FINAL
Preliminary Assessment Report
Camp Guernsey
Guernsey, Wyoming

Perfluorooctane-Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA) Impacted Sites
ARNG Installations, Nationwide

March 2020

Prepared for:

Army National Guard Bureau
111 S. George Mason Drive
Arlington, VA 22204

U.S. Army Corps of Engineers, Baltimore District
2 Hopkins Plaza
Baltimore, MD 21201

Prepared by:
AECOM
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876
aecom.com

Contract Number: W912DR-12-D-0014

Delivery Order: W912DR17F0192

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Acronyms and Abbreviations

AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
AOI	area of interest
ARNG	Army National Guard
bgs	below ground surface
BLM	Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	cubic feet per second
CSM	conceptual site model
EDR	Environmental Data Resource
FTA	Fire Training Area
NTA	North Training Area
PA	Preliminary Assessment
PFAS	per- and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
RFMSS	Range Facility Management Support System
SI	Site inspection
STA	South Training Area
U.S.	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
WYARNG	Wyoming Army National Guard

Executive Summary

The United States Army Corps of Engineers Baltimore District, on behalf of the Army National Guard (ARNG)-Installations & Environment Division, Cleanup Branch, contracted AECOM Technical Services, Inc. (AECOM) to perform Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) Impacted Sites at ARNG Facilities Nationwide. The ARNG is assessing potential effects on human health related to processes at facilities that used per- and poly-fluoroalkyl substances (PFAS) (a suite of related chemicals), primarily in the form of aqueous film forming (AFFF) foam released during firefighting activities or training, although other PFAS sources are possible. In addition, the ARNG is assessing businesses or operations adjacent to the ARNG facility (not under the control of ARNG) that could potentially be responsible for a PFAS release.

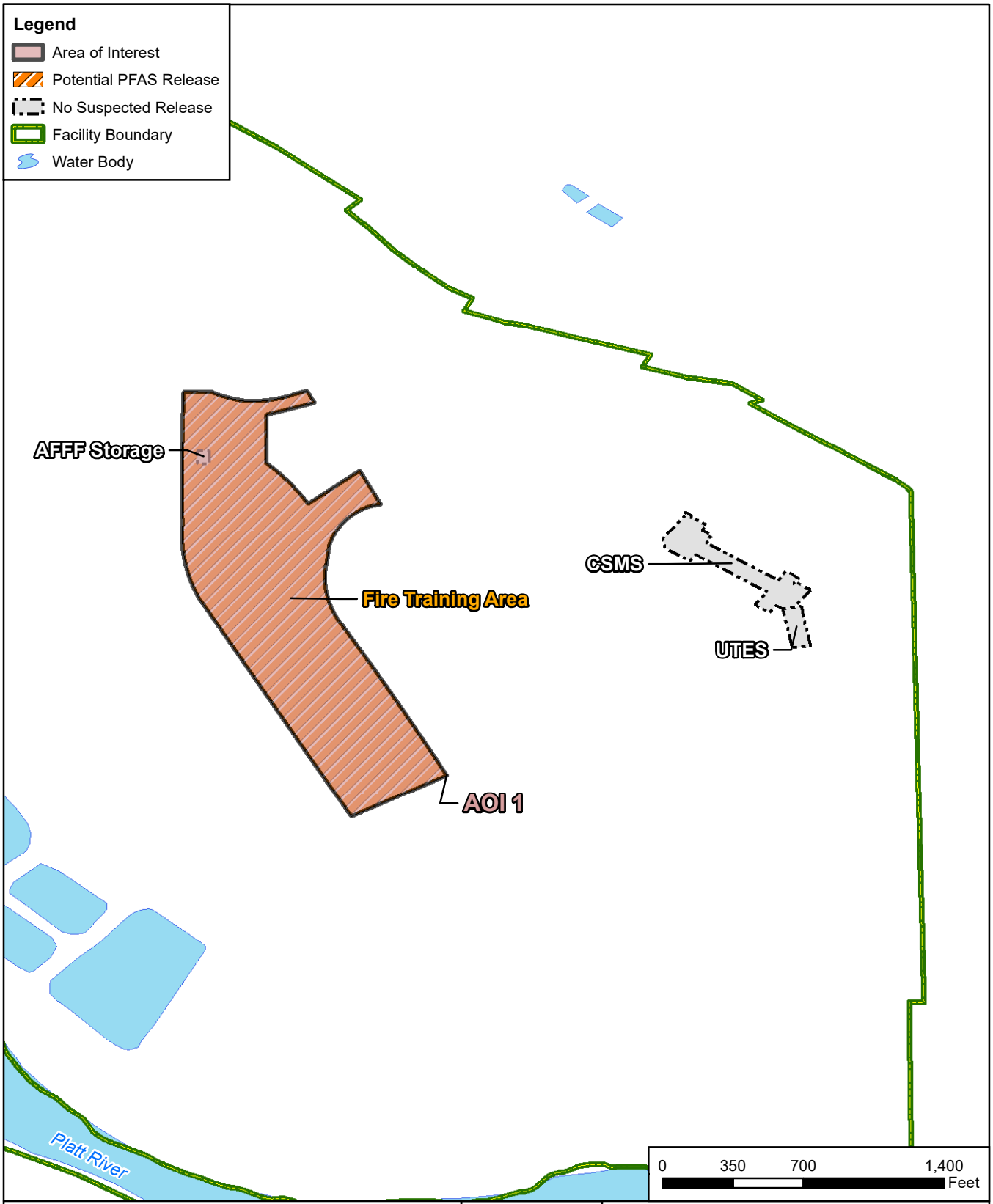
AECOM completed a PA for PFAS at Camp Guernsey. Camp Guernsey is a State-owned National Guard installation where the land is owned by the State of Wyoming Military Department; managed and operated by the Wyoming Army National Guard (WYARNG); and is primarily used for training the National Guard. The performance of this PA included the following tasks:

- Reviewed data resources to obtain information relevant to suspected PFAS releases including a synopsis of an interview conducted 16 December 2016 with the former Camp Guernsey Fire Chief.
- Conducted a 1-day site visit on 9 May 2018.
- Interviewed current Camp Guernsey personnel during the site visit including, the Fire Chief, Airfield Manager, environmental manager, and WYARNG environmental manager.
- Reviewed historical aerial photographs.
- Review of Range Facility Management Support System data to determine if fire training was conducted on ranges.
- Completed visual site inspections at known or suspected PFAS release locations and documented with photographs.
- Developed a conceptual site model (CSM) to outline the potential release and pathway of PFAS for the Area of Interest (AOI) and the facility.

One AOI related to potential PFAS release was identified at Camp Guernsey during the PA. The AOI is shown on **Figure ES-1** and described below:

Area of Interest	Name	Used by	Release Dates
AOI 1	Camp Guernsey Air Field	WYARNG	Prior to 2004

Based on documented potential AFFF releases at the airfield, there is potential for exposure to PFAS contamination in surface and subsurface soils to the site and construction workers via inhalation and ingestion, in surface water and sediment for all receptors via ingestion, and in groundwater for site and construction workers via ingestion. In addition, off-post residents using groundwater for drinking water surrounding the facility to the south may potentially be exposed to migrating PFAS contamination via ingestion. No sources of PFAS were identified in the local area surrounding Camp Guernsey through interviews or the Environmental Data Resource Report. The CSM for Camp Guernsey is shown on **Figure ES-2**.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Camp Guernsey, WY			
REVISED	1/17/2020	GIS BY	MS	1/17/2020
SCALE	1:8,400	CHK BY	VK	1/17/2020
Base Map:		PM	RG	1/17/2020

