the INRMP will need to be addressed in a Biological Assessment to meet the requirements of the Endangered Species Act
- Increasing development on the land surrounding the Armory
- Continuing problems with invasive plants
- A failed seeding effort in 2016
- The increase of the dwarf bear- poppy (Arctomecon humilis) over the last 5 years
- The discovery of Holmgren milkvetch (Astragalus holmgreniorum) in 2016
- Future expansion of the Armory facility on the current disturbed footprint

The plan was revised based on discussion of these issues. It was sent to the above stakeholders for review from 23 May to 31 July 2019 and 19 August to 24 October 2019. Comments were only received from the USFWS. It was sent for approval by the external stakeholders on 5 November 2019. The UDWR signed 12 February 2020 and the USFWS on 26 February 2020.

2 GENERAL INFORMATION

2.1 PURPOSE

The UTNG previously managed the natural resources of the St. George Armory by the "Endangered Species Management Plan for the Dwarf Bearclaw Poppy (*Arctomecon humilis* Coville) at the St. George Armory" (Johnson, 1995), the "Integrated Natural Resource Management Plan, Camp W.G. Williams, Utah" (UT-ERM, 2001-2006) and "Finding of No Significant Impact for Implementation of an Integrated Natural Resources Management Plan at Camp W.G. Williams" (2001). A new document was needed to update ecological information and to integrate the endangered species management component with ecosystem management consistent with current policy and guidance.

The St. George Armory INRMP is a comprehensive planning document incorporating inventory and monitoring data, land rehabilitation, and budget needs. In addition, the plan incorporates military training impacts and adaptive management of those impacts. When carried out, this INRMP with the ITAM program will serve as the basis for defensible environmental assessments and management.

2.2 GOALS AND OBJECTIVES

This INRMP for wild and developed lands of the St. George Armory addresses the overarching objectives of responsible stewardship, environmental compliance, and maintenance of a quality training environment. The plan uses an ecosystem approach to land management that strives to integrate military training with conserving ecological integrity and biodiversity. Sustainability of a quality training environment is dependent on keeping intact ecosystems. Overarching ecosystem management goals include:

- Maintenance of ecosystem integrity
- Keeping biodiversity and ecosystem processes
- Continuing quality training opportunities

2.3 AUTHORITY

This INRMP fulfills (in whole or part) or references the following natural resource-related laws and rules:

- The Sikes Act, 16 United States Code (USC) 670
- Department of Defense Instruction (DODI) 4715.03, Environmental Conservation Program
- Army Regulation (AR) 200-1
- Memorandum, ARNG-G-9, 2019, subject: Policy on Integrated Natural Resources Management Plans (INRMPS)
- National Environmental Policy Act of 1969 (NEPA), 42 USC 4321-4347
- Endangered Species Act of 1973 (ESA), 16 USC 1531-1544
- Federal Noxious Weed Act of 1974, 7 USC 2801-2814
- Clean Water Act of 1987, 33 USC 1251-1387
- Clean Air Act (as amended through 1996), 42 USC 7401-7671
- Migratory Bird Treaty Act, 16 USC 703-712

- 32 CFR Part 651, Environmental Analysis of Army Actions (replaced AR 200-2)
- NGB NEPA Handbook, Guidance on Preparing Environmental Documentation for Army National Actions under the National Environmental Policy Act of 1969

2.4 RESPONSIBILITIES

2.4.1 UTAH NATIONAL GUARD

The Utah National Guard is the proponent for development and implementation of the INRMP.

2.4.1.1 THE ADJUTANT GENERAL

The Adjutant General (TAG) is responsible to:

- Ensure that Base Support activities support military training and readiness operations, enhance mission accomplishment, and are conducted in a manner conducive to environmental stewardship
- Comply with applicable Federal, State, and local environmental laws, regulations, internal directives and goals, and Executive Orders
- Ensure that sufficient numbers of professionally trained natural resource management personnel and natural resources law enforcement personnel are available and assigned the responsibility to perform tasks necessary to comply with Section 670e, Title 16, United States Code (16 USC 670e)
- Approve integrated natural resource management plans (INRMPs)

2.4.1.2 THE G3 ARMY OPERATIONS & TRAINING

Training use and compliance with the INRMP are the responsibility of the training office and tenant units. The G3 Army Operations is responsible for approving training plans and training area use state-wide.

2.4.1.3 THE DIRECTOR OF ENVIRONMENTAL RESOURCES MANAGEMENT (UT-ERM)

The UT-ERM office provides administration and implementation of the INRMP, and advises the Facility Manager and tenant units on integrated natural resource management. Environmental Resources Management responsibilities include:

- Oversight and direction
- General natural resources program planning and management to include NEPA compliance
- Vegetation management
- Soil conservation
- Water resources protection and conservation
- Air quality and air emissions compliance
- Cultural resources protection and conservation
- Wildlife management
- Threatened and endangered species management surveys and protection
- Natural resources monitoring
- General environmental compliance

- Environmental awareness (EA)
- Integration of geographic information system (GIS) administration and management

2.4.1.3.1 NATURAL RESOURCE MANAGER

The Natural Resource Manager has primary responsibility for developing, maintaining, implementing and reporting on the INRMP. Most UT-ERM tasks in this plan are delegated as their responsibility.

2.4.1.4 THE INTEGRATED TRAINING AREA MANAGEMENT (ITAM) COORDINATOR

The Integrated Training Area Management program includes the following components for the management of training and training lands:

- Range and Training Land Assessment (RTLA)
- Land Rehabilitation And Maintenance (LRAM)
- Training Requirements Integration (TRI)
- Sustainable Range Awareness (SRA)

The ITAM Coordinator is responsible for implementing these to sustain and enhance training.

2.4.1.5 CONSTRUCTION FACILITIES MANAGEMENT (CFM)

The CFM is fiscally responsible for certain land maintenance duties, including:

- Planning for and overseeing of integrated pest management, including noxious weed control
- Erosion mitigation
- Grounds maintenance

2.4.1.6 TENANT UNITS: 222ND FIELD ARTILLERY AND 141ST MILITARY INTELLIGENCE DETACHMENT

All units and organizations training at or using the Armory will comply with the INRMP, and with oversight provided by the G3. Scheduling training use through the Range and Facilities Management Scheduling System (RFMSS) is essential for continuing maintenance and improvement resources.

2.4.2 ARNG G-9

ARNG G-9 Installations and Environment (formerly I&E) provides guidance, policy and funding for natural resource management and INRMP implementation. The ARNG G-9 provides review and approval of the INRMP Update. The Chief of ARNG G-9 is a signatory to the INRMP. ARNG G-9 is responsible for providing necessary funding to carry out Federal actions in the INRMP.

2.4.3 U.S. FISH AND WILDLIFE SERVICE

The USFWS takes part in development and review of the INRMP as directed by the Sikes Act and described by Army Sikes Act Guidance. The INRMP needs written USFWS concurrence through the Utah Ecological Services Field Office.

New actions resulting from the 2019 INRMP Update will be part of a Biological Assessment under the ESA submitted to the USFWS for approval as the regulatory agency. This is especially important for any noxious weed spraying, as herbicide may drift and affect protected species.

2.4.4 Utah Division of Wildlife Resources

The UDWR is the second principal non-Department of Defense (DOD) agency that takes part in development and review of this INRMP. The INRMP needs UDWR concurrence and the Director of UDWR is a signatory on the plan.

2.4.5 Indian Tribal Governments

The NGUT recognizes there exists a unique and distinctive relationship with federally recognized tribes. Specific Tribal Consultation requirements are in chapters 3 & 4 of the UTNG Integrated Cultural Resource Management Plan (ICRMP). The UTNG contacted the following tribes before starting INRMP development:

- Paiute Indian Tribe of Utah
- White Mesa Ute Council
- Ute Indian Tribe

There are no tribal treaty rights associated with the armory or its natural resources.

2.5 MANAGEMENT PHILOSOPHY

The goals of integrated natural resource management include, in general terms, addressing environmental opportunities and challenges and acceptance of the basic premise that continuing quality training opportunities is dependent on sustainable management of ecosystems. The basic focus of management is on habitat and ecological communities, rather than on individual species, to conserve biodiversity. This plan recognizes the changing nature of ecosystems, ecosystem processes and the military training mission, and that it is impossible to know everything about ecosystems and military and nonmilitary user's impacts on the environment. Therefore, effective monitoring and adaptive management are central to carrying out the goals. In all of its various parts, effective integrated natural resource management should use the best available science and information.

The UTNG developed the INRMP to address and integrate federal land management duties and military training needs. Federal land and ecological management were addressed through review of this document by the USFWS and the UDWR. The UT-ERM and tenant units, 222nd Field Artillery and the 141st Military Intelligence detachment, developed the training needs and assessment.

2.6 CONDITIONS FOR IMPLEMENTATION

2.6.1 Implementation

The UT-ERM is the lead for implementation of the INRMP. ITAM is responsible for projects specifically facilitating or repairing military training. The tenant units, the USFWS and the UDWR will be collaborators and advisers as suitable. UT-ERM is also

responsible for annual and five-year reviews under the Sikes Act and Sikes Act Improvement Act.

2.6.2 REVISIONS

No less often than every five years, UTNG, USFWS and UDWR must complete a review for operation and effect of the INRMP. Although the Sikes Act specifies only that a formal review must be completed no less often than every 5 years, DOD policy requires installations to review INRMPs yearly in cooperation with the other parties to the INRMP. Annual and more-intensive periodic reviews promote "adaptive management" by providing an opportunity for the parties to review monitoring and implementation results and compare them with the goals and objectives of the plan, revising planned actions as needed (Figure 2-1). Stakeholder participation is critical to connecting policy and management (Schreiber et al., 2004). The reviews are the mechanism for incorporating stakeholder participation into the identification and measure of goals and the evaluation of outcomes.

These revisions are not expected to result in biophysical effects materially different from those expected in the existing INRMP and analyzed in an existing NEPA document, then a Record of Environmental Consideration (REC) is necessary to satisfy NEPA policy.

FIGURE 2-1. INRMP MANAGEMENT CYCLE.

3 INSTALLATION OVERVIEW

3.1 LOCATION AND AREA

The St. George Armory is found within the City of St. George, in the south of Washington County, in the southwest corner of Utah (Figure 3-1). It is within the Fort Pierce Industrial Park, which is largely zoned M-1: “Space for warehousing, light manufacturing, fabrication, wholesaling, service or similar commercial establishments.”

3.2 INSTALLATION HISTORY

The UTNG obtained the Armory to replace an obsolete armory and for training ground. The action was evaluated under Environmental Assessment #91-7 for Proposed Armory and Organizational Maintenance Subshop Located in St. George, Utah, completed 10 January 1991; the Finding of No Significant Impact was signed 25 February 1991 (Crane, 1991).

In 1991 the land was withdrawn for military use from the BLM. The only significant prior use was light ATV recreation. The parcel is small and isolated from other BLM lands. Under the 2017 National Defense Authorization Act (NDAA), the land has been transferred to the Utah State Armory Board. The NGUT intends to continue this INRMP and associated natural resource management as a “state-owned National Guard installation.”

The Armory building and Organizational Maintenance Shop (OMS) was completed and occupied by 1993. The OMS has since been reorganized as Field Maintenance Shop (FMS) 5b. Only relatively light training impacts were noted until the resident units were mobilized for duty in Iraq. The UTNG previously used a bordering leased Local Training Area (LTA) until SITLA disposed of the land for development. The resident units have traditionally conducted training in other local areas as well[5].

3.3 MILITARY MISSION

The St. George Armory supports weekend Individual Duty Training (IDT) for Battery B of the 222nd FA, the 213th FSC and a detachment of the 141st MI and for weekday use associated with the FMS. Training at the Armory is critical to meeting the unit training needs due to the distance and, therefore, impracticality of training regularly at Camp Williams or other military installations. The artillery battery uses the training area for dismounted training and for light maneuvering. The 141st MI uses the training area occasionally. More on training needs is found in Section 6. The 222nd headquarters is at Cedar City and is a subordinate unit to the 65th MIB, headquartered at Camp Williams.

[5] These are evaluated separately through NEPA, which screens for potential issues with endangered species.

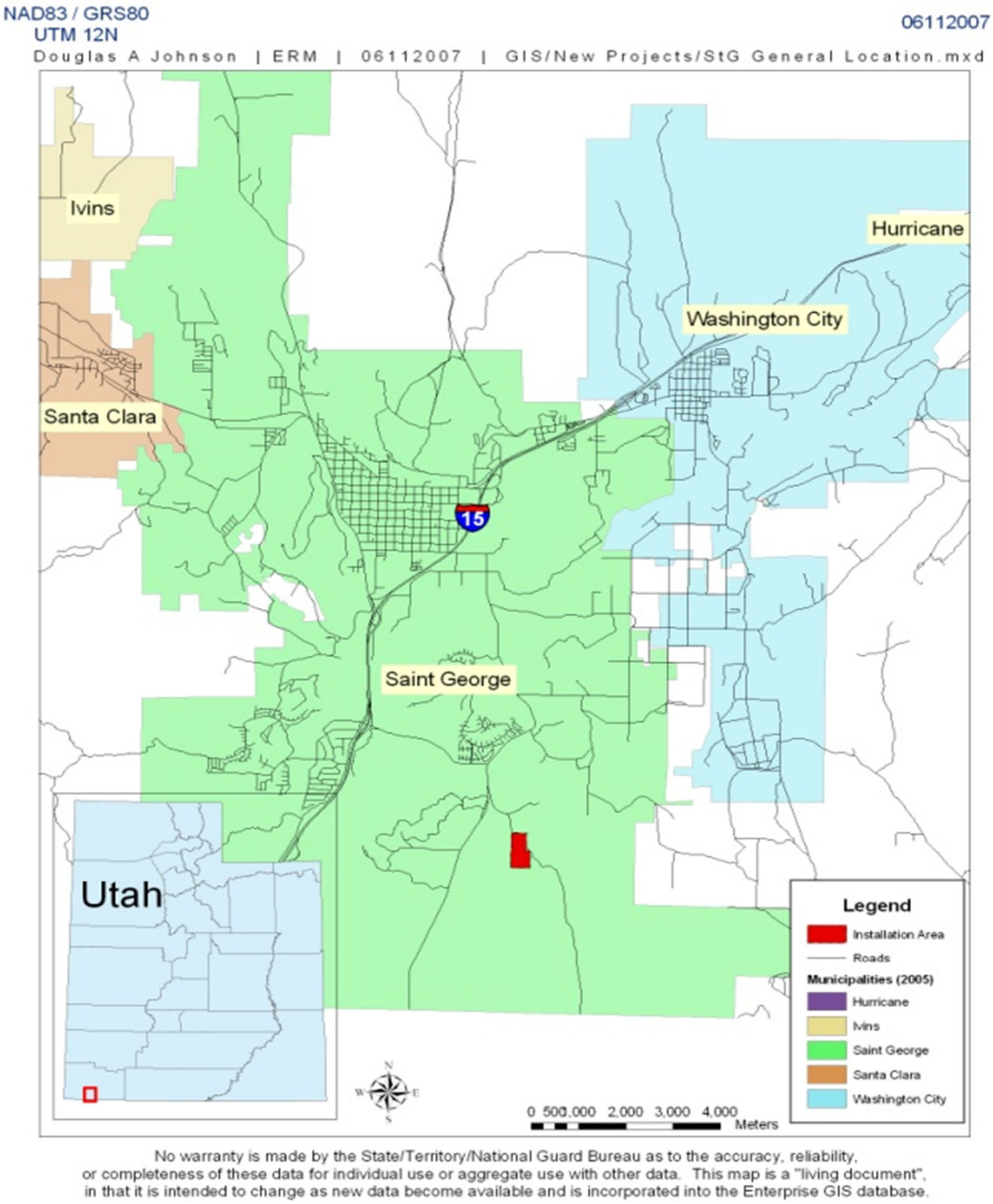

FIGURE 3-1 GENERAL LOCATION OF THE ST. GEORGE ARMORY.

3.4 SURROUNDING LAND USE

The Armory is within the rapidly developing and expanding Fort Pierce Industrial Park (Figure 3-2). The park has less than 2% vacancy and much of the surrounding land has been developed. In the last 10 years, all surrounding land except for the easternmost edge of the southern border has been developed.