Summary of Findings

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure ES-1

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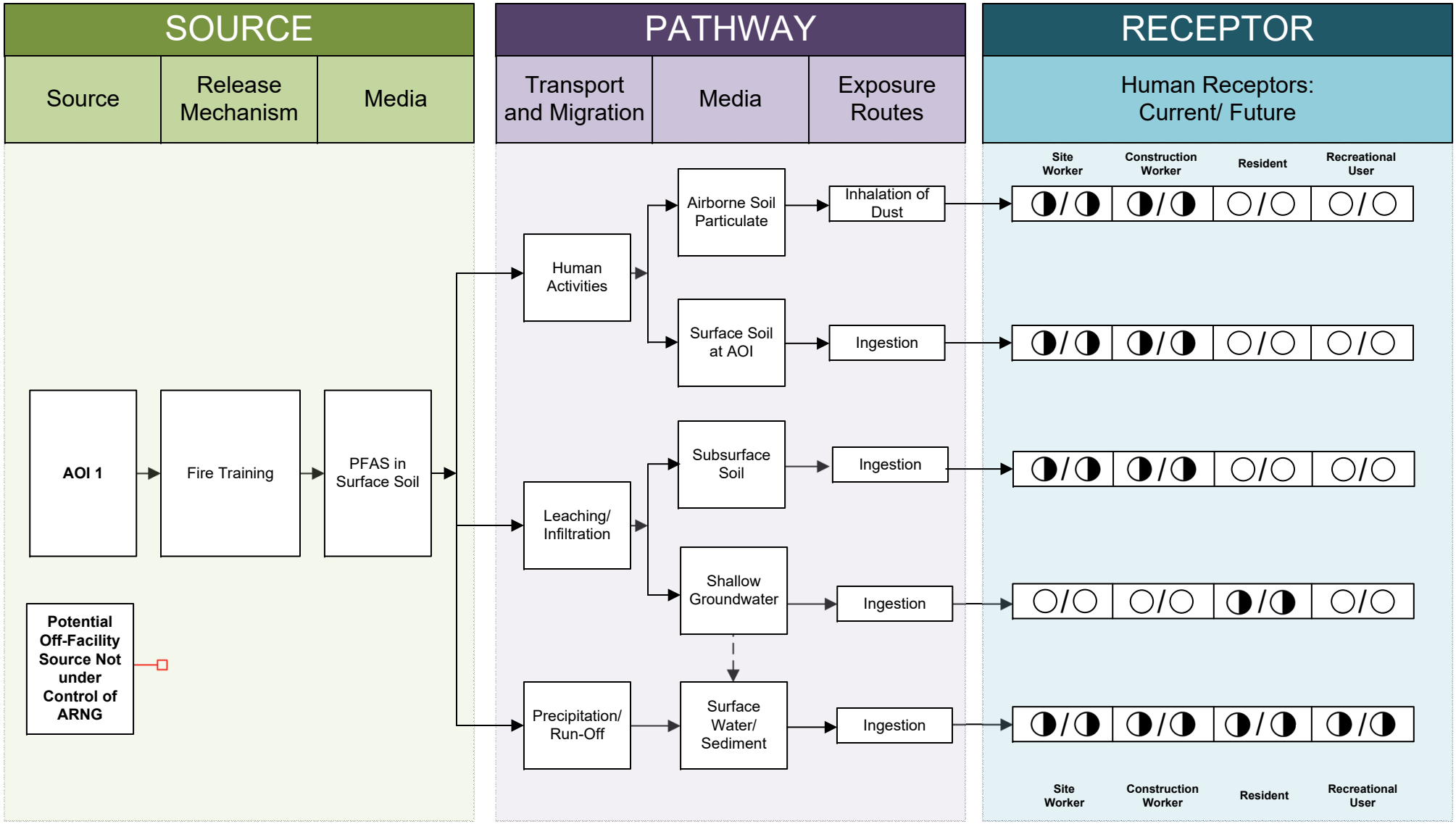


LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Complete Pathway

Figure ES-2
Conceptual Site Model
Camp Guernsey

1. Introduction

1.1 Authority and Purpose

The United States (U.S.) Army Corps of Engineers (USACE) Baltimore District on behalf of the Army National Guard (ARNG) – Installations & Environmental Division, Cleanup Branch contracted AECOM Technical Services, Inc. (AECOM) to perform Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) Impacted sites at ARNG Facilities Nationwide under Contract Number W912DR-12-D-0014, Task Order W912DR17F0192 issued 11 August 2017, and Modification 01 issued 30 September 2017. The ARNG is assessing potential effects on human health related to processes at their facilities that used per-and poly-fluoroalkyl substances (PFAS) (a suite of related chemicals), primarily releases of aqueous film forming foam (AFFF) released during firefighting activities or training, although other sources of PFAS are possible. In addition, the ARNG is assessing businesses or operations adjacent to the ARNG facility (not under the control of ARNG) that could potentially be responsible for a PFAS release.

PFAS are classified as emerging environmental contaminants that are garnering increasing regulator interest due to their potential risks to human health and the environment. PFAS formulations contain highly diverse mixtures of compounds. Thus, the fate of PFAS compounds in the environment varies. The regulatory framework at both federal and state levels continues to evolve. The US Environmental Protection Agency (USEPA) issued Drinking Water Health Advisories for PFOA and PFOS in May 2016, but there are currently no promulgated national standards regulating PFAS in drinking water. In the absence of federal maximum contaminant levels, some states have adopted their own drinking water standards for PFAS. Currently, the Wyoming Department of Environmental Quality does not have state-specific drinking water standards for PFAS.

This report presents findings of a Preliminary Assessment (PA) for PFAS at Camp Guernsey in Guernsey, Wyoming, in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations Part 300), and USACE requirements and guidance. This PA Report documents where PFAS may have been released into the environment. The term PFAS will be used throughout this report to encompass all PFAS chemicals being evaluated, including PFOS and PFOA, which are key AFFF components.

1.2 Preliminary Assessment Methods

The performance of this PA included the following tasks:

- Reviewed data resources to obtain information relevant to suspected PFAS releases including a synopsis of an interview conducted 16 December 2016 with the former Camp Guernsey Fire Chief.
- Conducted a 1-day site visit on 9 May 2018.
- Interviewed current Camp Guernsey personnel during the site visit including, the Fire Chief, Airfield Manager, environmental manager, and Wyoming Army National Guard (WYARNG) environmental manager.
- Reviewed historical aerial photographs.
- Reviewed Range Facility Management Support System (RFMSS) data to determine if fire training was conducted on ranges.

- Completed visual site inspections at known or suspected PFAS release locations and documented with photographs.
- Developed a conceptual site model (CSM) to outline the potential release and pathway of PFAS for the Area of Interest (AOI) and the facility.

1.3 Report Organization

This report has been prepared in accordance with the USEPA *Guidance for Performing Preliminary Assessments under CERCLA* (USEPA, 1991). The report sections and descriptions of each are:

- **Section 1** – **Introduction:** identifies the project purpose and authority and describes the facility location, environmental setting, and methods used to complete the PA.
- **Section 2** – **Fire Training Areas (FTAs):** describes the FTAs at the facility.
- **Section 3** – **Non-FTAs:** describes the airfield facility visited during the site visit.
- **Section 4** – **Emergency Response Areas:** describes areas of potential PFAS release at the facility, specifically in response to emergency situations.
- **Section 5** – **Adjacent Sources:** describes sources of potential PFAS release adjacent to the facility that are not under the control of ARNG.
- **Section 6** – **Conceptual Site Model:** describes the pathways of PFAS transport and receptors at each AOI.
- **Section 7** – **Conclusions:** summarizes the data findings and presents the conclusions of the PA.
- **Section 8** – **References:** provides the references used to develop this document.
- **Appendix A** – Data Resources
- **Appendix B** – Preliminary Assessment Documentation
- **Appendix C** – Photographic Log

1.4 Facility Location and Description

Camp Guernsey covers approximately 79,000 acres. The training site is in southeastern Wyoming approximately 80 miles north of Cheyenne, Wyoming, 90 miles southeast of Casper, Wyoming, and 15 miles east of Interstate 25. Camp Guernsey partially surrounds the towns of Guernsey and Hartville and is east of the Wheatland and Glendo in Platte County (**Figure 1-1**).

Camp Guernsey consists of the Cantonment Area, South Training Area (STA) and North Training Area (NTA). The Cantonment Area lies adjacent to the Town of Guernsey which has a population of approximately 1,200. The STA lies south and southwest of the Cantonment Area, while NTA is north of Guernsey State Park.

The historic buildings in the Cantonment Area of Camp Guernsey were constructed in 1938 and 1939 by the Works Projects Administration. The U.S. Army leased 6,209 acres in 1943 (during World War II) from the state of Wyoming (historically known as the STA) and acquired 4,500 acres in a land transfer from the Bureau of Land Management (BLM) in 1944 (within what is now Guernsey State Park) to train military personnel in maneuver and artillery and provide bivouac (camping). Between 1943 and 1945, the U.S. Army used the Camp Guernsey installation for bivouac and artillery maneuver training. In 1945, the lease with the U.S. Army on the state land was terminated and the buildings and improvements were transferred to the state

of Wyoming. The 4,500 acres of former BLM land was declared excess by the Department of Defense in 1950 (following the war) and returned to the Department of Interior. In 1951, the WYARNG took over management of the 6,209 acres of state property (Cantonment Area and STA). Through 1960, over 13,463 acres of land to the north were added to Camp Guernsey to establish an artillery range, impact area, and maneuver lands. These land acquisitions were completed through private land purchases and BLM patents (federal land withdrawals). Numerous private land acquisitions occurred from 2004-2012 which added another 39,000 acres of land to the Installation. These most recent acquisitions also encompassed an additional 3,000 acres of BLM land and 2,000 acres of State School Trust land.

The Cantonment Area covers approximately 500 acres and contains facilities primarily for administrative, supply, and maintenance in support of training activities on Camp Guernsey. Facilities include, but are not limited to, barracks, classrooms, warehouses, motor pools and maintenance facilities, a wastewater treatment plant, fuel storage, a heliport, and a paved airstrip/airfield. The Camp Guernsey Joint-Use Airfield, located in the eastern portion of the Cantonment Area, is used by Camp Guernsey and the Town of Guernsey as their municipal/regional airport. During a review of historical photographs, it was observed that the runway has been extended over the years.

1.4.1 Topography

The elevation at the Camp Guernsey airfield is 4,400 feet above sea level. Slopes within the Cantonment Area are level to nearly level, with the surface draining to the south and southeast towards the North Platte River.

1.4.2 Soil

Camp Guernsey is located in a geographic area that is composed predominantly of sandstone bedrock, resulting in primarily fine sandy loam soils. The soil depth varies from a few inches to 60 inches and the soils are well drained. Soil texture ranges from fine to coarse and occurs generally on plateaus, alluvial fans, and hills with gentle to steep slopes. Soil pH for the soil units throughout Camp Guernsey range from approximately 7.0 to 8.5. Soils with higher pH values tend to have an increased capacity to attenuate heavy metals (WYARNG, 2015).

Soils in the Cantonment Area are mostly deep alluvial soils consisting of stratified sand, loam, and minor layers of clayey soils with coarse and moderately textured sand. The soils bordering the North Platte River are subject to periodic water saturation due to seasonal fluctuations in the water table and occasional flooding.

Erosion hazard ratings vary, but approximately one-quarter of the installation contains soil with a high potential for soil erosion (WYARNG, 2015). Soil erosion potential can be evaluated by categorizing soil into K factor groups, where K is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible (K-factor values vary from 0.01 to 0.69). More than 50 percent of Camp Guernsey's land area consists of soils with low potential for soil erosion by water (K-factor values of 0.02 to 0.20), while one-quarter of the installation contains soils that are rated with a high potential for soil erosion (K-factor values of 0.02 to 0.41 to 0.69). Visual evidence of erosion is evident at numerous locations throughout the installation. Much of the installation is drained by intermittent streams or generally dry channelized drainages. Some of these drainages show substantial erosion due to stormwater flow during heavy rains.

1.4.3 Geology

Camp Guernsey is roughly split into two geologic and geomorphic regimes. The NTA is located over ancient rocks exposed in the southwestern end of a fault known as the Hartville Uplift. The Hartville Uplift is a north-northeast trending structural arch (anticline) that separates the Denver Basin (to the southeast) from the Powder River Basin (to the northwest). The arch extends from the northeast end of the Laramie Range to the south end of the Black Hills, roughly 45 miles long and 15 miles wide - roughly between the communities of Glendo, Guernsey, Hartville, and Lusk. The Hartville Uplift, has been subdued by erosion, with the current landscape showing little evidence of past tectonic activity. Along the anticline crest are exposed metavolcanic and granitic Precambrian age rocks (WYARNG, 2015).

Economic ore deposits (copper and iron) are present in this Precambrian rock crest near Camp Guernsey. Metal production began in the Hartville Uplift as early as 1880 with copper mining. As copper production decreased, miners extracted iron deposits that were associated with the copper. Iron mining began with the Sunrise Mine in 1898 and continued for almost a century (WYARNG, 2015).

The physiography of the NTA includes dissected plateaus, bluffs, hills, escarpments, and steep valley side-slopes. The physiography of the STA is much more subdued that the NTA being comprised primarily of irregular plains with moderate slope. The Hartville Uplift does not extend south of the Platte River. However, a prominent ridge does run north to south down the middle of the STA with the highest point named Black Butte (WYARNG, 2015).

The Arikaree Formation occurs in both the NTA and STA, and either outcrops or subcrops beneath the majority of the installation and surrounding area. Due to differing lithology, the Arikaree Formation consists of a lower and an upper unit:

- The upper unit is a very fine-grained, soft to moderately hard, generally massive sand and silt. Pebbles and cobbles, ranging from 0.25 inch to 5 inches in diameter, are scattered throughout the sand. A few beds of white volcanic ash are also present.
- The lower unit consists of loosely to well-cemented, red to gray, coarse to very coarse sandstone interbedded with lenses of well-cemented conglomerate containing fine to very coarse gravel and boulders. Sandstones usually contain significant clay or silt and are variably cemented. The lower unit thickness ranges from 88 to 340 feet below ground surface (bgs).

The Madison Group and Darby Formation underlies the Hartville Formation. It consists of cherty limestone and dolomite and is Lower Mississippian to Upper Devonian. The limestone unit is described as hard, gray, moderately cherty, coarsely bedded limestone. It is interbedded with thinly bedded, very fine-grained, hard, silty, purple to gray dolomite, along with hard, purple-gray dolomitic shale and siltstone (WYARNG, 2015).

Undifferentiated metavolcanic and granitic Pre-Cambrian units form the basement in a large portion of the area surrounding the installation, with outcrops primarily east and south of Camp Guernsey (WYARNG, 2015).

1.4.4 Hydrogeology

There are four main aquifers underlying the Guernsey area (**Figure 1-2**): the alluvial aquifer, which lies in the Quaternary alluvial deposits associated with the North Platte River; tributary drainages and deeper bedrock aquifers which may lie within the Arikaree, Guernsey or the Hartville formations (URS, 2014).

The alluvial aquifers tend to be located in valleys that contain sand and gravel deposits and are hydraulically connected to perennial streams that serve as sources of recharge. The alluvial aquifers in the Camp Guernsey area are heavily used for domestic and stock water production, as evidenced by the large number of wells located within the alluvial material limits (URS, 2014). The majority of the wells in the area on and surrounding Camp Guernsey draw water primarily from these alluvial aquifers. The largest alluvial aquifer in the State is the alluvium along the North Platte River, which is used extensively for water storage, agricultural, municipal, industrial, and domestic water uses. Numerous bedrock aquifer wells were installed on the Arikaree and Hartville formations, primarily used for domestic and livestock wells (URS, 2014).