3.5 LOCAL AND REGIONAL NATURAL AREAS

The St. George area has a unique set of edaphic, climatic and landform characteristics that supports various endemic or rare plants and animals. Three endangered plants, the dwarf bear-poppy, Siler's pincushion cactus, and Holmgren milkvetch, are found on or close to the Armory.

The USFWS designated critical habitat for Holmgren milk-vetch about two kilometers to the west and elsewhere in the greater St. George area. As of 2013, the entire length of the Virgin River, which runs approximately 10 kilometers to the north, is designated as Critical Habitat for the southwestern willow flycatcher (*Empodonax traillii extimus*) (USFWS 2013). The BLM has Areas of Critical Environmental Concern (ACEC) within 10 kilometers to the east and west. Areas proposed for wilderness status are found to the west and northeast. Finally, while some distance away, Snow Canyon State Park is found to the northwest of St. George and Zion National Park to the northeast.

3.6 WHITE DOME NATURE PRESERVE[6]

White Dome, the most significant local land feature, is found about 2 km directly to the south and was a favorite site for ATV use. The Nature Conservancy (TNC), Utah Department of Transportation (UDOT), and SITLA established the 800-acre White Dome Nature Preserve, directly south of the Armory, to protect the dwarf bear-poppy and Siler's pincushion cactus. The habitat of these areas is identical with some of the armory lands. The Preserve is open to the public for hiking, but all mechanized travel and recreation is prohibited there. There is connecting wild land between the southeastern corner of the Armory and the Preserve, though a dirt road runs between the Armory and the Preserve proper.

[6] https://www.nature.org/en-us/get-involved/how-to-help/places-we-protect/white-dome-nature-preserve/

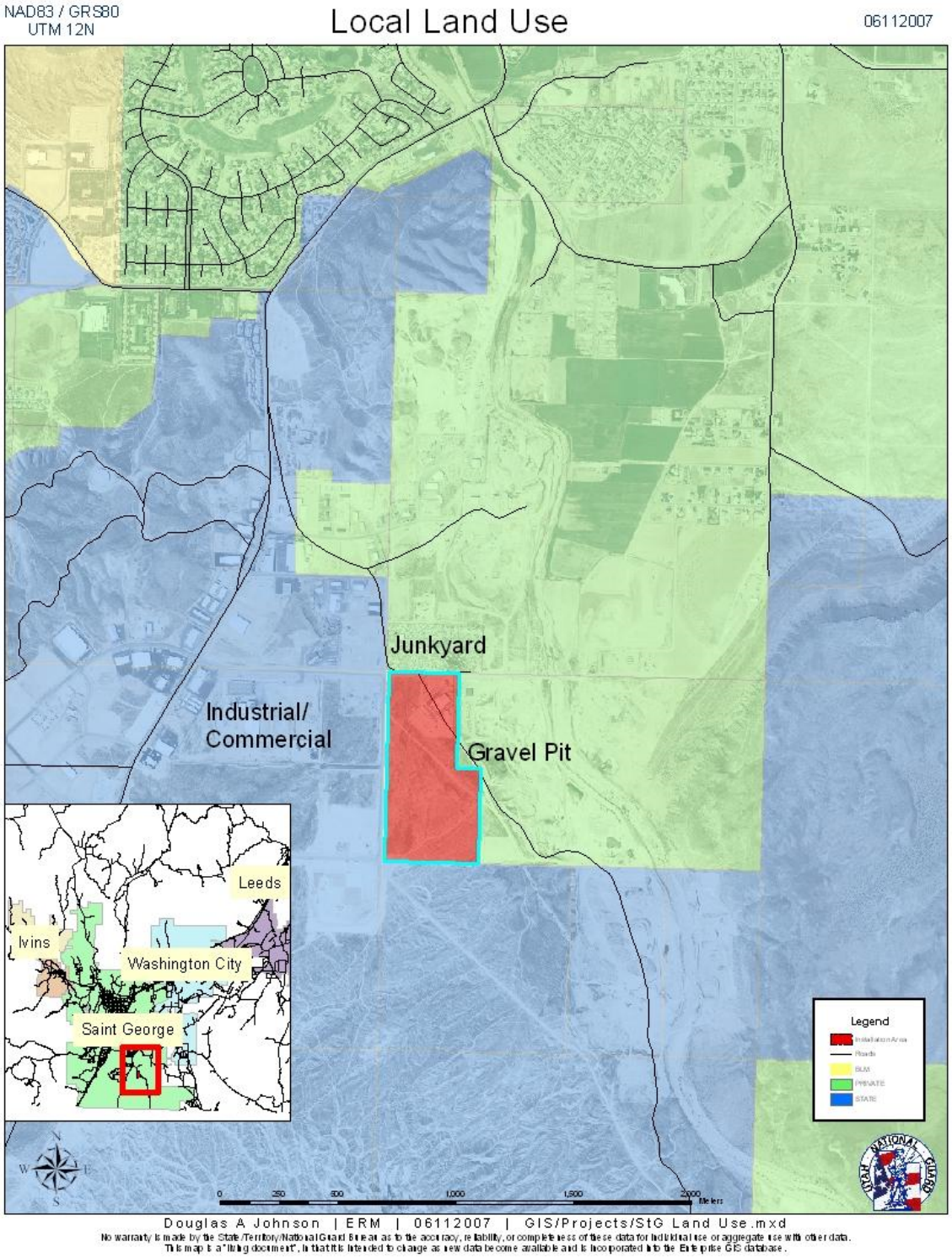

FIGURE 3-2 LAND USE AROUND THE ARMORY.

4 ECOSYSTEMS AND THE PHYSICAL AND BIOLOGICAL ENVIRONMENT

4.1 CLIMATE

The City of St. George lies on the north end of the Mojave Desert, which ecologists classify as an arid region. Characteristically, the area has hot summers, mild winters and evenly scattered monthly precipitation (Table 4-1). Summer rain comes from intense thunderstorms. Annual precipitation is low and is the major influence on vegetation establishment and community types. Some parts of the area in and around St. George have been recorded as having as low as 15 centimeters (cm) of rain yearly (Crane, 1991).

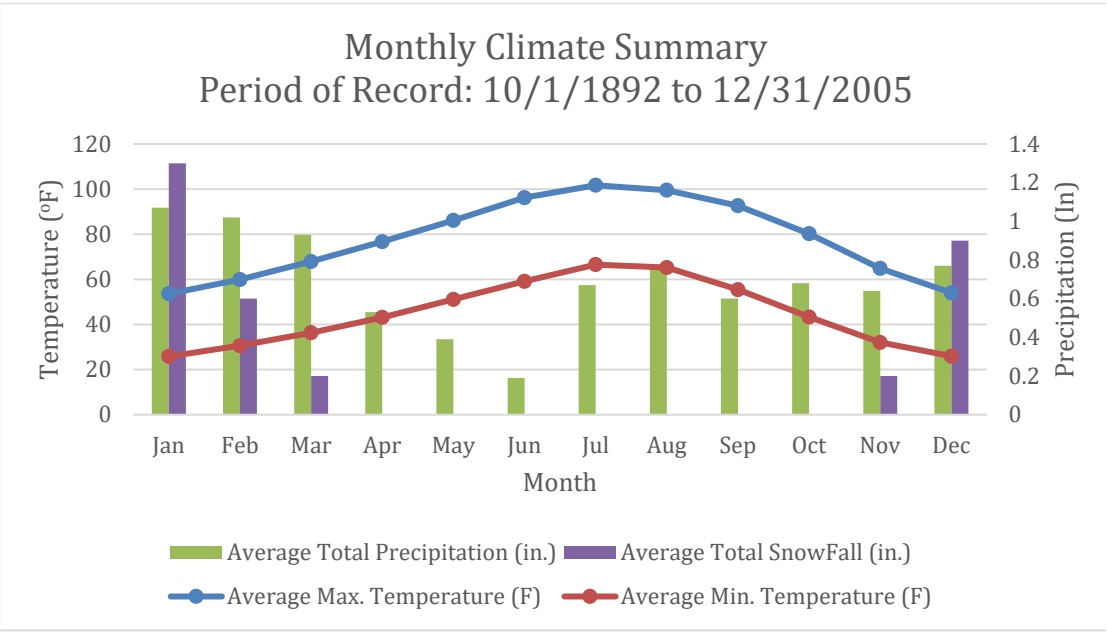

FIGURE 4-1 MONTHLY CLIMATE SUMMARY.

HTTPS://WRCC.DRI.EDU/CGI-BIN/CLIMAIN.PL?UTSTGE, ACCESSED 5/2/19.

4.2 LANDFORMS

The St. George Armory is located between the Colorado Plateau and Basin Range Physiographic Provinces. The area is part of the Colorado River drainage and the armory is found on top of alluvial fans. Fault lines are present within the western portion of the High Plateaus of the Colorado Plateau as well as in Hurricane. The installation is at roughly 800 meters elevation. The slope of the area is less than 5% and intermittent drainage runs through the northwest corner (Crane, 1991). The dominant feature in the immediate vicinity is White Dome, a small hill about 200 meters high (See section 3.6.1).

Alongside the physiography of the area, there are also several landforms that are of regional importance. Washington Dome is the middle of three structural domes along the length of the 40-mile-long (64 km), northeast-trending Virgin anticline, each of which exposes the Lower Permian Harrisburg Member of the Kaibab Formation. The Virgin anticline likely formed in the Late Cretaceous (85-72 million years ago) above a blind thrust fault in Cambrian Bright Angel Shale, and effectively marks the eastern limit of significant Sevier-age compressional deformation in southwest Utah (Biek and Hayden, 2007).

4.3 GEOLOGY

The AAPG Bulletin provides the following information on the history of the areas geology, “Cambrian quartzite rests uncomfortably on pre-Cambrian igneous rocks, and is overlain by as much as 20,000 feet of strata, which record frequent oscillations during the Paleozoic and Mesozoic, a period of uplift and erosion just prior to the Cretaceous, a period of orogeny during the late Cretaceous or early Tertiary (Laramide revolution), and post-Laramide thrust and normal faulting down to rather recent time” (Dobbin, 1939).

The dwarf bear-poppy is gypsophillic, and only grows on gypsum outcrops of the Shnabkaib, Middle Red and Upper Red Members of the Moenkopi Formation (USFWS 1985; Nelson and Welsh 1993) (Figure 4-2).

Holmgren's milkvetch is another endangered plant that only grows on specific geologic layers, primarily on the Virgin Limestone member of the Moenkopi formation. The largest population occurs in the Atkinville Wash and extends east across the I-15 and to the south into the northern part of Mohave County, AZ. All together there are 6 populations all within 10 miles of Saint George. The Saint George Armory looks like falls within the boundaries of the Central Valley population (Van Buren and Harper 2003), although the armory is outside of designated critical habitat.

Within the Virgin Limestone member of the Moenkopi formation Holmgren's milkvetch grows on the skirt edges of hills and plateau formations slightly above the edge of drainage areas. These soils tend to be small stone and gravel deposits with less than 20% plant cover.

Three of these geologic units occur within the UNG Saint George Armory border, including the Virgin Limestone Member of the Moenkopi Formation, the Middle Red Member of the Moenkopi Formation and the Shnabkaib Member of the Moenkopi Formation. This means that there is 16.2 acres of potential Holmgren's milkvetch habitat and 12.4 acres of dwarf bearclaw-poppy and Siler's pincushion cactus habitat.

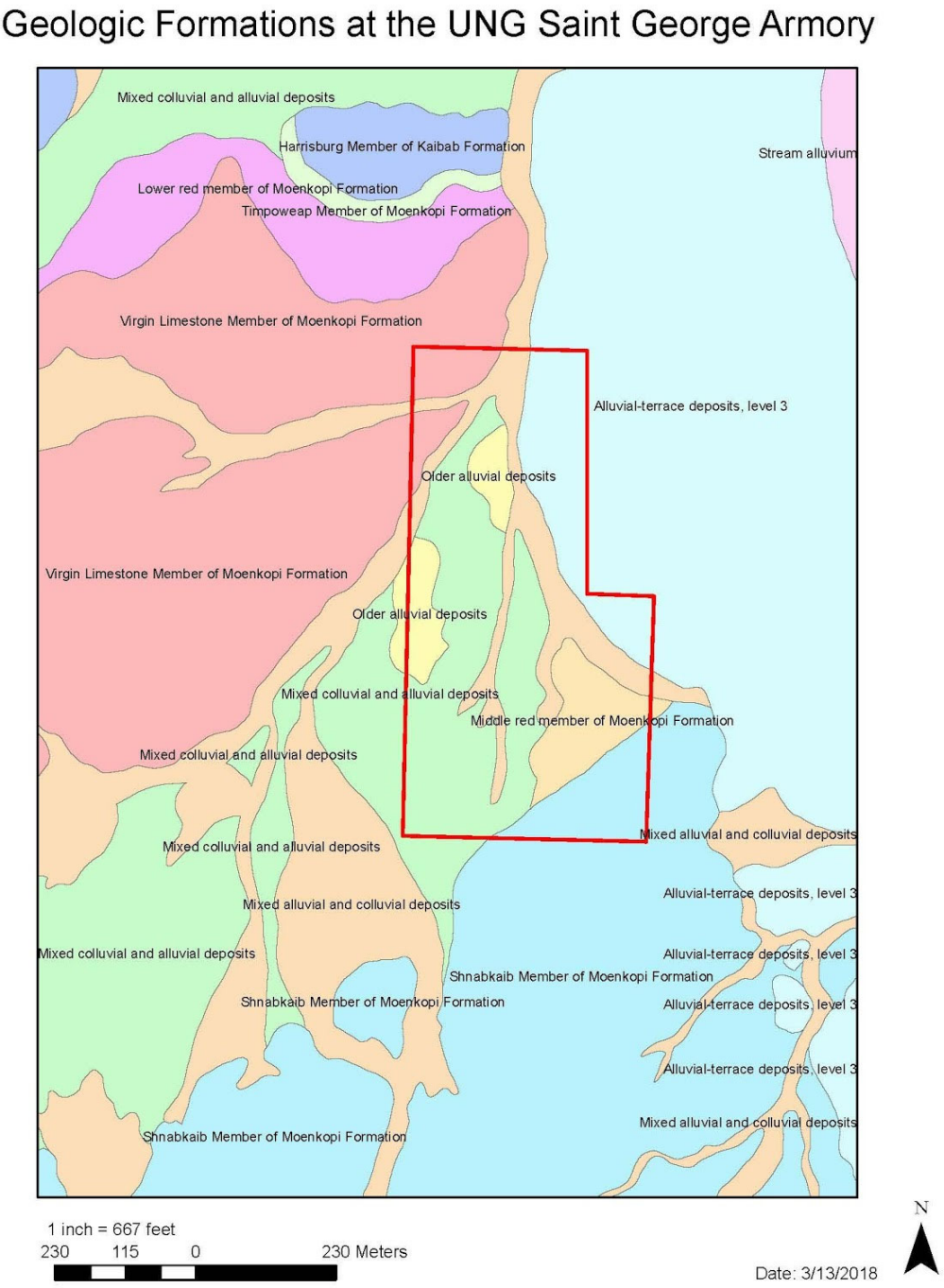

FIGURE 4-2 MAP OF THE GEOLOGICAL UNITS IN AND AROUND THE UNG SAINT GEORGE ARMORY (RED POLYGON).

4.4 SOILS

There are two main grades of soil in the boundaries of the installation (Mortensen et al., 1977)[7] (Figure 4-4). The Soil Conservation Service (SCS)[8] classified the soil at the south end of the armory as Badlands (BA). Found at the north end of the armory is soil that is classified as 'LaVerkin Series' soil (LcC).

4.4.1 BADLAND SOIL

"Badland (BA) consists of nearly barren, multicolored beds of actively eroding shale, shale interbedded with sandstone, and shale interbedded with layers of gypsum. The landscape is rolling and severely dissected, and channels of intermittent streams form a branching pattern." Included with this land type in mapping are small areas of shallow soils in drainage ways.

Badland supports only a sparse stand of vegetation. The SCS classified it as used mainly for aesthetic purposes: not worth irrigating (capability unit VIIIs-3, non-irrigated) and poor wildlife habitat (wildlife suitability group 4444).