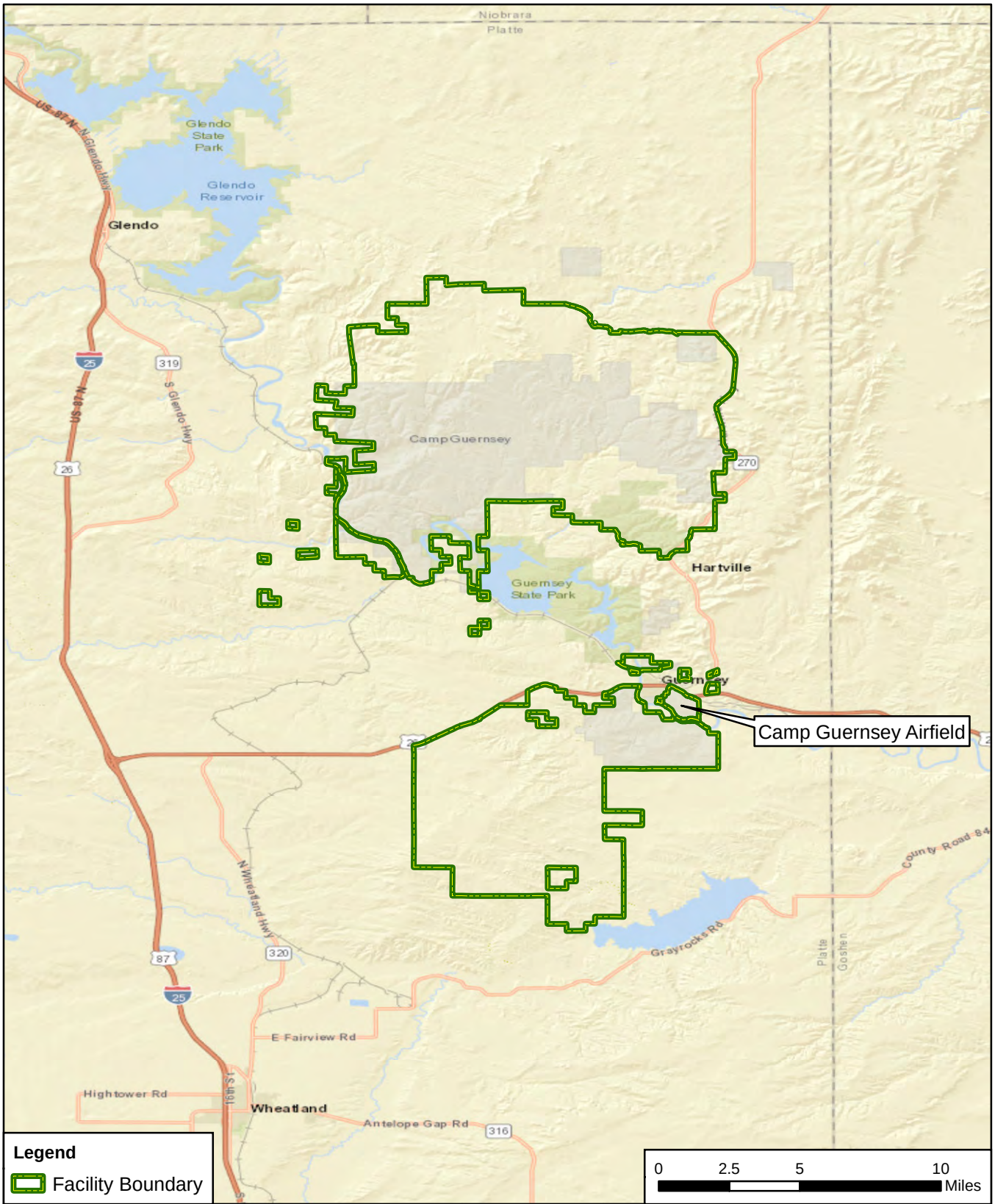
Few data were readily available to show groundwater depths at the installation, but in terrain such as that on Camp Guernsey, groundwater elevations tend to mimic the ground surface elevation. Therefore, groundwater elevations will be greater in the highlands and lower in the lowlands, and may occur at or near the ground surface within valleys near ephemeral streams. The depths to groundwater for the wells recorded in the Wyoming State Engineer's Office database (2004) confirm this trend in the area surrounding the installation. In several wells throughout the area, the depth to groundwater exceeds 100 feet bgs, and most of these wells were drilled to depths in excess of 200 feet bgs.

Because bedrock outcroppings or subcrops lie beneath a shallow layer of soil throughout Camp Guernsey, it may be a recharge area for the bedrock aquifer. Given the relatively low amount of precipitation (about 13.8 inches per year on average) and the high evaporation rates (estimated at 40 to 50 inches per year), the net aquifer recharge values are reportedly less than 1 inch per year but may be higher in the stream valleys (The Weather Channel, 2018). Groundwater levels in the alluvial aquifers underlying Camp Guernsey are recharged largely by local precipitation or by streams draining the area.

Groundwater is the primary source of drinking water for the town of Guernsey, Camp Guernsey, and surrounding residential areas outside of the town limits (USACHPPM, 2001). The town of Guernsey has three water supply wells in operation, which produce 220 million gallons per year (USACHPPM, 2003). Camp Guernsey has two supply wells, which are in the cantonment area, each capable of pumping up to 1 million gallons per day. These wells lie in the same alluvial gravel layer as the wells for the town of Guernsey. Approximately fifty (50) potable wells are located within a 1/2 mile radius of the airfield, see Environmental Data Resources (EDR) Report in **Appendix A**.

1.4.5 Hydrology/Surface Water

Camp Guernsey falls within the lower drainage of the North Platte River, which flows through parts of the NTA from the northwest to the southeast. The width of the North Platte River channel in this area is approximately 300 feet with a typical centerline depth ranging from 0 to 8 feet depending on discharges from the Glendo and Guernsey Reservoirs (WYARNG, 2015). The average annual flow is approximately 1,000 cubic feet per second (cfs), with extremes ranging from as low as 0 cfs during times of low flow (November through March) to a maximum of up to 30,000 cfs during times of extreme precipitation (late June and early July). Also, as a result of regulation of the North Platte River's flow by several upstream reservoirs, water depths and flow rates are variable from season to season. Most of the river's drainages are surrounded by chalk rock bluffs and outcrops. North Platte River primary uses include a valuable recreational fishery and water transport for agricultural uses (USACHPPM, 2003). A popular activity for Guernsey residents is to float the Platte River on inner-tubes through town. Surface water features are presented on **Figure 1-3**.



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SCALE	1:316,800	CHK BY	VK	8/20/2018
Base Map: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI,		PM	RG	8/20/2018

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Facility Location

AECOM
12420 Milestone Center Drive
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Figure 1-1

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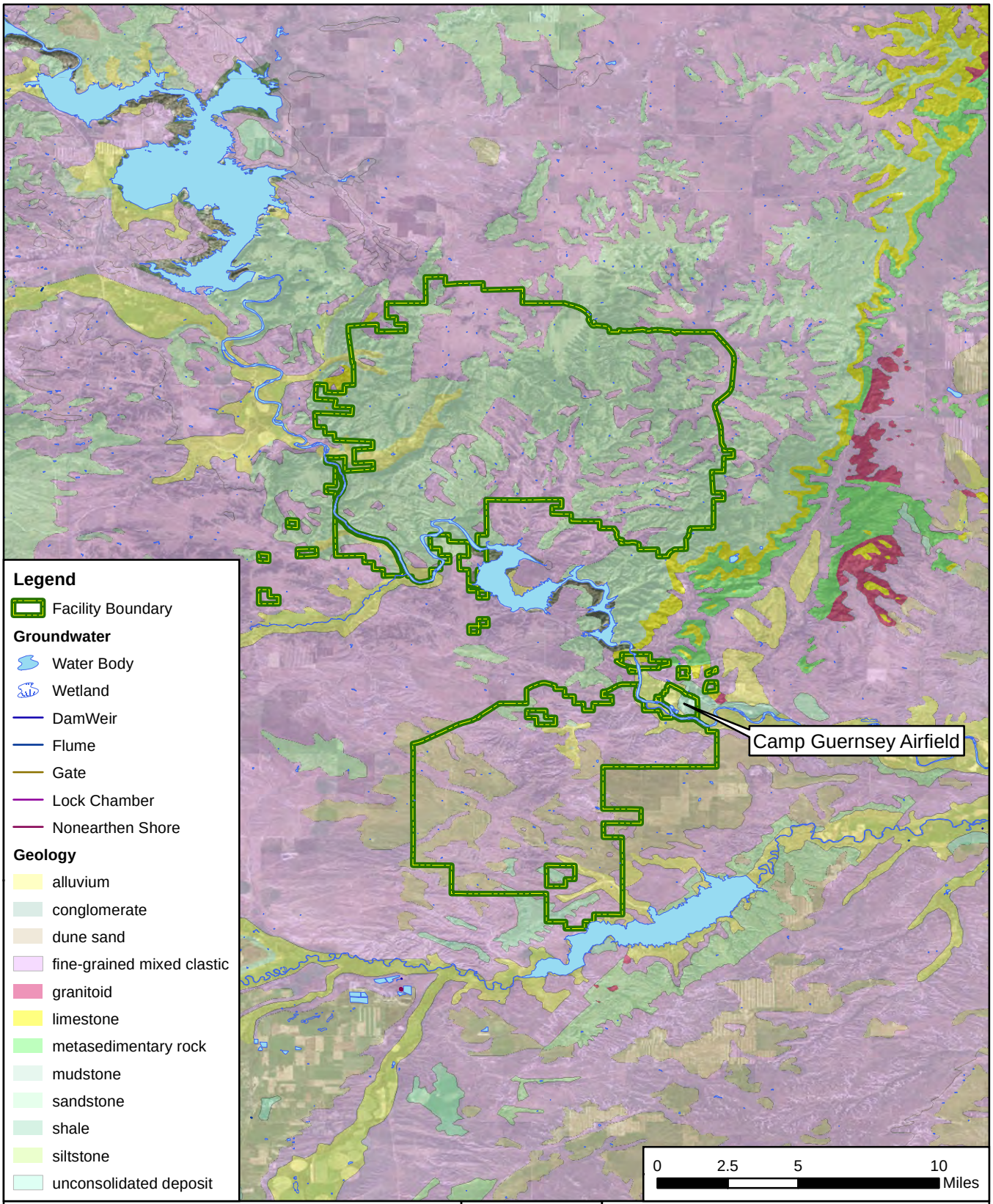

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Groundwater Features

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Figure 1-2

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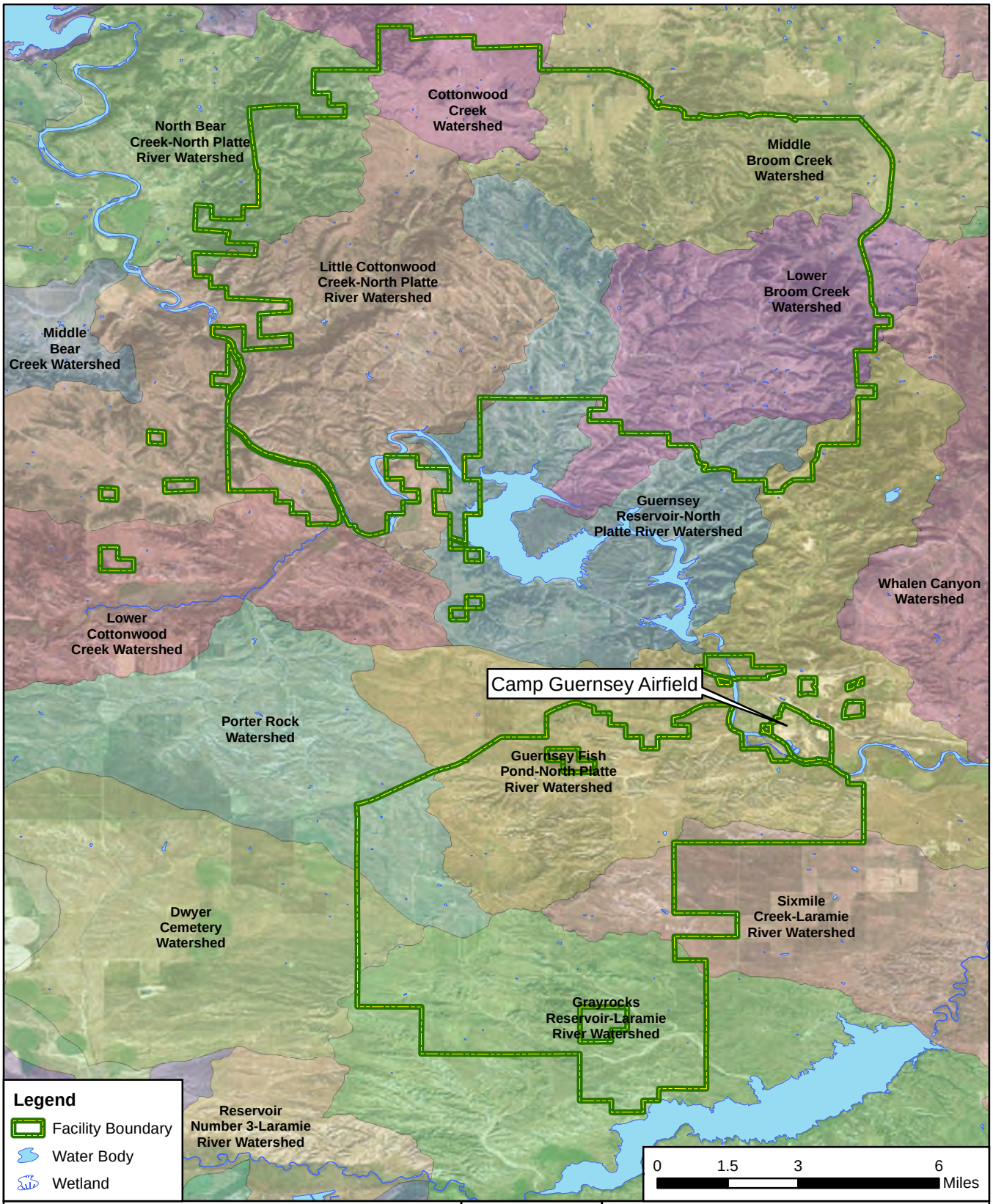

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Surface Water Features

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Figure 1-3

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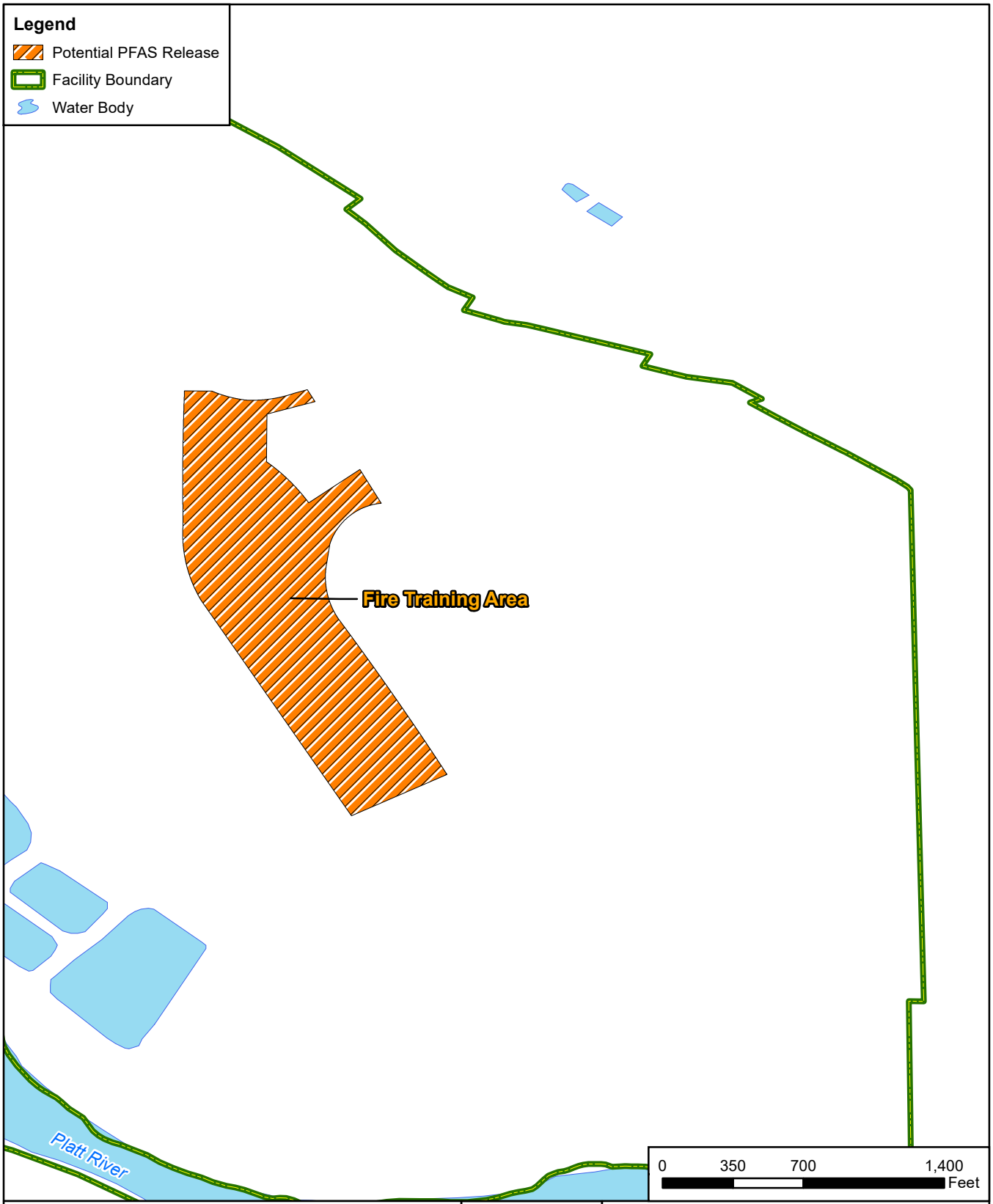
2. Fire Training Areas