Runoff is rapid. Erosion and sediment potential is high during intense thunderstorms in summer. Because of the presence of BA within the St. George Armory, it is difficult for flora to thrive on the property. The cryptobiotic[9] crust is critical for land surface stability and holding nutrients.

4.4.2 LAVERKIN SERIES

"The LaVerkin (LcC) series consists of well-drained soils on alluvial fans, in valleys, and on stream terraces. These soils formed in mixed alluvium washed from limestone, sandstone, and shale." Slopes range from 1 to 5 percent. Elevation is 2,650 to 3,300 feet. The native vegetation is desert shrubs, grasses, and cactus. Average annual precipitation is 8 to 11 inches; average annual air temperature is 57 to 67 degrees F, and the frost-free period is 190 to 195 days. La Verkin soils are commonly associated with Hantz, Leeds, Nikey, and Tobler soils. In a representative profile, the surface layer is brown fine sandy loam about 3 inches thick. The subsoil is reddish-brown fine sandy loam or sandy clay loam about 27 inches thick. The substratum is reddish-brown and light reddish-brown sandy clay loam to a depth of 60 inches.

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[7] Soils are defined and identified in the Soil Survey of Washington County Area, Utah by the U.S. Department of Agriculture Soil Conservation Service and U.S. Department of the Interior, Bureau of Land Management and National Park Service In cooperation with Utah Agricultural Experiment Station issued in October 1977. *The Soil Survey of Washington County* provides more information on the descriptions, effects and other specific details pertaining to soil types/grades and their respective effects within the overall county.

[8] Now reorganized as the Natural Resources Conservation Service (NRCS).

[9] Cryptobiotic crust is also referred to as cryptogamic or microbiotic, and as crust or soil. It is a complex of algae, moss, lichens and the like on the soil surface and is important to desert ecosystems.

Permeability is moderate. Available water capacity is 7.5 to 10 inches to a depth of 5 feet. The water supplying capacity is 5 to 6 inches. Roots penetrate to a depth of 5 feet or more. The SCS classified LcC soils as used for irrigated crops, range, and wildlife habitat. Some of the better soil areas in Washington County are used for irrigated crops. The Tobler-Harrisburg-Junction (THJ) supports sugar beet seed, small grain, milo, alfalfa, pasture and sorgum for silage purposes. Certain THJ areas are also used for urban means.

4.4.3 SOIL IMPORTANCE

The dwarf bear-poppy is gypsophillic, and only grows on gypsum outcrops of the Shnabkaib, Middle Red and Upper Red Members of the Moenkopi Formation (USFWS 1985; Nelson and Welsh 1993). On the armory, the geologic layers with endangered plants are represented by the BA soils. The unique soil, however, has become a commodity among consumers in recent years because of the need for developers to use the gypsum for sheetrock in urban expansion. While metropolitan growth is important, demand has exceeded supply, resulting in several gypsum-dependent species struggling for existence within the area; particularly the dwarf bear-poppy. Washington County, Utah is the only place where this plant exists. According to TNC, “Human impacts, including development and off-road vehicle use, continue to destroy the poppies and their habitat, and impair key plant life-cycle processes, such as pollination visits… The dwarf bear poppy is pollinated by a rare ground-dwelling bee” (The Nature Conservancy, 2007). Ground disturbance destroys the nutrient rich microbiotic crust soil surface, causing nutrient loss, increasing erosion, and resulting in the death of rare ground-dwelling bees. “When an area becomes disrupted, such as the removal of vegetation, soil erosion may increase to unacceptable levels. This is a problem in semiarid rangelands where rain is not high enough to regenerate a timely protective vegetation cover (UT-ERM, 2007).”

4.5 HYDROLOGY

The study of water on or below the surface and its particular distribution is important when considering the types and boundaries of vegetation that are able to thrive within a given area.

According to the St. George Environmental Assessment, “There are no surface water resources on the Armory/OMS property. The property is situated between the Virgin River to the west and Fort Pierce Wash to the east, and outside any designated aquifers, water protection zones, or municipal watershed” (Crane, 1991). The armory itself has little effect on the groundwater. The wetland plant species in the Table 5-1 are from a leak from a 12” pipe running water across our land to the neighboring gravel pit. The pipe was removed several years ago and the plants have since died out.

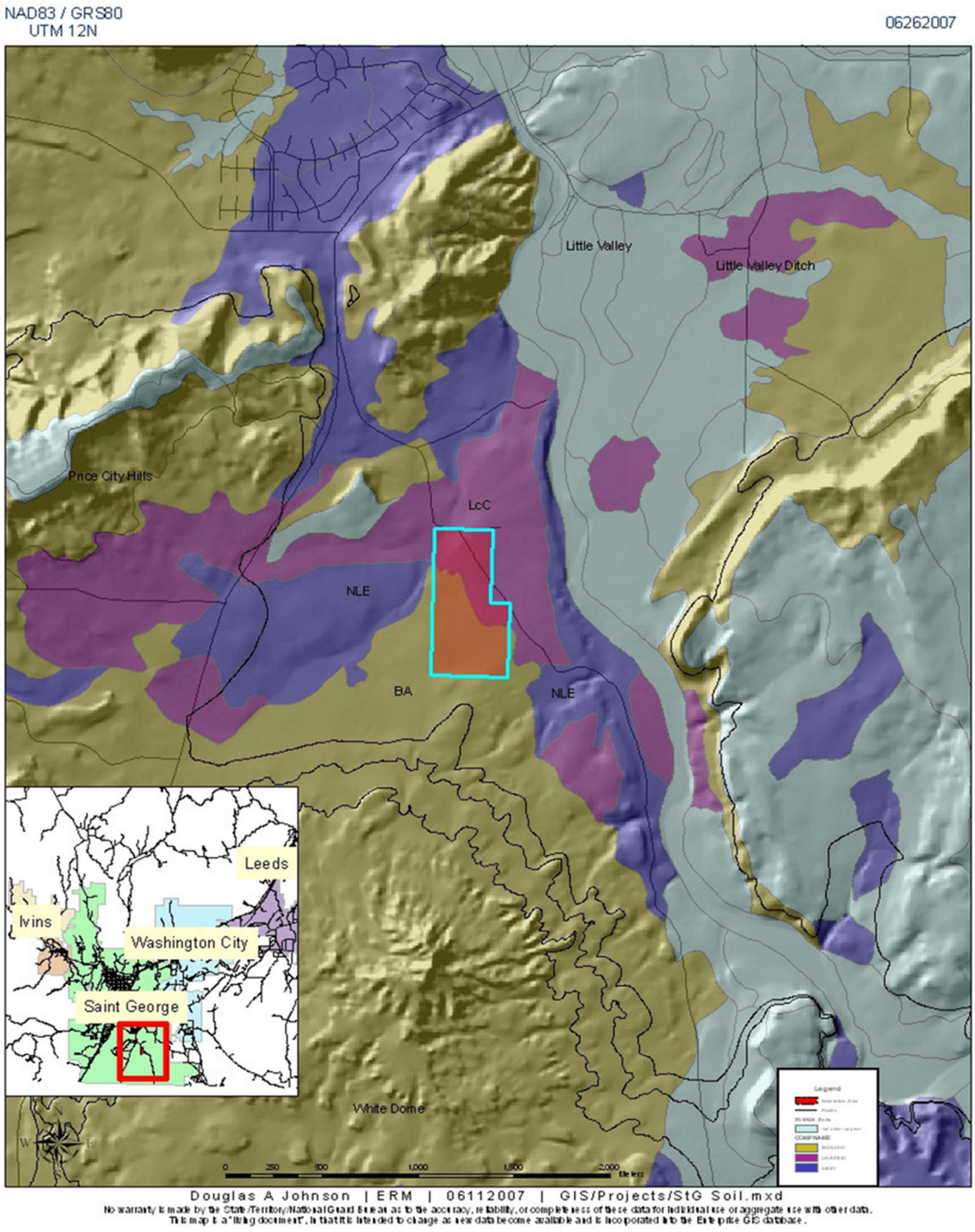

FIGURE 4-3 SOILS.

4.6 ECOSYSTEM CLASSIFICATION

Major Land Resource Areas (MLRA) are geographically associated land resource units that reflect nearly homogeneous areas of land use, elevation, topography, climate, water resources, potential vegetation, and soils (NRCS, 2006). The St. George Armory is within MLRA 30 – Mojave Desert of the D-Western Range and Irrigated Region. This MLRA is characterized by isolated, short mountain ranges separated by aggraded desert plains, low precipitation, high temperatures, and low vegetative production.

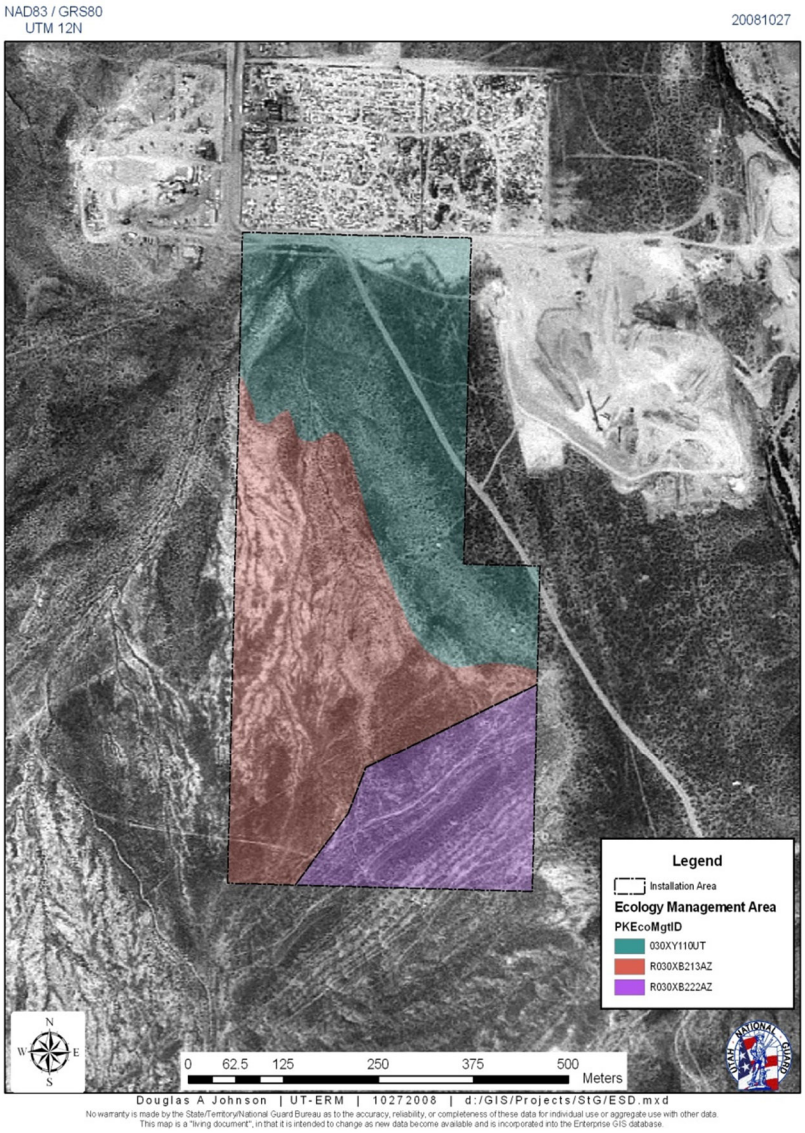

FIGURE 4-3 ECOLOGICAL SITE DESCRIPTION TYPES FOR THE ST. GEORGE ARMORY.

The Vegetation Planning Level Survey (Johnson, 2010) delineated three NRCS Ecological Sites Types (Descriptions; ESD)(NRCS, 2007a)(Figure 5-1). The major land management agencies (such as the Forest Service and BLM) are moving toward the use of ESDs based on state-and-transition models (Laycock, 1991; Stringham et al., 2002). The ESDs offer a comprehensive approach to site characterization and comparisons of management and information among agencies.

The northern portion is characterized by R030XY110UT – Desert Loam (Creosotebush) (NRCS, 2007b)[10]. The type's dominant vegetation is creosotebush (*Larrea tridentata*), often with a big galleta grass (*Pleuraphis rigida* (formerly *Hilaria* sp.)) understory. Soils are moderately deep and well-drained. It is sensitive to disturbance and rapid weed invasions.

Most of the training ground is R030XB213AZ – Gypsum Upland 6-9" p.z. Alkaline (NRCS, 2007c)[11]. Dominant vegetation for this type is shadscale saltbush (*Atriplex confertifolia*) and Nevada Mormon tea (*Ephedra nevadensis*). Soils are deep, well-drained colluviums. Vegetation production is low. The ephedra found on this and the following site type appears to be *E. torreyana* or a hybrid between the two (Johnson, 2010), but this should not affect the ESDs' usefulness. Red brome and other weed invade under disturbance.

The low hills in the southeastern corner are a related type, R030XB222AZ – Gypsum Hills 6-9" p.z. Alkaline (NRCS, 2007d)[12]. Again, the dominant vegetation for the type is shadscale saltbush and Nevada Mormon tea. Soils are shallow to hard gypsite, with a high erosion hazard.

4.7 VEGETATION

This land historically and currently supports thin stands of vegetation. The principle dominant vegetation is native shrubs, such as Torrey's jointfir, creosotebush, shadscale saltbush, and greasewood (Table 5-1)(Johnson, 2010).

[10] For more information, see http://esis.sc.egov.usda.gov/esis_report/fsReport.aspx?id=R030XY110UT&rptLevel=all&approved=yes.

[11] For more information, see http://esis.sc.egov.usda.gov/esis_report/fsReport.aspx?id=R030XB213AZ&rptLevel=all&approved=yes.

[12] For more information see http://esis.sc.egov.usda.gov/esis_report/fsReport.aspx?id=R030XB222AZ&rptLevel=all&approved=yes.

TABLE 4-1 VEGETATION BY ECOLOGICAL SITE DESCRIPTION.

	Name	Origin[13]	Ecological Site		
			030XB213AZ	030XB222AZ	030XY110UT
	Baretwig neststraw (*Stylocline psilocarphoides*)	N	X		X
	Broad-leaved cattail (*Typhia latifolia*)	N			X
	Dwarf bear-poppy (*Arctomecon humilis*)				
	- Endangered	N		X	
	Desert marigold (*Baileya multiradiata*)	N			X
	Desert trumpet (*Eriogonium inflatum*)	N	X		
	Fendler's euphorb (*Chamaesyce fendleri*)	N	X		
Forbs	Newberry's twinpod (*Physaria newberryi*)	N	X	X	
	Nuttall's rockcress (*Arabis nuttallii*)	N			X
	Pacific popcornflower (*Plagiobothrys tenellus*)	N			X
	Redray alpinegold (*Hulsea heterochroma*)	N	X		
	Stokes' buckwheat (*Eriogonum subreniforme*)	N		X	
	African mustard (*Malcolmia africana*)	I	X	X	X
	Asthmaweed (*Conyza bonariensis*)	I	X		
	Barbwire Russian thistle (*Salsola paulsenii*)	I	X		

[13] "N" – native; "I" – Introduced.

	Name	Origin[13]	Ecological Site		
			030XB213AZ	030XB222AZ	030XY110UT
	Broadleaved pepperweed (*Lepidium latifolium*)[14] - Noxious Weed	I			X
	Crossflower (*Chorispora tenella*)	I	X		
	Prickly Russian thistle (*Salsola tragus*)	I	X		
	Prostrate pigweed (*Amaranthus albus*)	I	X		
	Redstem stork's bill (*Erodium cicutarium*)	I	X		X
	Dropseed (*Sporobolus* sp)	N	X		
	Jame's galleta (*Pleuraphis jamesii*)	N	X		
Grass	Low woollygrass (*Dasycholoa pulchella*)	N	X		
	Pine dropseed (*Blepharoneuron tricholepis*)	N	X		
	Red brome (*Bromus rubens*)	I	X	X	X
Cactus	Buck-horn cholla (*Cylindropuntia acanthocarpa*)	N	X	X	
	Plains pricklepear (*Opuntia polycantha*)	N	X		
	Burrobush (*Hymenoclea salsola*)	N	X		
	Desert globemallow (*Sphaeralcea ambigua*)	N	X		
Subshrub	Fremont's pepperplant (*Lepidium fremontii*)	N	X	X	
	Rubber rabbitbrush (*Ericameria nauseosa* ssp. *Consimilis*)	N	X		
	Shadscale saltbush (*Atriplex confertifolia*)	N	X	X	X

[14] Broadleaved pepperweed is also commonly called perennial pepperweed.