The National Fire Protection Agency requires annual testing of the proportioning valves on the ARFs, but no testing has occurred in this manner since the 1990s. An interview on 16 December 2016 (**Appendix B**) with the previous Camp Guernsey Fire Chief determined the fire department trained with foam every two years on the airfield because the foam expired every two years. The type, amount, and concentration of AFFF used during the training activities is unknown or if all the three fire trucks were used every event. This occurred approximately five times in the 1990s and then Camp Guernsey ceased this operation when the current Camp Guernsey Fire Chief arrived in 2004. The information from the former Camp Guernsey Fire Chief and the period of his service cannot be corroborated, nor can additional details be gathered, as the interviewee passed away after the 2016 interview and no records of the concentration or amount of AFFF used for training in the 1990s. No other releases are known since this practice ceased. The FTA locations are shown on **Figure 2-1**.

Additionally, RFMSS data were reviewed during the previously conducted Operational Range Assessment as well as interviews with Camp Guernsey personnel, to determine no fire training occurred on the ranges. There is no evidence of AFFF being used at other locations on Camp Guernsey, to include both the North Training Area and South Training Area.



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Fire Training Area

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12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-1

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3. Non-Fire Training Areas

No non-FTA releases was identified during the PA. A description of locations where AFFF is stored are presented below, and the non-FTAs are shown on **Figure 3-1**. Photographs of the non-FTAs appear in **Appendix C**.

3.1 Camp Guernsey AFFF Storage

The Camp Guernsey Airfield, which includes multiple buildings, a landing strip, and taxiway, is located on Bridger Road (**Figure 3-1**). The geographic coordinates are 40°15'46.86"N and 104°43'56.11"W. The Guernsey Airfield and the Guernsey Municipal Airport is a Joint Use Airfield.

AFFF is stored by Camp Guernsey in eight (8) 55-gallon drums (6% concentration) and in four (4) Airport Rescue Firefighter vehicles; one (1) with 160 gallon tank and three (3) with 380 gallon tanks. The AFFF is stored within a warehouse next to the Airfield Operations building. Aircraft are re-fueled on the aircraft parking aprons with a 5,000 gallon fuel truck. Fire extinguishers with Purple-K are also co-located on the parking aprons and on the fuel truck.

No known spills or leaks of AFFF were identified during the PA. However, the National Fire Protection Agency requires annual testing of the proportioning valves on the ARFs, but no testing has occurred in this manner since the 1990s (**Section 2**).

There is no evidence of AFFF being used at other locations on Camp Guernsey, to include both the North Training Area and South Training Area.

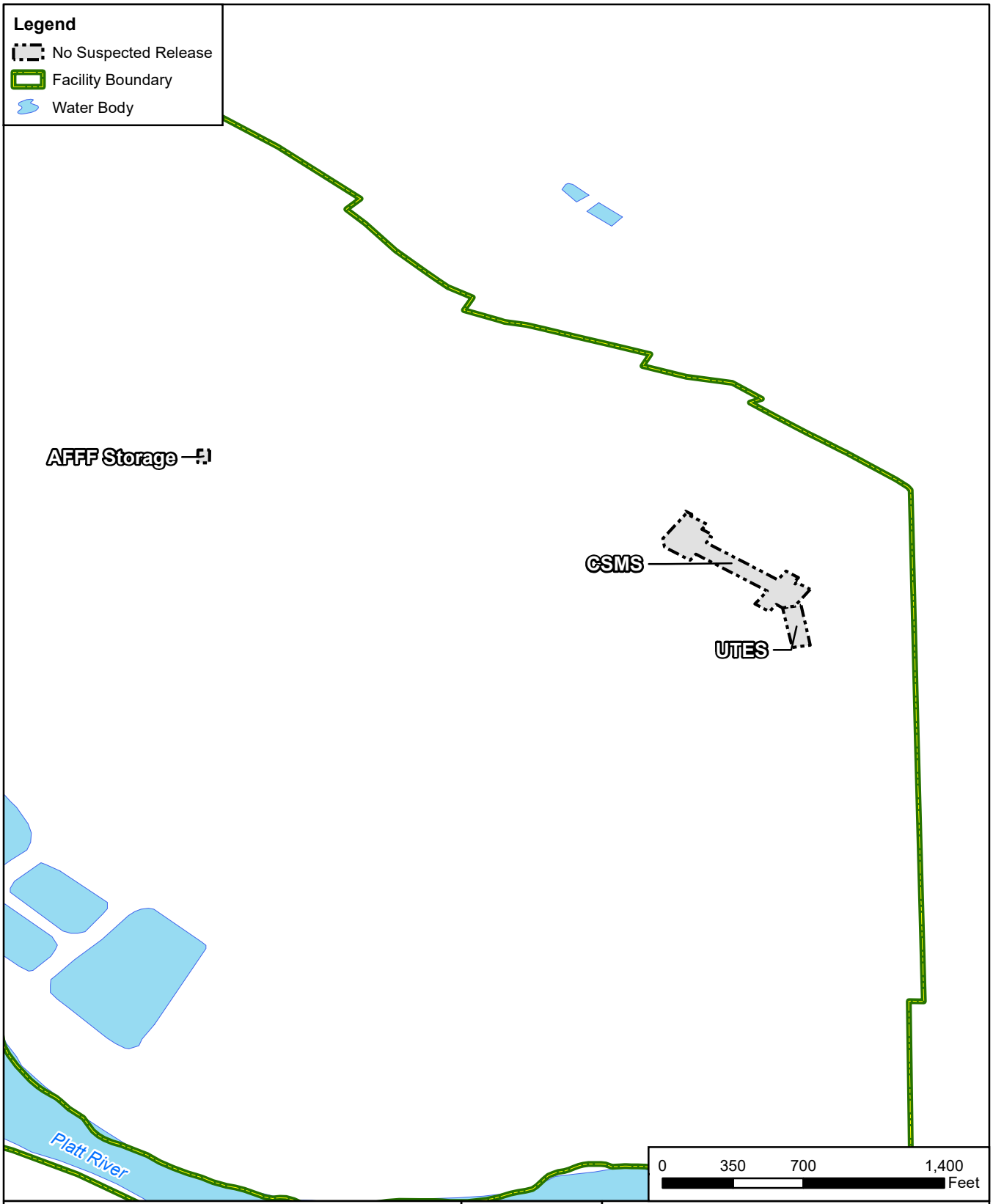
3.2 Camp Guernsey Fire Truck Maintenance

The fire trucks are maintained in several areas. Federally owned fire trucks are maintained on Camp Guernsey at either the Unit Training Equipment Site or Combined Support Maintenance Shop. State owned vehicles are maintained either at the state vehicle maintenance shop on Camp Guernsey, Camp Guernsey fire station by either ARNG mechanics or contracted mechanics, or the vehicle is taken off site to a commercial maintenance shop. The foam tanks are not emptied when firefighting vehicles are taken off installation for maintenance. Interviewees indicated that the fire trucks were cleaned periodically and that the waste water generated from these activities went to the oil water separator. The oil water separator has an 8,000-gallon containment tank, which is pumped and disposed offsite. Wastewater is treated at the Town of Guernsey WWTP.

For the past year, fire trucks are stationed at the fire house, which is co-located at the air traffic control tower or at the fire station parking annex, which is adjacent to the large aircraft parking apron. Previously, vehicles were stored at Fire Station 1, which has an oil separator floor drain, while two other vehicles were stored in various heated buildings for the winter or until needed. When needed for flight support trucks were located at the airfield.

3.3 Landfills

Landfills are not usually a primary potential release area of PFAS, but materials disposed of in landfills may create a secondary source of contamination. Such materials, to name a few, may include sludge from a WWTP that processes PFAS-laden water, used AFFF storage containers, or products associated with waterproofing uniforms or boots. No landfills were identified at Camp Guernsey, during the PA.



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Non-Fire Training Area

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Germantown, MD 20876

Figure 3-1

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4. Emergency Response Areas

No instances of emergency response areas were identified at Camp Guernsey during the PA through interviews or EDR. All emergency services for the Camp Guernsey Airfield (Building 107) are provided by Camp Guernsey.

5. Adjacent Sources

No off-site PFAS sources adjacent to Camp Guernsey were identified during the PA through interviews or the EDR Report. The Petroleum Tank Farm is 7 miles southeast of Camp Guernsey. Follow-up phone calls were made with the petroleum companies comprising the Petroleum Tank Farm. Several companies indicated that AFFF was not used for their firefighting activities; however, not all companies provided a response. Camp Guernsey Airfield and the Guernsey Municipal Airport are a Joint Use Airfield. The geographic coordinates are 46°36'36.8"N and 111°59'24.7"W. No information was available on the use of AFFF by the Guernsey Municipal Airport; however, Camp Guernsey provides all emergency services for Camp Guernsey.

6. Conceptual Site Model

Based on the PA findings, the Camp Guernsey Airfield is noted as AOI 1. The AOI location is shown on **Figure 6-1**. The following section describes the CSM components and the specific CSM developed for the AOI. The CSM identifies the three components necessary for a potentially complete exposure pathway: (1) source, (2) pathway, and (3) receptor. If any of these elements are missing, the pathway is considered incomplete.

In general, the potential PFAS exposure pathways are inhalation and ingestion. Dermal contact is not considered to be a potential exposure pathway as studies have shown very limited absorption of PFAS through the skin (National Groundwater Association, 2018). Receptors at Camp Guernsey include site workers, construction workers, residents, and recreational users. The CSM indicates which specific receptor could potentially be exposed to PFAS.

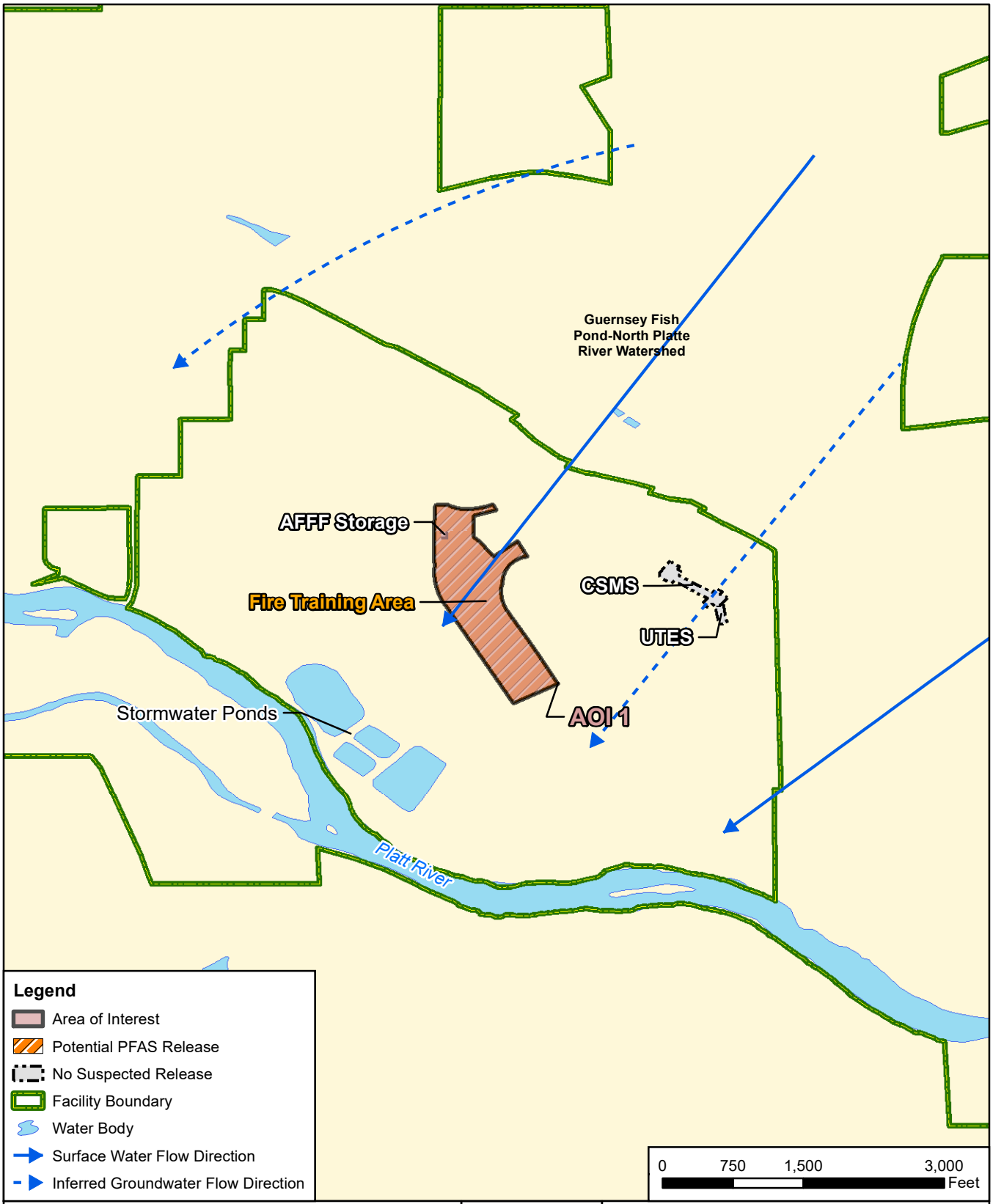
6.1 AOI 1 Camp Guernsey Air Field

AOI 1 is the Camp Guernsey Airfield. AFFF was potentially released every two years on the airfield in the 1990s. It is unknown how the AFFF was released during the training events or the specific location of the events; however, during the site visit, the interviewee indicated that AFFF was only used at the airfield and nowhere else on Camp Guernsey.

The airfield ramp is gently sloped with an apex occurring in the middle. A stormwater retention pond is located the east of the airfield ramp. The Platte River is the only known surface water body located at the southern end of the airfield. Because potential AFFF releases to surface soil have occurred at AOI 1, potential PFAS contamination, could migrate from the soil at AOI 1 to the Platte River via over land surface water flow and into the groundwater via infiltration.