	Name	Origin[13]	Ecological Site		
			030XB213AZ	030XB222AZ	030XY110UT
Shrub	Slender poreleaf (*Porophyllum gracile*)	N	X	X	X
	Smallflower globemallow (*Sphaeralcea parvifolia*)	N	X	X	
	Torrey's jointfir (*Ephedra torreyana*)	N	X	X	X
	Threadleaf snakeweed (*Gutierrezia microcephala*)	N	X		
	Winterfat (*Krasheninnikovia lanata*)	N	X		
	Creosote Bush (*Larrea tridentata*)	N	X		X
	Fourwing saltbush (*Atriplex canescens*)	N	X		
	Fremont's dalea (*Psorothamnus fremontii*)	N	X		X
	Greasewood (*Sarcobatus vermiculatus*)	N	X		X
	Narrowleaf willow (*Salix exigua*)	N			X
	Water jacket (*Lycium andersonii*)	N	X		
Tree	Catclaw acacia (*Acacia greggii*)	N	X		
	Saltcedar (*Tamarix ramosissima*) – Noxious Weed[15]	I			X

There is a diverse understory of forbs and grasses, but it has been invaded by successive weeds, starting with redstem stork's bill and red brome to currently (2018-19) African mustard (a Utah Class 1B: Early Detection Rapid Response (EDRR) Noxious Weed)[16], and Russian thistle. These occur across all vegetation types and into the landscaping. Another weed, saltcedar, won't spread outside channels, but deserves management attention as a Utah Class 3: Containment Noxious weed.

[15] Also commonly called tamarisk.

[16] https://ag.utah.gov/divs-progs/50-plants-and-pests/hay-grain-seed/599-noxious-weed-list.html

UT-ERM conducts regular vegetation monitoring of the Armory site. Results of the 2018 monitoring are summarized in figure 5-2. In 2018, weeds made up approximately 8% of the aerial cover in the Wash area and about 4% in the Flat area, while the weed cover was negligible in the Exclosure area[17]. The Exclosure area had a much higher cover of biological crust and significantly less bare soil (about 32% bare soil) than either the Wash or Flat area, which had approximately 60% and 64% bare soil, respectively. All three areas had low cover of shrubs and native grass (<10%).

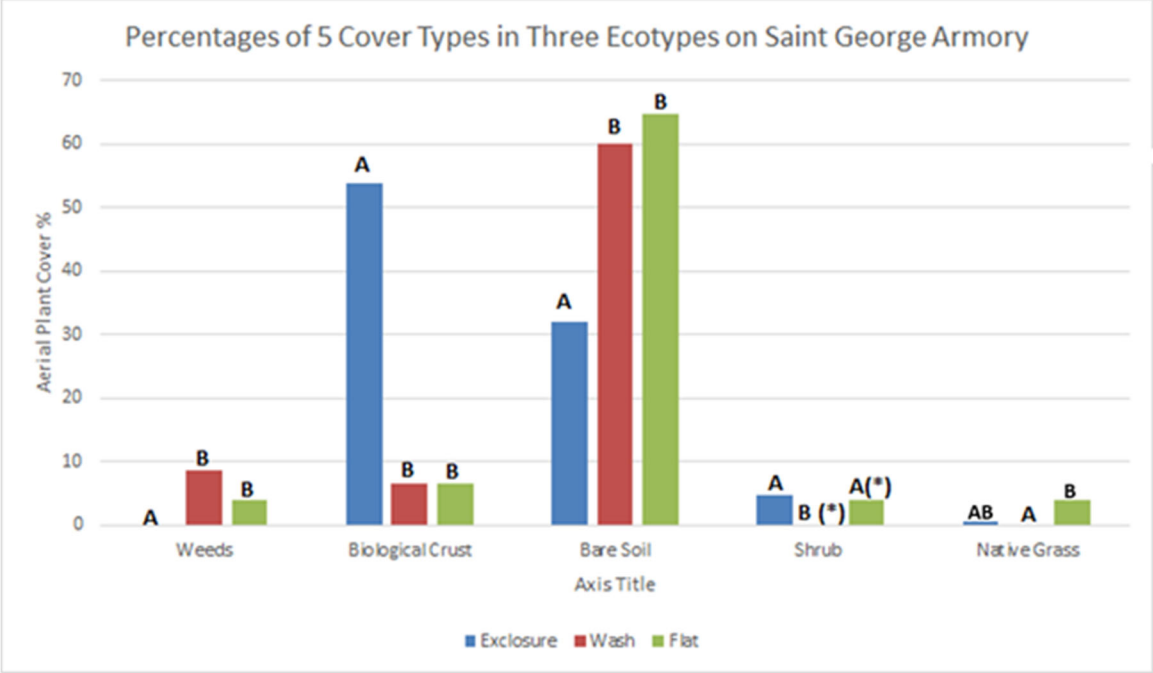

FIGURE 4-4 COVER IN THE 3 ECOLOGICAL SITES.

[17] The report categorized the ecological sites present at the Armory as follows: the "Exclosure" area corresponds to R030XB222AZ, the "Flats" area corresponds to R030XB213AZ, and the "Wash" corresponds to R030XY110UT.

All three ecological types should have a well-developed microbiotic crust (Figure 5-2). Microbiotic crusts are composed of various small living organisms concentrated in the top several centimeters of the soil. They contribute to a properly functioning environment, far outweighing their size, including soil stability, atmospheric N-fixation, nutrient cycling, water relations, infiltration, seedling germination, and plant growth (Johnston, 1997). While adapted to severe climate, they are easily lost to trampling and other disturbances and not easily recovered. Further, loss leads to soil erosion and invasion by exotic annuals (Watts, 1998).

FIGURE 4-5 MICROBIOTIC CRUSTS ARE A MIXTURE OF ALGAE, CYANOBACTERIA, LICHEN AND MOSS IN THE SOIL SURFACE LAYER.

Many of the wetland plants, including cattial and the willow, were associated with a leak in a 12" pipe running water across our property to the neighboring gravel pit. The pipe was removed several years ago and the plants have consequently died out.

4.8 WILDLIFE

The small size of the armory, the desert ecosystem, and the surrounding land use limits wildlife diversity within the area. UT-ERM through the Fauna PLS and subsequent surveys and monitoring have documented 7 species of lizards, 28 birds (26 are Migratory Birds)[18] and 7 mammals (3 are domestic)(Stoner and Newbold, 2006). The PLS looked at the armory, a now-defunct bordering Local Training Area (LTA), and at neighboring SITLA lands as a comparison. The PLS has been updated by reptile, avian and mammal surveys from 2009 to 2018.

4.9 HERPTOFAUNA

Wildlife biologists found five species of lizards during initial surveys (Stoner and Newbold, 2006). They did not note any snakes during the single night-driving survey along the perimeter of the site, nor have any been seen during many site visits by UT-ERM staff. Table 5-2 summarizes the composition and relative abundance (RA) of non-listed species encountered during initial surveys on all properties. These species included: side-blotched lizards, western whiptail lizards, long-nosed leopard lizards, and Great Basin collared.

[18] ttps://www.fws.gov/birds/management/managed-species/migratory-bird-treaty-act-protected-species.php

TABLE 4-2 HERTOFAUNA ABUNDANCE.

Family/ Species	Armory	RA[1]	LTA	RA	SITLA	RA	Other	RA	Total
TEIIDAE									
Western Whiptail lizard (*Aspidoscelis tigris*)			14	38	4	80			18
PHRYNOSOMATIDAE									
Side-blotched lizard (*Uta stansburiana*)	3	75	21	57	1	20	3	60	28
CROTAPHYTIDAE									
Long-nosed leopard lizard (*Gambelia wislizenii*)	1	25	2	5			1	20	4
Great Basin collared lizard (*Crotaphytus bicinctores*)							1	20	1
PHRYNOSOMA									
Desert horned lizard (*Phynosoma platyrhinos*)	X[2]								
Western fence lizard (Sceloporus goccidentalis)	X[2]								
Utah banded gecko (Coleonyx variegatus utahensis)	X[2]								

1 – RA is relative abundance (%) over the four landownership types surveyed.

2 – UT-ERM staff surveys and observation, 2009-2019.

Side-blotched lizards were the most common lizards noted in the area. These and sagebrush lizards (*Scelpoperus graciosus*) tend to be the most visible reptiles. Side-blotched lizards feed on various insects, scorpions, and spiders (Stebbins 2003). Western whiptail lizards were also common (Table 5-2). These lizards tend to be found in areas with less dense vegetation and open areas suitable for running. Only one collared lizard was found during surveys. Collared lizards typically occupy rocky terrain, but also can be found in gravelly, open habitat with few rocks (Stebbins, 2003). Collared lizards eat small vertebrates.

Long-nosed leopard lizards were a Tier III species in the 2005 Utah Comprehensive Wildlife Conservation Strategy, but the Utah Wildlife Action Plan was updated in 2015 and the long-nosed leopard lizard is no longer listed as a species of conservation concern or of greatest conservation need (Utah Wildlife Action Plan Joint Team, 2015). (Utah Wildlife Action Plan Joint Team, 2015). Tier III species are of conservation

concern because they are linked to at-risk habitat, have a declining population, or there is little scientific information on them (as with this lizard). They might be at-risk to be listed under the Endangered Species Act but not enough information exists. They were encountered in most of the areas searched, but in lower abundance than other lizards, perhaps reflecting their higher trophic position in the system (that is, will readily eat small lizards such as side-blotched lizards). These lizards occupy various arid and semi-arid habitats, but avoid areas of dense grass. They feed on insects, as well as small lizards, snakes, and small mammals (Stebbins, 2003).

One Utah banded gecko was observed during other field work, but has not been seen since. They were are a Tier II species in the Utah Comprehensive Wildlife Conservation Strategy (Utah Wildlife Action Plan Joint Team, 2005) and on the Utah Sensitive Species List. The Utah Banded Gecko is currently a species of greatest conservation need (GCN)(Utah Wildlife Action Plan Joint Team, 2015) and on the Utah Sensitive Species list (Utah Division of Wildlife Resources, 2017). The species is ranked a S3 on the GCN indicating they are considered vulnerable. The area was near a wash area that has been used for vehicle retrieval training.

4.10 AVIAN SPECIES

32 avian species have been documented on the armory, the now defunct LTA and neighboring SITLA lands (Table 5-4) (Stoner and Newbold, 2006). The two state sensitive species, long-billed curlew and western burrowing owl, were found adjacent to armory grounds and are discussed in section 5.4.2 Species Near the Armory.

Most bird species detected are fairly common and protected by the Migratory Bird Treaty Act. The armory is within Bird Conservation Region (BCR) 16, Southern Rockies/Colorado Plateau, but very near to BCR 33, Sonoran and Mojave Deserts. Brewer's sparrow, found on the installation, is a Bird of Conservation Concern (USFWS, 2008)[19].

[19] Https://www.fws.gov/birds/management/managed-species/migratory-bird-treaty-act-protected-species.php

FIGURE 5-5. LIST OF SPECIES OBSERVED ON THE ST. GEORGE LTA SITE STARTING IN 2009. (++ INDICATES PREVIOUSLY UNDOCUMENTED OR RECORDED SPECIES.)

Common Name	Scientific Name	4/28/2009	4/3/2010	3/22/2011	4/21/2014	4/28/2015	4/19/2017	4/5/2018
American Kestrel	*Falco sparverius*	++						+
American Robin	*Turdus migratorius*							++
American Crow	*Corvus brachyrhynchos*						+	
Black-Chinned Hummingbird	*Archilochus alexandri*					+		
Brewer's Sparrow	*Spizella breweri*					++		
Canada Goose	*Branta Canadensis*	++						
Chipping Sparrow	*Spizella passerine*		++		+			
Common Raven	*Corvus corax*	++	+	+	+			
European Starling	*Sturnus vulgaris*	+	+	+			+	+
Gambel's Quail	*Callipepla gambelii*							
Greater Roadrunner	*Geococcyx californianus*							
Horned Lark	*Eremophila alpestris*			+		+	+	+
House Finch	*Carpodacus mexicanus*			+		+	+	+
House Sparrow	*Passer domesticus*				++			
House Wren	*Troglodytes aedon*		++					
Killdeer	*Charadrius vociferous*	++			+		+	
Lark Sparrow	*Chondestes grammacus*					++		
Lesser Nighthawk	*Chordeiles acutipennis*							
Mourning Dove	*Zenaida macroura*	+	+	+	+	+	+	+
Northern Harrier	*Circus cyaneus*							
Northern Mockingbird	*Mimus polyglottos*				++	+	+	
Northern Rough-Winged Swallow	*Stelgidopteryx serripennis*	+			+			
Red-Tailed Hawk	*Buteo jamaicensis*							+
Rock Wren	*Salpinctes obsoletus*	+		+	+			+
Sage Thrasher	*Oreoscoptes montanus*					++		
Savannah Sparrow	*Passerculus sanchwichensis*							++
Says's Phoebe	*Sayornis saya*	+	+				+	+
Vesper Sparrow	*Pooecetes gramineus*		++	+	+			
Western Kingbird	*Tyrannus verticalis*	+	+		+	+	+	+
Western Meadowlark	*Sturnella neglecta*	++	+	+			+	
White-crowned Sparrow	*Zonotrichia leucophrys*	++		+		+	+	+
White-throated Sparrow	*Zonotrichia albicollis*						++	

4.10.1 MAMMALS

Four species of mammals were confirmed on the armory (Table 5-3) (Stoner and Newbold, 2006). It is likely that coyotes pass through and that kit fox are in the area. The dog, cattle, and horse are all domestic animals, but tracks of the last 2 are quite old.

TABLE 4-3 MAMMALS ON AND ADJACENT TO THE ARMORY.

Common Name	*Scientific Name*	Status	Survey Notes
Desert cottontail	*Sylvilagus audubonii*		
White-tailed antelope squirrel	*Ammospermophilus leucurus*		
kit fox	*Vulpes macrotis*	SS [1]	sign only
Coyote	*Canis latrans*		sign only
Dog	*Canis familiarus*		sign only
Cattle	*Bos taurus*		sign only
Horse	*Equus caballus*		sign only

1 Utah Species of Greatest conservation need and Species of Conservation Concern.

The kit fox is on the state species of greatest conservation need list (Utah Wildlife Action Plan Joint Team, 2015 as well as noted as a species of conservation concern on the Utah Sensitive Species list (Utah Division of Wildlife Resources 2017). The presence of fine soils and fossorial rodents suggests that SGA may be suitable habitat for the kit fox. Evidence of burrowing (complete with prey remains and scats) suggests the presence of kit foxes on nearby SITLA land. In order to gain a full understanding of area use by kit fox, further surveys would be necessary. Because no sign of kit fox has been found on the armory by UT-ERM personnel, we do not consider this a priority.

4.11 THREATENED AND ENDANGERED SPECIES

The impetus for development of this INRMP is the presence of the endangered dwarf bear-poppy, known and managed since the early 1990s, and Holmgren milkvetch, which was found on the Armory in 2016 and had a population of 7 individuals in 2018. No other threatened or endangered species are known to occur on the installation, although several sensitive species, including Siler's pincushion cactus, kit fox (*Vulpes macrotis*), and western burrowing owl (*Athene cunicularia hypugaea*), have been found immediately nearby (Stoner and Newbold, 2006)[20].

[20] The Threatened and Endangered Species (TES) Planning Level Survey (PLS) by Stoner and Newbold (2006) surveyed for all potential state and federally-listed species (e.g., desert tortoise, long-billed curlew, etc.); this report details methodology and findings. Section 5.3 Wildlife was developed primarily from information obtained through surveys for TES.

4.11.1 DWARF BEAR-POPPY

4.11.1.1 OVERVIEW

The dwarf bear-poppy was one of the first plants, on November 6, 1979, to be listed as "endangered" (44 FR 64250). It has a Global Rank of G1/S1, "Critically Imperiled, typically five or fewer occurrences or very few individuals remaining." The poppy has a high public profile (e.g., Utah Native Plant Society,; TNC, 2008).

FIGURE 4-6 DWARF BEAR-POPPIES ON GYPSUM-BASED SOILS ON LOW FOOTHILLS; WHITE DOME IS IN THE BACKGROUND.

4.11.1.2 LIFE HISTORY AND BACKGROUND

The poppy is rare because of habitat needs that restrict it to areas within 15 miles of downtown St. George. It is an obligate gypsophile (restricted to gypsum-rich soils) on Shnabkaib, Upper Red, and Middle Red members of the Moenkopi Formation, from 2,700 to 3,300 feet elevation, on the eastern edge of the Mojave Desert (Anderson, 1985; USFWS 2013). These habitats are on badland topography, characterized by erosive, non-alkaline, gypsiferous soil with a low shrink-swell capacity and obvious cryptogamic crust (Figure 5-5). The White Dome population is one of three high-density sites.

This species experiences large year-to-year fluctuations in population; a study found that the number of live individuals counted in mid-October in one population near Bloomingdale, Utah ranged between 3 and 400 between 1987 and 2002 (Harper and Van Buren, 2004). The dwarf bear-poppy appears to experience rare recruitment events when precipitation is sufficient, and ants often disperse the seeds over short distances. ARHU3 requires abundant precipitation (at least 5 cm) between February and April to produce. ARHU3 is a short-lived perennial, with seedlings generally surviving for fewer than 5 years However, (Harper and Van Buren, 2004) found that mortality was loosely correlated with water-year precipitation, February-April precipitation, and mean monthly temperature. Seeds can last up to 20 years in the soil.

FIGURE 4-7 DWARF BEAR-POPPY IN BLOOM, ABOUT 12" TALL.

Being short-lived, ARHU3 relies on a large seed bank to persist on the landscape. (Harper and Van Buren, 2004) found that ARHU3 seeds from the seedbank had 64% viability.

Historically, several native bee species, including *Eucera quadricincta*, *Anthophora lesquerellae*, *Stelis anthocopae*, and members of genera *Lasioglossum*, *Megachile*, and *Perdita* have pollinated ARHU3. European honey bees (*Apis mellifera*) also have pollinated ARHU3 (Tepedino et al.). However, in recent years many fewer native pollinators have been found visiting ARHU3 (including the probable local extinction of *Perdita meconis*, an ARHU3 specialist), and Africanized honey bees (AHB) have increased in abundance (Portman et al. 2018). Some ARHU3 individuals are reproductively self-compatible while others are reproductively self-incompatible; however, some uncertainty remains as to the relative proportion of self-compatibility of DBW individuals and populations. Generally, more fruit and more seeds per fruit result from outcrossing (xenogamy) compared to self-pollination.

4.11.1.3 STATUS

In 1998 during the annual survey, no poppy plants were noted on the armory and the main population on White Dome was drastically reduced. Such diebacks have happened before and are a response to drought or possibly other unknown causes. In 2007, for the first time since 1998, five plants were recorded on the armory and the main population to the south on White Dome seems to be recovering. In 2015, UT-ERM staff found 45 plants on or immediately adjacent (<100m) of armory property, many of which were either flowering or starting to seed.

The Armory population increased every year from 2015 to 2018, when there were 84 individuals. In 2018, 78% of the plants had crown diameters of 13 cm or smaller, though 7 plants in 2018 had crown diameters of 20 cm or greater, which may indicate that the population now has a few individuals reaching their maximum lifespan, as the poppies tend to reach their largest average size (22 cm) in their seventh growing season (Harper and Van Buren, 2004). While it is unknown what makes up a self-sustaining population, the healthy Warner Ridge site averages 15-20 plants per acre. The population within the armory grounds is currently at a similar density.

4.11.1.4 THREATS AND MANAGEMENT

The major threats to ARHU3 include continuing urban development leading to habitat destruction and fragmentation (Utah Field Office, 2016). This concern is evident near the St. George Armory where industrial development has encroached on ARHU3 habitat. Changes in pollinator communities pose a concern for ARHU3. Portman et al. (2018) hypothesized that the recent expansion of Africanized honey bees into Washington County may be the main cause of the decline in native pollinators. While the replacement of native pollinators with the AHB may not present an existential threat to ARHU3 reproduction, Portman et al. (2018) observed declining ARHU3 fruit set between 2012 and 2016.

The small size of ARHU3 populations may be raise concerns about the genetic viability of ARHU3 populations. Because the ARHU3 population on the Armory is near the While Dome Nature Preserve, it may experience gene flow though both the Armory and the White Dome Nature Preserve are isolated from other ARHU3 populations. As Tepedino et al. (2014) note, self-incompatible plants are more vulnerable to local extinction than self-compatible plants.

Climate change could affect the viability of ARHU3 populations. For example, if changes in the climate result in reduced spring precipitation, ARHU3 recruitment may be limited. Additionally, ARHU3 pollinator behavior often correlates with air temperature (Portman et al. 2018), so a general warming trend or an increase in extreme heat events during ARHU3 flowering season could also affect recruitment via pollination or plant physiological processes.

OHV use is a threat to this species because of direct impacts to plants and it destroys the biological soil crust that ARHU3 often grows in or near (Utah Field Office, 2016).

Invasive plant species, including red brome (*Bromus rubens*), cheatgrass (*Bromus tectorum*), barb-wire Russian thistle (*Salsola paulsenii*), and African mustard (*Malcomia africana*), redstem stork's-bill (*Erodium cicutarium*), and a split grass species (Schismus spp.) pose a threat to ARHU3, and USFWS lists invasives as a "potential threat" with low management potential (Utah Field Office, 2016). Many human activities, including development, OHV use, road-building, and livestock grazing, can accelerate plant invasions (Utah Field Office, 2016). A recent survey of the St. George Armory ARHU3 population found that the cover of invasive plants in the ARHU3 enclosure was less than 5%. Therefore, invasive plants may not be top concern for ARHU3 conservation at the Armory, though they should continue to be monitored.

4.11.1.5 MANAGEMENT HISTORY ON ARMORY

No threatened or endangered species were found during inspections by the BLM before the armory land was withdrawn for military use (Crane, 1991). The poppy was found in the southeast corner in 1993, after the armory buildings were built but before any training had taken place. About 20 individual plants were found in 1996 on the armory, with another 200-300 within several hundred yards south[21]. Only the southeast corner of the armory has suitable habitat (Figure 5-6).

Through consultation with the USFWS, it was decided to fence the population to exclude vehicles to limit impacts to the poppy and erosion of the friable soils. Because the poppy habitat is small (4.7 acres), the benefits of fencing to the poppy and conservation of the erodible soil outweighed the impacts to military training due to the restriction of vehicles. Impacts from ATVs are one of the two main threats identified in the Recovery Plan (Anderson and England, 1985) and noted by other interested parties, such as the Utah Native Plant Society. The fence is two-strand, smooth-wire, supported by native juniper

[21] Douglas Johnson (Natural Resources Manager, UT-ERM). 1996. Hand-drawn map.

posts, having an entry point on each side to enable modest levels of dismounted training, such as land navigation (Figure 5-7). Soldiers are educated about the poppy identification and management requirements through an awareness board within the armory (see 6.4.2.1 for further information). The dwarf bear-poppy enclosure was built to accept foot traffic, although the units have avoided any use.

FIGURE 4-8 THE ENCLOSURE FENCE WITH DISMOUNTED ENTRY POINT

4.11.2 HOLMGREN MILKVETCH

4.11.2.1 OVERVIEW

The USFWS listed this species as endangered in 2001 due to its "rarity, urban development, OHV use, grazing, displacement by invasive plants, and mineral development"[22]. The USFWS designated 2620 hectares of critical habitat for this species in 2006[23].

4.11.2.2 LIFE HISTORY

Holmgren milkvetch (*Astragalus holmgreniorum*) is a low-growing, short-lived perennial found only in a total of six populations that lie in Washington County, Utah and Mohave County, Arizona between 750 and 915 m. The USFWS listed this species as endangered in 2001 due to its "rarity, urban development, off-road vehicle (ORV) use, grazing, displacement by invasive plants, and mineral development." All together there are 6 populations all within 10 miles of Saint George. The USFWS designated 2,620 hectares of critical habitat for this species in 2006. Holmgren milkvetch populations and critical habitat are found to about 1.5 km to the west of the Armory across River Road in areas historically used to conduct UTNG training by the 222nd FA (Figure 4-9).

Holmgren milkvetch grows on the Virgin limestone, Upper Red, and Middle Red members of the Moenkopi Formation and sometimes on the Petrified Forest member of the Chinle shale Formation (Van Buren and Harper, 2003). Holmgren milkvetch is often found just above or at the edge of intermittent drainages. Because ASHO3 is often found at the edge of washes or in run-off channels near mounds, it is thought that water is a primary dispersal mechanism of AHSO3 seeds, though rodents and ground-dwelling birds may also play a role in seed dispersal[23].

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[22] 66 FR 49560 49567

[23] 71 FR 15966 16002

This species usually flowers between March and mid-May and dies back before mid-June (Van Buren and Harper, 2003). Few plants live longer than three or four years. Seedling density is strongly correlated (R=.76) with January-April. Few seedlings live longer than three or four years. Seedling density is strongly correlated (R=0.76) with January-April precipitation. Between 1994 and 2006, ASHO3 density ranged between 1 and 0.05 plants m-2 at six populations.

Several species of bee pollinate Holmgren milkvetch, including *Anthophora poterae*, (the most common pollinator of Holmgren milkvetch), *Anthophora coptognatha*, *Anthophora dammersi*, *Eucera quadricincta*, *Osmia titusi*, two species of *Dialictus*, and European honey bee (*Apis mellifera*)[23]. The Africanized honey bee may also pollinate this species (see Portman et al. 2018).

(Searle, 2011) found that AHSO3 seeds had high viability in the seed bank, with five of the six studied populations exhibiting total viability over 50%. Total viability in Searle's study was defined as the sum of the percentage of seeds germinated in a lab and the percent showing viability in a tetrazolium test. Searle also found that the average density of ASHO3 seeds in the seed bank was 4.3 seeds m^{-2}, though less than 11% of seeds placed in mesh bags and buried 2 cm in the soil germinated after 1 year despite high viability.

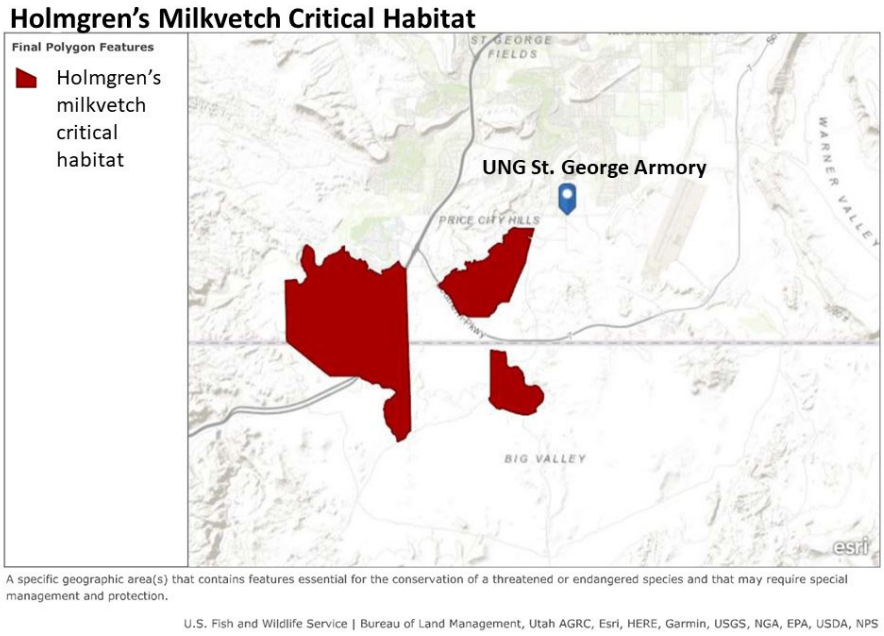

FIGURE 4-9 THE SOUTHERN PORTION OF DESIGNATED CRITICAL HABITAT FOR THE HOLMGREN MILKVETCH. THE BLUE MARKER IS THE ARMORY.

4.11.2.3 STATUS

A single individual of this species was found on the Armory in 2016, and 7 individuals were present in 2018, up from 3 in 2017. In 2017 and 2018 the plants consisted of one adult, reproductive individual with the rest seedlings. UT-ERM has installed a temporary 8' square cattle panel fence around 5 of the plants to protect the population.

During the 2019 survey no individuals of Holmgren's milkvetch were found on the armory. It was concluded that this was mostly likely due to natural cycle of the species. This conclusion was reached based on several observations supported by research. First, the population has a large range but is it not dense and dynamically shifts from one area to the other over time (Van Buren and Harper 2004). The complete die-off in a small area, like that at the armory, is only one part of a larger habitat that the population, as a whole, would be shifting through. Secondly, the majority of the plants only live to 3 years. Since the plants were found in 2016, 2017 and 2018 that would indicate the adult plant was at the end of its natural lifecycle. Lastly, seedling survival is very low (Van Buren and Harper, 2004). This would be particularly true for an isolated individual with low cross-pollinating potential. As such, a total loss of all of the seedlings in 2017 and 2018 is not unlikely.

4.11.2.4 THREATS AND MANAGEMENT

USFWS has identified several threats to this species. These include development, OHV use, invasive species, changes in fire cycles and drought severity/frequency, issues with pollinators, erosion, and herbicide use. The most pressing threat to ASHO3 is development in the St. George area. As the population in the region grows, OHV use may increase. OHV use can kill plants and promote erosion, which is a serious concern for ASHO3 because of its proclivity to grow near washes.

Invasive plant species including red brome (*Bromus rubens*), cheatgrass (*B. tectorum*), African mustard (*Malcolmia africana*), and redstem storksbill (*Erodium cicutarium*), may threaten this species via competition (Van Buren and Harper, 2003). Van Buren and Harper (2003) also found that annual exotic plant species provided more cover at sites with ASHO3 than any other group of plants, including shrubs, perennial grasses, annual natives, and nonvascular plants. They noted that because annual exotic species provided the most cover in areas where ASHO3 was found, they posed a serious threat to ASHO3, especially considering ASHO3's short life span and reliance on seedling recruitment for persistence. More research is needed on seedling competition between this species and annual exotics. Additionally, red brome and cheatgrass may alter the fire regime of ASHO3 habitat, allowing more frequent fires to occur and potentially harm ASHO3 populations[23].

It is unclear how the recent expansion of the Africanized honey bee and its partial replacement of the European honey bee in the region might affect pollination of ASHO3 (see Portman et al. 2018). Additionally, there has been a reduction in native pollinators visiting the dwarf bear-poppy, (*Arctomecon humilis*), including *Eucera quadricincta*, which also pollinates ASHO3 (Portman et al. 2018). Portman et al. (2018) posited that *E. quadricincta* has declined rather than switched to other species because it is easy to detect and has been detected rarely on other plant species. Studied solitary bees

generally have foraging distances of 150 to 1200 meters, so pollination of the Armory population may be hindered given its distance to the other ASHO3 populations (Gathmann and Tscharntke, 2002; Zurbuchen et al., 2010)[23]. Increasing human development may reduce the interchange of pollinators between ASHO3 populations.

Herbicide application can threaten ASHO3, and care should be taken when using herbicide near ASHO3 populations[23].

The Armory population may be isolated from the larger Holmgren milkvetch populations, and insufficient gene flow is a potential threat to this population.

4.11.2.5 MANAGEMENT HISTORY ON THE ARMORY

Because it was only recently discovered, there is little management history, with only establishing a small exclusion fence around the reproductive individual and several seedlings.

4.11.3 OTHER SPECIES NEAR THE ARMORY

4.11.3.1 SILER PINCUSHION CACTUS

While this plant has not been found on the armory, UT-ERM recorded it within 650 meters to the south (mid-2000s). It has similar habitat needs as the dwarf bear-poppy and is often associated with it.

4.11.3.2 LONG-BILLED CURLEW

One long-billed curlew was noted on SITLA land about 1 km from the southwestern boundary of the St. George Armory. This bird was sighted incidentally during a survey for desert tortoise on 10 June 2005.

4.11.3.3 KIT FOX

The kit fox is a year-round resident with both historic (< 1983) and current (> 1983) reports of denning activity in the desert portions of Washington County. No kit foxes were recorded during the Fauna PLS (Stoner and Newbold, 2006). However, some sign (scats, prey remains, and active burrows) were found on the immediately adjacent SITLA land previously leased by the UTNG as an LTA for tracked-vehicle maneuvering[24]. A (non-military) commercial building has now been built on the site. Stoner reported finding several long-abandoned burrows on the armory that could have been excavated by kit fox. No sign of kit fox have been otherwise noted since during annual visits.

4.11.3.4 WESTERN BURROWING OWL

During the nights of 28 May and 10 June, 2005, 10 km of habitat on and surrounding the armory were surveyed (Stoner and Newbold, 2006). Over the course of these surveys we detected at least one burrowing owl on SITLA land southeast of the LTA. In addition, UT-ERM personnel viewed a burrowing owl to the southwest of the armory and

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[24] The report by Stoner did not note how far away. Sign of kit fox were not noted during the surveys in support of an Environmental Assessment for the LTA (2002).

accidentally flushed an owl from a nest to the southeast (2006). No owls or suitable burrows have been noted during surveys on the armory itself. Suitable habitat is found in the fenced enclosure, but it lacks existing burrows.

4.12 WETLANDS

There are no wetlands on the installation or within the area that could conceivably be affected by natural resource management or military training on the armory.

5 MISSION IMPACTS ON NATURAL RESOURCES

5.1 LAND USE

The installation consists of 69.3 acres. About 11 acres have been developed as the armory building, the FMS and parking areas; the remaining lands are undeveloped wildlands. Of the remaining 58 acres of wildland, or undeveloped training ground, 4.7 acres has been fenced as a limited-use enclosure isolating the endangered dwarf bear-poppy.

Most of the undeveloped area is used for tracked vehicle, Paladins and support vehicles, maneuvering and driver familiarization training and for dismounted soldier skills. The Paladin is a fully tracked, armored vehicle with a 155 mm howitzer. According to Army Range Requirements Model (ARRM), the training doctrine needs for this unit is an impact area of at least 6,175 acres, a maximum of 77 km^2 of light maneuver area, and potential for as much as 6,251 maneuver impact miles (although the MIM needs are substantially less for each of the subunits). In discussing the maneuver area basic land requirements and Maneuver Impact Miles (MIM) need (for Camp Williams) of the 222nd with trainers of that unit, it was determined the unit could still train effectively if provided with several 'goose eggs' with an ideal diameter of 750 meters. Less than ideal goose eggs of 250-350 meter diameter could also be used for training. The goose eggs would have to be close enough that tracked vehicles could be driven between them. The current armory grounds are much too small to meet this requirement and could show significant deterioration quickly if training activities were conducted in a higher density in an attempt to meet training requirements. Also, in response to this need, the 222nd is exploring options for an LTA that will alleviate some of these effects[25].

The armory also hosts a Detachment of Company D of the 141st MI, which principally trains on roads, trails, campgrounds and other developed areas of other landholders under various agreements.

5.2 CURRENT MAJOR IMPACTS

5.2.1 PHOTOPOINT ANALYSIS

The largest impact on the natural resources, and on the training mission, is development of the industrial park. The location was chosen in 1989 because it was isolated and undeveloped. In addition, there was potential for agreements with SITLA for training use. It is now surrounded by industrial entities. Of the 10 photopoints originally put on bordering property as controls, six have been removed through development, and two more fall within the White Dome Preserve (Douglas Johnson, 2002)[26]. Repeat

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[25] It is important the units schedule use of the training area and other LTAs through RFMSS for two reasons. First, the UTNG receives land management funds based on training area use. Second, it documents the need for a LTA within the vicinity.

[26] Because so many of these plots are gone, we have not continued this monitoring.

photography from 2002 and 2008 show the development surrounding the previously isolated armory (Figure 6-1).

FIGURE 5-1 REPEAT PHOTOGRAPHY SHOWS SURROUNDING DEVELOPMENT, RESIDUAL TRACKS AND TRAINING USE ON THE SOIL, AND THE INFLUENCE OF SEASON ON VEGETATION (LEFT - 2002; RIGHT - 2008).

Repeat photography also shows the modest residual signs of tracked vehicle maneuvers on the soil surface (Figure 6-1.) While the 2002 image appears barren compared with the 2008 image, it was taken in midsummer during a drought and open spaces are common in Mojave plant communities. Since that time, red brome (an annual, invasive grass) and African mustard (noxious weed) have expanded.

5.2.2 THREATENED AND ENDANGERED SPECIES

No military land use has been noted within the dwarf bear-poppy enclosure; the only sign of human activity has been UT-ERM's footprints from monitoring from previous years.

There has been some ATV use close to the south fence, off of UTNG property and White Dome is a favorite, though illegal, ATV site for the St. George area. There is also a dirt road for mining operation access on SITLA land about 200-300 meters to the south. This road separates the armory's dwarf bear-poppy subpopulation and their pollinators from the main White Dome population, which probably has some negative effect on the armory population.

5.2.3 FORMER LTA AND NATURAL AREAS (WHITE DOME & CRITICAL HABITAT)

The St. George area has a high number of endemic species that have high visibility (Utah Native Plant Society; Center for Biological Diversity, 2005; Dave Livermore, 2007). In the late 2000s, TNC has partnered with other agencies to protect the White Dome

area with a Nature Preserve within two kilometers to the south of the armory (Dave Livermore, 2007)[27].

Much of the now defunct LTA has been developed as part of the current industrial park. The remaining area is habitat for both the dwarf bear-poppy and the Siler pincushion cactus and is off-limits to training (E2M et al., 2003).

As mentioned previously, the USFWS designated Critical Habitat for the Holmgren milkvetch about two kilometers to the west in an area where the 222nd FA historically trained[28]. The Holmgren milkvetch is often found along old trails, is low-growing (<5 cm), and is easily negatively impacted. Use of this area for future training could have consequences under the Endangered Species Act for the 222nd FA and the UTNG.

Holmgren milkvetch was found on the Armory in 2016, and a population of 7 individuals was counted in 2018. UT-ERM has installed an 8' square temporary cattle fence to protect the population. Threats to this species include invasive species such as red brome and African mustard, vehicle use (including tenant unit training), and urbanization, and habitat fragmentation (Van Buren and Harper, 2003).

No impact from training on this area has been reported. Development of these surrounding areas limits local training opportunities.

5.2.4 Pollution Concerns

There are no pollution concerns, such as permitted air or water point sources, hazardous waste, or contamination or restoration sites, which affect natural resources. The last Environmental Compliance Assessment System (ECAS) (2007) identified a small erosion feature as part of a finding that there was no procedure to deal with erosion. The site was monitored and mitigation was performed by the ITAM program. The soils are highly erodible and loss of vegetative cover may cause dust and erosion features, such as gullies, which are a problem and cause neighbor complaints (Fehmi et al., 2001).

5.2.5 Noise

The site is buffered from residential areas by the industrial park that includes a gravel quarry and manufacturers. Training occurs mostly on weekends when neighboring businesses are largely closed or causing their own noise. Therefore, noise has not been an issue.

5.2.6 Other Issues

Convoy training with wheeled vehicles is largely a nonissue as many of the surrounding roads are dirt or graveled and maintained by the county which has allowed the use of rubber-tracked or wheeled vehicles by the 222nd in the past.

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[27] Refer to Section 3.6 Local and Regional Natural Areas.

[28] Refer back to Section 3.6 for more information.

5.3 POTENTIAL FUTURE IMPACTS

Military training and preparation for combat requires realistic training in all environmental conditions. Military combat training creates ecological impacts and effects that are somewhat different from natural or other man-made disturbances (Fehmi et al., 2001). Training intensity is dictated by the need for training a competent force rather than land capacity. This is true of artillery training which does not directly depend on the vegetated environment – decisions in the field are dependent on training objectives. As much as possible, units work with environmental managers to prevent or repair environmental damage.

The effects of military, including tracked vehicle, training have been documented in the scientific literature (Fehmi et al., 2001). Potential impacts, and therefore monitoring, should focus on vegetation cover, especially changes in shrub and invasive species cover (Johnson, 1982; Shaw and Diersing, 1990; Anderson et al., 2005; Leis et al., 2005), and soil disturbance indicators, such as compaction and erosion (Thurow et al., 1993; Anderson et al., 2005).

It is likely that use and impacts will decrease with the expected replacement of the artillery battery with the support company. However, the armory is small for even one battery and any increase in the training tempo will lead to the loss of native, perennial vegetation, especially shrubs, and an increase in adverse soil disturbances. Soils of all three ecological sites are erodible and loss of vegetation may lead to gully formation and other erosion that could, in turn, negatively impact training use. This is especially true for soils of the low foothills in the northeast and southeast corners.

Military use of the armory should not impact the enclosure, the TNC preserve (White Dome), or critical habitat. Development of a new LTA in the St. George area will have its own issues and resulting NEPA analysis independent of this management plan.

The site will be monitored and evaluated for impacts through the RTLA function of the ITAM program. Training impacts will be compared and evaluated with natural resource monitoring (e.g., birds, reptiles, and weeds) to identify problems and develop solutions. The resident units will be key stakeholders where training is concerned or may be impacted. The ITAM program incorporates a combination of modification driven by Training Requirement Integration (TRI) And Land Rehabilitation And Maintenance (LRAM) for solutions to training-caused environmental issues. The U.S. Army has a vested interest in conserving its limited training lands and, therefore, the ITAM program is a core component of the Sustainable Range Program. The ITAM projects for the site are discussed in coordination with resident units and UT-ERM, then prioritized based on training need and availability of funds.

5.4 NATURAL RESOURCES NEEDED TO SUPPORT THE MILITARY MISSION

Ideally, the artillery training mission needs acreage without major obstacles such as: slopes greater than 15%; heavy vegetation; or deep or wide gullies. The artillery batteries have found the existing gullies to inhibit full use of the armory grounds, but to be useful for training in overcoming real-world hazards. These gullies, as mentioned,

are monitored; repeat photography shows they are stable and unchanged from 2002 to 2008 (Figure 6-2). Hardened crossings would allow further use of an already limited training area and would be useful for sediment control and aid in preventing future erosion of the gully. The idea of hardened crossings has been discussed with trainers and it has been determined that while the crossings would enhance training, they are not required in order to continue training. However, because of the benefits they would provide they will be included as a planned project pending funding availability. The acres available for tracked vehicle maneuver are substantially less than training doctrine needs: the main shortfall of the St. George armory site is that it is much too small.

FIGURE 5-2 SEVERAL GULLIES INHIBIT TRAINING, BUT ARE RELATIVELY STABLE (LEFT - 2002, RIGHT 2008).

5.5 NATURAL RESOURCE CONSTRAINTS TO MISSIONS AND MISSION PLANNING

5.5.1 CONSTRAINTS

The armory has several constraints to training, including a large ephemeral drainage next to the developed area, erodible soils, and the enclosure in the southeast corner of the training lands. Most artillery training has been within the Gypsum Upland 6-9" p.z. Alkaline ecological type and not on the erodible foothills (Desert Loam (Creosotebush)). Intense use of the foothills may result in problems needing mitigation through the LRAM part of the ITAM program. Maintenance of a protective vegetative cover is a key objective of this INRMP. Impacts in a desert environment are long-lasting, as shown by studies of Patton's WWII training (Prose, 1985) and difficult to stabilize or rehabilitate because of natural constraints (Anderson and Ostler; Bowker, 2007).

The dwarf bear-poppy enclosure was built to accept foot traffic, although the units have avoided any use. If they were to start using it, there may be some level at which use would have to be regulated to avoid large impacts.

The St. George area has many protected, endemic plants and animals and protected lands, such as critical habitat and nature preserves, that ought to be considered in mission planning off the armory. The primary vehicle for consideration is through submittal of a Record of Environmental Consideration, found on the UT-ERM SharePoint, under NEPA to the G3 and the UT-ERM office.

5.5.2 Training Impacts Mitigation

Training use and the potential for resulting impacts are increasing on the armory. The Environmental and ITAM Programs cooperate to mitigate training impacts. Mitigation (Land Rehabilitation and Maintenance), outside the dwarf bear-poppy enclosure, will be enacted when it is determined that training impacts have triggered erosion on the site or when it has been determined that current impacts have affected the quality of training available on the site. Mitigation will be executed with the goal of inhibiting further erosion and restoring, if possible, the land to its previous condition. Techniques of mitigation largely consist of revegetation (preferably with native species) and erosion controls, such as sediment traps and gabions. There is some concern that any mitigation in the form of re-contouring and reseeding would be less effective under current training load of the site. As of January 2019, the Armory facility is being expanded within its currently disturbed footprint. This includes expanding the motor pool into an area bladed in 2017, paving the main road into the facility, building a secure fence around the front of the facility, and constructing an addition to the main building.

6 NATURAL RESOURCES PROGRAM MANAGEMENT

6.1 NATURAL RESOURCES PROGRAM MANAGEMENT

The UT-ERM office is responsible for developing and maintaining the INRMP per the Sikes Act and DOD policies and for overseeing implementation and monitoring. The Army has divided funding responsibility among the principle proponents (see 2.4 Responsibilities)[29]. The Construction Facilities Management Office (CFMO) has responsibility for funding general erosion mitigation and weed control. The ITAM program is responsible for monitoring and mitigating military training impacts, developing training opportunities, and ensuring program compliance with the INRMP. The St. George armory is about 300 miles south of most NGUT offices, which constrains field time and on-site management.

The 222nd FA, as the chief armory tenant, through their Training Officer and Unit Environmental Compliance Officer (UECO) is responsible for ensuring compliance with the INRMP and endangered species requirements while planning for and conducting training. They are also responsible to communicate training needs to UT-ERM and ITAM.

The USFWS is the lead agency for endangered species management and a collaborator in INRMP development and maintenance. The UDWR is the other primary collaborator in the INRMP and has responsibilities in wildlife management.

6.2 GEOGRAPHIC INFORMATION SYSTEMS (GIS)

Geographic Information System (GIS) technology is essential to natural resource management, allowing staff to evaluate, communicate and manage information for effective ecosystem management and military training. The GIS program is integrated into environmental and facilities management. It is compatible with federal and state datasets and conforms to Tri-Services Spatial Data Standard where applicable and the Federal Geographic Data Committee Content Standards for Digital Geospatial Metadata (FGDC-STD-001-1998).

6.2.1 PLANNING PROCESS

The UT-ERM, Construction Facilities Maintenance Office (UT-CFMO), ITAM, and Operations (UT-G3) communicate and interface as needed for their respective planning, including for the INRMP, Integrated Cultural Resource Management Plan (ICRMP), and Master Planning.

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[29] Memorandum, DAIM-ZA, 30 Jun 05, subject: Sustainable Range Program Environmental Activities Matrix.

6.3 FISH AND WILDLIFE MANAGEMENT

6.3.1 INTRODUCTION

The primary goal for wildlife management is a holistic approach to enable training while conserving habitat to carry native species. Management of wildlife species must: 1) follow state and federal laws on threatened and endangered species; 2) uphold the training mission; 3) preserve healthy populations; and 4) be adaptive and flexible. Several animals recorded on or near the armory have management significance and need individual consideration. Management for a particular species is not carried out without consideration of their impact on the whole.

6.3.2 REPTILES

Reptiles occupy key ecological roles as scavengers and predators, controlling insects and rodents. However, reptile and amphibian populations and species diversity are declining worldwide[30]. DoD PARC Strategic Plan for Reptile Conservation and Management on Department of Defense Lands objectives state: Develop and maintain an amphibian and reptile species inventory (e.g., spreadsheets) for DoD installations with an INRMP, Maintain and make available up-to-date biological information relevant to the management of listed, at-risk, and common species, Develop training and education materials specific to DoD, Identify opportunities and/or partners to promote regional conservation and cost-sharing, for both on- and off installation efforts and Establish and maintain regular communications with OSD and the Military Services. By completing Fauna PLS and monitoring we can help achieve the DOD PARC objectives, support the military mission and successfully manage and maintain reptile populations.

The Fauna PLS has recorded seven reptile species. The UT-ERM will track population levels through a combination of visual transect surveys, cover boards or pitfall traps (Reynolds and Johnson, 2008); especially for Utah banded gecko and long-nosed leopard lizards, for which little is known (Gorrell, et al., 2005).

6.3.2.1 LEGAL REQUIREMENTS

Reptiles may not be collected from or released onto the armory without UT-ERM's written permission and a Utah Department of Natural Resources Certificate of Registration.

6.3.2.2 BEST MANAGEMENT PRACTICES

Reptiles will be best conserved through ecosystem management, through preserving healthy, native vegetation communities, especially through revegetating with native species and controlling invasive plant and wildlife species. Reptiles and their habitat will be considered in vegetation manipulation, such as mowing and herbicide use, through consultation with the UTNG Natural Resource Manager. Consult Habitat Management Guidelines for Amphibians and Reptiles of the Southwestern United States (Jones et al. 2016) when making recommendations and decisions affecting reptile habitat on Armory.

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[30] See http://www.parcplace.org, as referenced in (DOD, #662).

No impacts to training are expected from this recommendation.

6.3.3 MIGRATORY BIRDS

The USFWS identified a subset of the 1000+ species of migratory birds as priority species under Birds of Conservation Concern (BCC;[31]) (USFWS, 2008). The purpose was to identify birds of conservation value, to stimulate coordinated and early management, to address threats that may lead to listing under the Endangered Species Act, and to make management cost-effective. The BCC named priority species at the national and regional scale, but the foundation management areas were Bird Conservation Regions (BCR), regions that encompass landscapes having similar bird communities, habitats, and resource issues. Mourning doves are listed as Game Birds Below Desired Condition (GBBDC) (Table 7-2).

The DOD PIF (Partners in Flight) Strategic Plan promotes a landscape perspective in migratory bird conservation: the biggest threat is from habitat loss, fragmentation and changing natural processes, such as changing fire regimes or hydrologic cycles (DOD, 2014). A key aim of the Utah Partners in Flight (UTPIF) strategy and the DOD PIF plan is habitat conservation that preserves fully functioning natural ecosystems that support bird needs. This INRMP promotes an ecosystem focus on habitats and communities to keep the major native vegetation communities in roughly their current proportion (though diversity of vegetative age classes may be promoted).

The UTPIF Avian Conservation Strategy focuses on effective and efficient ecological management of priority bird species and their habitats within Utah (Parrish et al., 2002). Nine species found at the armory are on the Avian Conservation Strategy list. The Priority score ranges from 10-50, is a compilation of various factors, and higher numbers have a higher relative importance for management. Two of these species are priority species from the Utah Comprehensive Wildlife Conservation Strategy (Gorrell, 2005). The Long-billed curlew was a Tier II, equivalent to the Utah Species of Concern List; Gambel's Quail were Tier III, linked to at-risk habitats. The Utah Comprehensive Wildlife Conservation Strategy was set to expire in 2015, at which time the Utah Wildlife Action plan was updated and includes a species of greatest conservation need list. Neither of the fore mentioned species are included as a species of greatest conservation need or on the Utah sensitive species list.

A key goal is to incorporate recommendations into land management plans. The BCC, UTPIF, and DOD PIF strategies form the basis for prioritizing bird species for management. Table 7-2 lists the birds identified as priority species in the BCC and the UTPIF recorded on or near the armory and the management recommendations that will be implemented from the plans listed above. Note that several were found on adjacent

[31] Available at www.fwsgov/migratorybirds,AiewReportsPubiications/SpecialTopics/

BCC2008/BCC2008.pdf).

property and not actually on the armory, so management options for those species are limited.

TABLE 6-1 PRIORITY BIRDS AND MANAGEMENT STATUS

Name	BCC	Priority/ Tier[32]	Breeding and Winter Habitats	Regional Threats[33]	Management Recommendations
Black-chinned hummingbird	C	28/na	Pinyon-juniper & mountain shrub; migrant.	-	-
Gambel's quail		32/na	Low desert shrub & riparian; agriculture.	-impacts to habitat from urbanization & improper grazing; -loss of native species; -loss of fence row habitat	-monitor population response to grazing and development -manage for native species
Greater roadrunner	C	28/na	Desert shrub.	-	-
Lesser nighthawk	C	20/na	Low desert shrub & riparian; migrant.	-	-
Long-billed curlew	BCR33	34/na	Grassland & agriculture; migrant.	-predation -habitat loss	-control red fox; -manage for native vegetation; -monitor

[32] Priority is a relative weighting of a bird's vulnerability from 10 (low)-50 (high) from (Parrish et al., 2002; USFWS, 2008); Tier is an assessment of its legal status (II are state species of concern, III are of conservation concern) from the (Gorrell, 2005)

[33] Blank ("-") cells mean the two management plans (listed in the previous footnote) that this table summarizes did not include that information.

Name	BCC	Priority/ Tier[32]	Breeding and Winter Habitats	Regional Threats[33]	Management Recommendations
Mourning dove	GBBDC	14/na	Lowland riparian & agriculture.	-	-
Rock wren	C	25/na	Rock & playa.	-	watch
Say's phoebe	C	21/na	Desert shrub.	-	-
Western burrowing owl		28/II	Desert shrub & grassland.	-Urbaniza-ton destroying habitat; -informa-tion needed on population	-determine response to habitat alteration; -monitor population;

6.3.4 LEGAL REQUIREMENTS

The Migratory Bird Treaty Act protects migratory birds from take – to chase, hunt, take, capture or kill. Federal agencies are responsible to coordinate with the USFWS before an action that is likely to take birds, to develop procedures and practices to minimize the take, and to control harmful invasive species. Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, specifically directs federal agencies that are likely to have a measurable negative effect to develop and carry out a protective Memorandum of Understanding (MOU). The DOD and the USFWS have completed the conservation MOU[34].

Incidental take during military readiness exercises is addressed in a rulemaking under section 315 of the National Defense Authorization Act for FY2003 (Pub. L. 107-314, 116 Stat. 2458). Federal regulations (50 CFR) and Executive Order 13186 regulate migratory bird take and possession. For any take that does not occur as a direct result of military readiness preparation, as defined in the Director's Order, federal permits are needed to take, have, transport, and dispose of migratory birds, bird parts, nests, or eggs. When necessary, application for permits will be made to the USFWS Migratory Bird Permit Office in Denver, Colorado.

[34] Memorandum of Understanding Between The U.S. Department Of Defense And The U.S. Fish And Wildlife Service To Promote The Conservation Of Migratory Birds. 5 Sep 14.

Congress clearly expressed its intention that the Armed Forces give appropriate consideration to the protection of migratory birds when planning and executing military readiness activities, but not at the expense of diminishing the effectiveness of such activities. Any diminishment in effectiveness could impair the ability of the Armed Forces to fulfill their national security mission.

6.3.5 BEST MANAGEMENT PRACTICES

6.3.5.1 GENERAL MANAGEMENT GUIDELINES ARE TO:

Survey for these species before altering or impacting their respective habitats. Once an active nest is identified, the UTNG must avoid the nesting site or obtain a permit for removal

- Avoid the use of pesticides within their breeding habitats
- Prevent and control exotic plants
- Reestablish native grasses and shrubs and reduce weed dominance

Specific recommendations from regional plans cited above are carried out through the ecosystem management addressed in this INRMP, such as maintenance of native communities and invasive species control.

Removal of pest birds or nests requires coordination with ERM to prevent violations of the Migratory Bird Treaty Act.

No impacts to training are expected from this recommendation.

6.3.6 MAMMAL MANAGEMENT

Four native mammal species are found on or near the installation. Desert cottontails and white-tailed antelope squirrels have home ranges small enough to be contained on the installation, but are effectively managed through ecosystem-level management and do not need species-specific actions at this point. Signs of kit fox were found on the bordering, now-defunct LTA and signs of coyote have been found on the armory. No sign of kit fox have been noted in the last 15 years, but UT-ERM will survey while updating the Threatened and Endangered Species (TES) PLS. Coyotes do pass through and undoubtedly use the armory grounds, but the armory could not solely support coyote and they are unlikely to den on the grounds because of military and surrounding land uses.

6.3.6.1 LEGAL REQUIREMENTS

None

6.3.6.2 BEST MANAGEMENT PRACTICES

Do not feed wildlife. It can make pests of them that can damage equipment and structures and then require control.

No impacts to training are expected from this recommendation.

6.4 MANAGEMENT OF THREATENED AND ENDANGERED SPECIES AND HABITATS[35]

6.4.1 LEGAL REQUIREMENTS

The Endangered Species Act (ESA) was passed by Congress in 1973. Its purpose is to conserve the ecosystem on which endangered and other species, including man, depend. It was set up because of "species extinctions due to economic growth and development untempered by concern for the environment." Plant or animal species are listed as either "threatened" or "endangered" based upon determinations and studies by the USFWS, who have jurisdiction under the ESA.

The ESA (16 USC 1531-1543) requires that all federal agencies ensure that their actions do not jeopardize the existence of such species and restricts them from actions that would adversely affect the specie's environment. This responsibility extends to activities on military or any other land, and for the actions of any visiting federal, state, or private group on Guard land. Also, all federal agencies must seek to conserve endangered species through environmental monitoring and management plans. "Conserve" has been defined to mean the use of all methods and procedures that are necessary to bring any endangered species to the point at which the measures under the act are no longer necessary.

The ESA requires a three-step process for proposed actions in an endangered species' habitat. First, for the UTNG or subordinate units, the proponent must internally decide through UT-ERM whether the action might affect the species or its habitat. The action proponent will submit a REC to start this process. If the environmental office discovers there will be no impact, UT-ERM will approve the REC and the action may continue. If UT-ERM thinks there might be an adverse impact, the UTNG will consult with the USFWS under section 7 for concurrence with this finding.

If the USFWS confirms the finding and the UTNG wishes to continue, the Guard must enter formal consultation involving preparation of a Biological Assessment about the species. This may lead to an Environmental Assessment or an Environmental Impact Statement. Lastly, if the assessment finds out an impact, the UTNG must formally consult with the USFWS to receive approval to continue and to plan for mitigating actions.

6.4.2 DWARF BEAR-POPPY

One of only several major populations centers on White Dome. The armory is at the northern edge of the poppy's habitat – the gypsum-based soils only extend several hundred meters into the armory grounds. Soon after its discovery on the armory, the UTNG published an ESMP (Johnson, 1995) in coordination with the USFWS. The ESMP was maintained until 1999, when the poppies within the Armory died. The seeds

[35] The DOD and Army have produced a great deal of information on military ESA management, which can be found online.

have about 20-year viability in the soil and protection of the seed bank is important to protecting the species. In the late 2000s, UT-ERM decided there were sufficient reason to develop an INRMP. This INRMP incorporates the requirements of the ESMP and fulfills Endangered Species Act requirements.

6.4.3 MANAGEMENT

Range-wide threats to poppy populations include urban and residential development; soil compaction, erosion and vegetative denudation by ATVs; and mineral exploration (and extraction)(Anderson and England, 1985). The recovery plan lists three goals that have parallels or application to our management:

- Remove threats…enforce regulations and protect sites…manage ATV use.
- Sustain healthy populations…inventory.
- Develop public awareness…and support.

The Armory grounds are fenced and posted as a military training site and consequently receives little nonmilitary use. However, the primary tenant, 222nd FA, trains with self-propelled tracked vehicles that have a larger footprint than light dirt bikes or other privately owned ATV. Therefore, the primary action within the ESMP (Johnson, 1995) was to fence the gypsum hill habitat. The fence is checked yearly and has needed little to no maintenance.

FIGURE 6-1 THE ENCLOSURE FENCE ENABLES THE UTNG TO MANAGE IMPACTS.

The poppy is better protected on the armory than on surrounding lands (Figure 7-1). The enclosure has been maintained and checked without the vandalism that other agencies deal with daily. There are no plans to develop at least the southern half of the armory, which includes the enclosure. Events outside UTNG control – developing the industrial park in which the armory lies - may act to isolate the armory's plants from pollinators and thereby decrease the total number below a sustainable number.

In cooperation with the tenant batteries, UT-ERM developed and posted an endangered species awareness board at the armory to educate military trainers about the poppy and management requirements. UT-ERM will continue to maintain and update it as needed.

Implementation of these projects will restrict mounted training from endangered species habitat, shifting it to other parts of the installation.

6.4.4 HOLMGREN MILKVETCH

FIGURE 6-2 ENDANGERED SPECIES AWARENESS BOARD

Holmgren milkvetch is endemic to Washington County, Utah and Mohave County, Arizona, growing on Virgin Limestone Member, Schnabkaib Member and Upper Red Member of the Moenkopi Formation and occasionally on the Chinle Shale Formation (Van Buren and Harper, 2003). It was listed as endangered by USFWS in 2001 due to declining populations (USDA 2011). An individual was found on the Armory in 2016, and the known Armory population consisted of 7 individuals by 2018. USFWS has designated about 6,289 acres as critical habitat for this species, some of which lies about 1.5 km west of the Armory. This species is pollinated by native bees, including *Anthophora poterae*, *Osmia titusi*, *Eucera quadricincta*, and two species of *Dialictus* (USDA 2011). This species is very sensitive to later winter and spring precipitation, and seedling density shows a strong positive relationship with January-April precipitation (Van Buren and Harper, 2003).

6.4.4.1 MANAGEMENT

Threats to Holmgren milkvetch include urbanization, invasive species like red brome, habitat loss and fragmentation, and vehicle use (Van Buren and Harper, 2003). Holmgren milkvetch is a short-lived perennial, with seedlings rarely living longer than three years, and it relies on a seedbank for recruitment; for this reason, it may be especially vulnerable to soil erosion. As noted above, the Armory grounds are not fenced, but the area receives little OHV use. Like the dwarf bear-poppy, increasing industrial development around the Armory may isolate this population from other populations and from pollinators.

The area with this milkvetch has been used for vehicle retrieval training by the 222nd and the FMS. In collaboration with tenant unit representatives, this area will be designated for dismounted training only. We will also fence a small area to protect the milkvetch from all impacts, thereby protecting the population. The fence will be installed when the milkvetch is dormant, July-February. ITAM will develop and install a sign containing a map of the area that shows training go/no go areas. This will impact training, technically from ESA and not Sikes Act implementation. As partial mitigation, ITAM will develop a pit on previously disturbed ground for vehicle retrieval.

6.5 WATER RESOURCE PROTECTION

The Utah Army National Guard's Water Quality Management program ensures that care has been taken for Utah's water resources. The St. George site takes multiple measures to ensure that clean water is provided to our soldiers. For example, the site has set up a Spill Prevention Control and Countermeasures Plan.

6.5.1 WASTEWATER MANAGEMENT

Currently, wastewater from the St. George site is transported by two separate systems. The Field Maintenance Shop disperses its wastewater through an oil water separator into a concrete lined evaporation basin west of the maintenance shop. The administrative buildings disperse wastewater into a large septic tank system.

6.5.2 STORMWATER MANAGEMENT

The St. George site is being evaluated for possible Utah Pollutant Discharge Elimination System (UPDES) requirements about stormwater drainage. Overall, the St. George site has set up two methods for controlling storm drainage. First, in soft-surfaces areas runoff is allowed to infiltrate into the ground by grading and the open drainage line emptying to large unoccupied areas mainly to the west of the grounds. Second, in the industrial areas and the vehicle wash rack, the storm water drainage system was designed to transport surface runoff to the settling and retention basin found west of the maintenance shop. The site storm drain system is connected with the off-site storm sewer.

6.5.3 IMPACTS

No impact to training is expected.

6.6 WETLAND PROTECTION

The St. George Armory has no natural or jurisdictional wetlands on-site and the nearest off-site wetlands are remote enough that land management and training will not affect them.

Wetlands are rare regionally and are a draw for many protected or nuisance plant and wildlife species. The small, artificial wetland created by water piping to the neighboring gravel pit should be surveyed for such species and, if none are found, it should be removed.

6.7 FOREST MANAGEMENT

This site has no forests.

6.8 FIRE MANAGEMENT

Vegetation is sparse enough that wildfires are not an issue.

6.9 AGRICULTURAL OUTLEASING

No agricultural lands of any sort are associated with the armory.

6.10 INTEGRATED PEST MANAGEMENT PROGRAM

Because effective land-based training depends on the continued availability of suitable training areas, the National Guard has a basic commitment to preserving healthy ecosystems. A major challenge to upholding intact native ecosystems is the rapid expansion of invasive weeds. Unchecked, invasive plants can quickly dominate and fundamentally alter native plant communities. Potential results of these invasions include displacing native plant species, altering natural disturbance regimes and declines in the quality of wildlife and livestock forage. It is estimated that on western

public lands noxious weeds are spreading at more than 1.5 million acres per year and the rate of spread is increasing.

Noxious weeds "have characteristics that make them a threat to agronomic agriculture, grazing lands, and the environment in general if allowed to be introduced or spread without control" (Antognini et al., 1995). Such species are named as noxious weeds by federal, state, and sometimes county, governments. Managers of state and federal lands, including National Guard installations, are mandated to prevent the spread of these listed species (Federal Noxious Weed Act [7 USC 2801-2814]).

While there are no major infestations of noxious weeds at the armory, there is considerable potential for detrimental plant species invasion; currently, nearly 25% of the vascular plant species on the installation are nonnative. Of these, only perennial pepperweed and saltcedar are listed as noxious. However, red brome, African mustard and storksbill fillaree can adversely impact the (endangered) dwarf bear-poppy and the armory should be monitored for the presence of these and other non-native plant species. Implementation of this noxious weed management plan, which is strongly integrated with the Camp Williams grazing and wildfire management plans, should simplify the control of existing infestations and minimize the risk of new ones.

Weed invasions have been compared to slow-moving wildfires. This is a useful perspective when developing and carrying out a weed management plan (Dewey et al., 1995). Following a "fire suppression" model, the Camp Williams noxious weed management plan stresses strategy as well as tactics. The plan features focused surveying to ensure early detection and effective control of noxious weeds while populations are still small.

The noxious weed management plan has the following management objectives: Prevention, Detection, Rapid Response, Containment and Control, and Site Rehabilitation. These program areas are intended to comply with the requirements for federal agencies of Executive Order 13112 – Invasive Species. Noxious and invasive weed control will be continued in consultation with National Guard Bureau and the Invasive Species Council, as suitable.

All pest management must comply with the Utah National Guard's Integrated Pest Management Plan (2017)[36].

6.10.1 Legal Requirements

Invasive and exotic species may include plants, insects, or animals. An invasive species is defined as "an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health." An alien (or non-native) species is defined as a "species including its seeds, eggs, spores, or other biological material capable of propagating that species that is not native to that ecosystem (EO 13112)".

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[36] Utah National Guard. 2017. Integrated Pest Management Plan (IPMP) for Utah Army National Guard (UTARNG). 47p.

Because of their invasive capacity, many exotic species have the ability to spread rapidly through ecosystems since their natural predators are often not present. Such species often retard natural succession and generally cause a reduction of biological diversity in natural ecosystems.

6.10.2 Prevention

Preventing infestations of noxious weeds is an effective, yet often overlooked, tool in weed control (Antognini et al., 1995). Effective prevention includes ecosystem management, monitoring, and minimizing new introductions.

Monitoring of training and other management is integral to ecosystem management. A benefit of this comprehensive monitoring is anticipation (and therefore, avoidance) of levels of disturbance conducive to invasive plants. Given this early warning, training and resource managers can respond by reallocating, when practical, training to alternative training sites.

Besides preserving healthy, intact plant communities, another element of the prevention strategy is to minimize the risk of noxious weeds being unintentionally introduced onto the installation. For example, restoration and rehabilitation will only use certified seed from reliable sources.

6.10.3 Detection

The earliest possible detection of new instances of noxious weeds is a critical strategic element of the noxious weed management plan. Successful implementation of the early detection strategy depends chiefly on aggressive "focused" surveying based on species-specific ecosystem-based analysis. Detection of weeds will be a key part of the spring surveying effort. Personnel conducting other surveys (e.g., birds, reptiles, etc.) will be trained on the weeds and directed to watch for them during other work.

6.10.4 Rapid response

Rapid response, following early detection, is the key to effective (and cost-effective) noxious weed management. Approval and implementation of this noxious weed plan will allow rapid and therefore effective response to small populations of noxious weeds. An annual control effort of modest scale can be expected and budgeted for, thus removing both budgetary and administrative barriers to rapid response.

Treatment is only effective when it is timely and considers the plant's physiology. Treatment of new populations is the most effective method. For instance, about 150 plants of purple starthistle (*Centaurea calcitrapa*) were found near Camp William's 25m Range in 1999. Aggressive treatment by hand pulling and herbicide removed it; no plants have been found after three years.

6.10.5 Containment and control

There is strong theoretical and empirical support for an emphasis on detection and control of "satellite foci" as opposed to main infestations. The most effective weed management strategy is to wipe out isolated populations while they are still small (that is, the "spot fire" analogy of Dewey et al. [1995]). The overarching goal of the noxious

weed management plan is the detection and eradication of new introductions. Eradication involves total removal of the weed including seeds and roots. This is only possible on small-scale infestations and requires annual monitoring and evaluation of treated areas to ensure success. With small infestations, control may be carried out by mechanical means (for example, pulling individual plants). Where hand weeding is not practical, herbicide treatments will be carried out by a trained applicator. Specific herbicidal control recommendations for each of the Utah noxious weeds are included in the Montana-Utah-Wyoming Weed Management Handbook[37].

Treatment has been transferred to Real Property (CFMO) per Department of the Army (DA) policy. UT-ERM will continue to play a key role with advice and consultation.

The Camp Williams noxious weed management plan is consistent with the intent of the DOD/Environmental Protection Agency (EPA) MOU on the Pesticide Environmental Stewardship Program (PESP). A goal of PESP is to reduce pesticide use through the development and implementation of integrated pest management programs. Under the noxious weed management plan, herbicides are applied only in small amounts and when they are most effective (that is, rapid response to small, satellite populations following early detection).

New actions resulting from the 2019 Review for Operation and Effect (ROE) will be part of a Biological Assessment under the ESA submitted to the USFWS for approval as the regulatory agency. This is especially important for any noxious weed spraying, as herbicide may drift and affect protected species.

6.10.6 SITE REHABILITATION AFTER WEED CONTROL

Natural or assisted revegetation of treated sites is important to minimize reinvasion by weeds. Each site-specific treatment prescription will include an assessment of natural revegetation potential and a recommendation for seeding or planting when needed. Consistent with overall direction from the INRMP, native species adapted to local environmental conditions will be selected for revegetation and only certified seed will be used in direct seeding projects.

UT-ERM reseeded in 2016, but it showed little success. It is common to see little success in reseeding projects at hot desert sites, especially when little precipitation falls. The site has poor condition due to the impacts of heavy training. Implementation of a noxious and invasive weed component should improve training conditions. UT-ERM will plan on reseeding to improve ecological and training conditions.

6.11 OUTDOOR RECREATION

The site has no recreational amenities or attractions.

[37] http://www.uwyo.edu/uwe/programs/weed-management-handbook.html.

6.12 CULTURAL RESOURCES PROTECTION

There are no known cultural resources within the Armory grounds. The entire parcel is located within an area that was inventoried for cultural resources by the Bureau of Land Management in 1995, reinventoried by the UTNG in 2006 and again in 2019. The State Historic Preservation Office (SHPO) concurred with the findings.

Should future ground disturbance reveal previously unidentified cultural resources, personnel on-site will comply with Standard Operating Procedure No. 5: Inadvertent Discovery of Cultural Materials, as outlined in the UTNG Integrated Cultural Resources Management Plan (ICRMP). Briefly, the procedures for inadvertent discovery of prehistoric or historic artifacts or features, human remains, unmarked graves, or paleontological remains includes 1) stop the ground disturbing activity, 2) secure the location to prevent further impacts from vandalism or weather, and 3) report it to the facility manager and the UTNG Cultural Resources Manager [Maia London, Office (801) 878-5882]. Ground disturbing activities may resume only with the approval of the Cultural Resources Manager.

6.13 ENFORCEMENT

The USFWS is responsible for ESA and MBTA law enforcement. The Washington County Sheriff or St. George City Police are responsible for all other legal enforcement.

6.14 PUBLIC OUTREACH

The Sustainable Range Awareness Program, part of ITAM, has the primary goal of educating soldiers to conduct environmentally responsible training both on the armory and on other lands. It is intended to foster concern, thinking, and action to protect and conserve both the natural resources and future training opportunities. A program of environmental awareness (EA) provides a means to educate land users on their environmental stewardship responsibilities. It provides for the development and distribution of educational materials to land users. These materials relate the principles of land stewardship and the practices of reducing training or testing impacts and includes information provided to environmental professionals about operational requirements.

The primary target audience is military and nonmilitary personnel working and training on the armory. Education about natural resource concerns, training and operation impacts, and environmental programs, including the INRMP, are specific objectives of the EA program. Major topics at the armory include protection of endangered species and minimization of soil erosion. A secondary objective is informing the public about Army environmental programs and specific issues.

6.14.1 MILITARY PERSONNEL AWARENESS

Education of soldiers and training units is chiefly the responsibility of the SRA part of ITAM and is carried out by staff and in-coming unit briefings, posters, the UT-ERM website, written materials (e.g. pamphlets and handouts), and articles in the *Utah Minuteman*, a thrice-yearly magazine for members of the Utah National Guard. The

ITAM Manager and Unit Environmental Coordinator have primary responsibility for the EA effort.

7 MANAGEMENT GOALS AND OBJECTIVES

Goals and objectives for the INRMP are based upon the scientific information presented with this INRMP. Goals are the primary focal points for implementation of the INRMP over the five years covered by the plan and should reflect a vision of the desired condition of the armory's natural resources. Objectives support the goals and indicate a management initiative or strategy through what, how and when it will be done. The 5-year workplan to achieve these are found in Appendix A; the projects are further described in Appendix C: Projects.

7.1 GOAL: SUPPORT THE MILITARY TRAINING MISSION BY CONSERVING, PROTECTING AND ENHANCING THE TRAINING SITE NATURAL ECOSYSTEMS AND BIODIVERSITY.

7.1.1 OBJECTIVE: MAINTAIN AND IMPROVE FOUNDATIONAL NATURAL RESOURCE INFORMATION

7.1.2 OBJECTIVE: MAINTAIN AND ENHANCE ENDANGERED SPECIES AND HABITAT.

7.1.3 OBJECTIVE: CONSERVE NATIVE BIODIVERSITY.

7.1.4 OBJECTIVE: MAINTAIN AND ENHANCE THE TRAINING RESOURCE TO BETTER MEET TRAINING NEED.

7.2 GOAL: ADMINISTER THE INRMP TO ENSURE ALL LAND USES AND MANAGEMENT IS COMPATIBLE WITH THE MILITARY MISSION AND MEETS ENVIRONMENTAL COMPLIANCE RESPONSIBILITIES.

7.2.1 OBJECTIVE: ENSURE MISSION COMPLIANCE WITH REGULATIONS AND INRMP REQUIREMENTS.

7.2.2 OBJECTIVE: COMPLY WITH THE SIKES ACT AND SIKES ACT IMPROVEMENT ACT.

8 IMPLEMENTATION

8.1 NATURAL RESOURCES MANAGEMENT STAFFING

Responsibility for INRMP implementation falls primarily on the Natural Resource Manager, but other NGUT staff have partial responsibility:

8.1.1 NGUT-ERM

- Natural Resources Manager
- NR Flora Specialist
- NR Fauna Specialist
- Environmental Protection Specialist
- GIS Program Manager
- Cultural Resources Manager

8.1.2 UTC-RC

- ITAM Coordinator

Tenant units and other training units are responsible to comply with INRMP and other environmental requirements under the direction of their commander, Unit Environmental Compliance Officers and the training officers.

8.2 PROJECT IMPLEMENTATION

The project list from this REC is in Appendix A and will be updated annually during the Annual Review. The projects will be tasked by proponent through the NGUT Environmental Management System. Failure to implement projects will be a Class I or III, depending on criteria, EPAS finding. Implementation of projects involving ground disturbance will require a REC through UT-ERM and possibly an OMG Project Request (form 420) from CFM. Project managers will be required to submit a project update for the Annual Review.

8.3 COORDINATION REQUIREMENTS

The UT-ERM will act as the lead organization for the annual (and five-year) review. UT-ERM will engage ARNG I&E, USFWS, and the UDWR (Southern Region) in the scoping, preparation and approval of this INRMP. It will reflect the “mutual agreement” of all four parties.

UT-ERM will review all INRMPs annually in cooperation with internal (Training, Facilities, etc.) and external (USFWS, UDWR) partners. The purpose of the annual review is to document progress toward the objectives, maintain the INRMP, and determine if an INRMP Update or Revision is necessary. UT-ERM will prepare a Memorandum for Record (MFR) detailing the annual review, which shall include the names and offices of all attendees, responses to the Annual Review Template (Appendix A), and whether an Update or Revision is necessary, to the stakeholders.

The Training Officer of the 222nd will annually assess whether implementation of the INRMP is having a net negative effect on military training.

Per §670a (b)(2) of the SAIA, each INRMP must be reviewed for "Operation and Effect" at least once every 5 years by the NGUT, USFWS, UDWR, and ARNG I&E. The Review for Operation and Effect is a comprehensive review of the INRMP by the NGUT, the USFWS, UDWR, and ARNG I&E to assess whether the INRMP is being implemented effectively and contributing to the conservation and rehabilitation of natural resources on State ARNG lands.

LIST OF ACRONYMS

ACEC	Area of Critical Environmental Concern
AGCW	Army Garrison Camp Williams
AHB	Africanized Honey Bee
AR	Army Regulation
ARRM	Army Range Requirements Model
ATV	All-Terrain Vehicle
BA	Badlands (soils)
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BLM	Bureau of Land Management
CFMO	Construction Facilities Management Office (UTNG)
CFR	Code of Federal Regulations
cm	Centimeter(s)
DA	Department of the Army
DOD	Department Of Defense
DODI	Department of Defense Instruction
EA	Environmental Awareness
ECAS	Environmental Compliance Assessment System
EDRR	Early Detection Rapid Response
EPA	Environmental Protection Agency
EPAS	Environmental Performance Assessment System
ESA	Endangered Species Act
ESD	Ecological Site Description
ESMP	Endangered Species Management Plan
FA	Field Artillery
FGDC-STD	Federal Geographic Data Committee Content Standards for Digital Geospatial Metadata
FMS	Field Maintenance Shop

G-9	ARNG Installations & Environment (formerly G-9)
GBBDC	Game Birds Below Desired Condition
GIS	Geographic Information System
GPS	Global Positioning System
IAW	In Accordance With
ICRMP	Integrated Cultural Resources Management Plan
IDT	Individual Duty Training
INRMP	Integrated Natural Resource Management Plan
ITAM	Integrated Training Area Management
LPI	Line-Point Intercept
LRAM	Land Rehabilitation And Maintenance (ITAM component)
LTA	Local Training Area
MACOM	Major Army COMmand
MBTA	Migratory Bird Treaty Act
MFR	Memorandum for Record
MI	Military Intelligence
MIM	Maneuver Impact Miles
MLRA	Major Land Resource Area
MOU	Memorandum of Understanding
NDAA	National Defense Authorization Act
NEPA	National Environmental Policy Act
NGB	National Guard Bureau
NRCS	Natural Resources Conservation Service
OHV	Off-Highway Vehicle
OMS	Organizational Maintenance Shop (reorganized as FMS)
PESP	Pesticide Environmental Stewardship Program
PIF	Partners in Flight
PLS	Planning-Level Survey

RA	Relative Abundance
REC	Record of Environmental Consideration
RFMSS	Range Facilities Management Scheduling System
RTLA	Range and Training Land Analysis (ITAM component)
SAIA	Sikes Act Improvement Act
SCS	Soil Conservation Service (reorganized as the NRCS)
SITLA	State Institutional Trust Land Administration
SRA	Sustainable Range Awareness (ITAM component)
TES	Threatened and Endangered Species
TNC	The Nature Conservancy
TRI	Training Requirements Integration (ITAM component)
UDOT	Utah Department of Transportation
UDWR	Utah Division of Wildlife Resources
UECO	Unit Environmental Compliance Officer
UPDES	Utah Pollutant Discharge Elimination System
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
UT-ERM	Environmental Resources Management (UTNG)
UTNG	Utah National Guard
UTPIF	Utah Partners in Flight

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