Ground-disturbing activities to surface soil at AOI 1 could result in site and construction worker exposure to potential PFAS contamination via inhalation of dust particles or ingestion of surface soil. Ground-disturbing activities to subsurface soil could result in site and construction worker exposure via ingestion of subsurface soil. Therefore, the exposure pathways for these receptors are potentially complete. In addition, because potential PFAS contamination may have migrated from the soil at AOI 1 to the Platte River, the surface water and sediment exposure pathways via ingestion for site and construction workers and recreational users of the Platte River are potentially complete.

The groundwater flow direction for AOI 1 is predominantly southwest towards the Platte River. The ARNG conducted sampling on eight drinking water sources and one blended water sample location prior to the entry point of the distribution system on 15 May 2017. Results indicate that concentrations of PFOA and PFOS were detected in groundwater but were below the Environmental Protection Agency Health Advisory of 70 nanogram per Liter. Due to the discharge of AFFF to the ground, possibly infiltrating groundwater, and the use of groundwater as a drinking water source, the exposure pathway for groundwater via ingestion is potentially complete for site and construction workers working on Camp Guernsey, and off-post residents living south of the airfield. However, no drinking water wells or intakes are present to the south and in the direct vicinity of the potential release area. The CSM for AOI 1 is shown on **Figure 6-2**.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Camp Guernsey, WY			
REVISED	1/17/2020	GIS BY	MS	1/17/2020
SCALE	1:18,000	CHK BY	VK	1/17/2020
Base Map:		PM	RG	1/17/2020

N

Area of Interest

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-1

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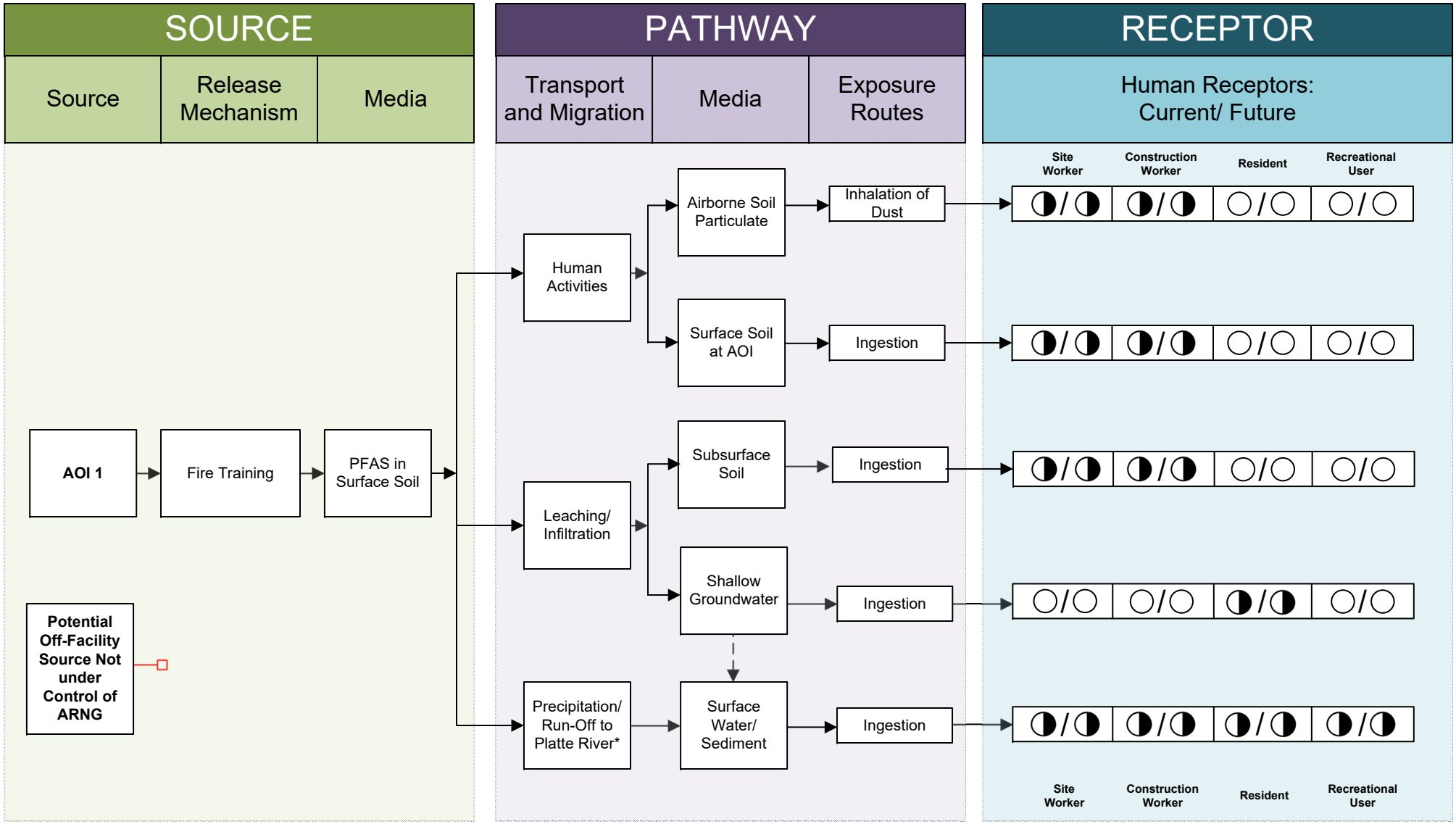


LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Complete Pathway

NOTE

*The shallow groundwater ingestion pathway is potentially complete for off-Post residents only.

Figure 6-2
Conceptual Site Model
AOI 1 Camp Guernsey Air Field

7. Conclusions

This report presents a summary of available information gathered during the PA on the use and storage of AFFF at Camp Guernsey. The PA findings are based on the information presented in **Appendix A** and **Appendix B**.

7.1 Findings

One AOI related to potential PFAS release was identified (**Table 7-1**) at Camp Guernsey during the PA (**Figure 7-1**).

Table 7-1: AOIs at Camp Guernsey

Area of Interest	Name	Used by	Potential Release Dates
AOI 1	Camp Guernsey Air Field	WYARNG	Prior to 2004

Based on documented potential AFFF releases at the AOI, there is potential for exposure to PFAS contamination in surface and subsurface soils to the site and construction workers via inhalation and ingestion, in surface water and sediment for all receptors via ingestion, and in groundwater for site and construction workers via ingestion. In addition, off-post residents using groundwater for drinking water surrounding the facility to the south may potentially be exposed to migrating PFAS contamination via ingestion; however, no known drinking water wells or intakes are present directly south of the potential release area. No sources of PFAS were identified in the local area surrounding Camp Guernsey.

7.2 Uncertainties

A number of information sources were investigated during this PA to determine the potential for PFAS-containing materials to have been present, used, or released at the facility. Historically, documentation of PFAS use was not required because PFAS were considered benign. Therefore, records were not typically kept by the facility or available during the PA on the use of PFAS in training, firefighting, or on its disposition.

The information on PFAS uses during the 1990s cannot be corroborated, nor can additional details be gathered, as the former Camp Guernsey Fire Chief passed away shortly after a 2016 interview and no records were maintained.

The conclusions of this PA are predominantly based on the information provided during interviews with personnel who had direct knowledge of PFAS use at Camp Guernsey. Gathered information has a degree of uncertainty due to the absence of written documentation, the limited number of personnel with direct knowledge due to staffing changes, the time passed since PFAS was first used (1969 – present), and a reliance on personal recollection. Inaccuracies may arise in potential PFAS release locations, dates of release, volume of releases, and the concentration of AFFF used. There is also a possibility the PA has missed a source of PFAS, as the science of how PFAS may enter the environment continually evolves.

In order to minimize the level of uncertainty, readily available data regarding the use and storage of PFAS were reviewed, retired and current personnel were interviewed, multiple personnel were interviewed for the same potential source area, and potential source areas were visually inspected.

Table 7-2 summarizes the uncertainties associated with the PA:

Area of Interest	Source of Uncertainty
AOI 1	No or limited information was available on the type, amount, and concentration of AFFF used. The former Fire Chief recalled approximately five (5) releases during his tenure. Unsure what occurred prior to this time.
AOI 1	No or limited information was available on the firefighting activities (if any) at the Petroleum Tank Farm.

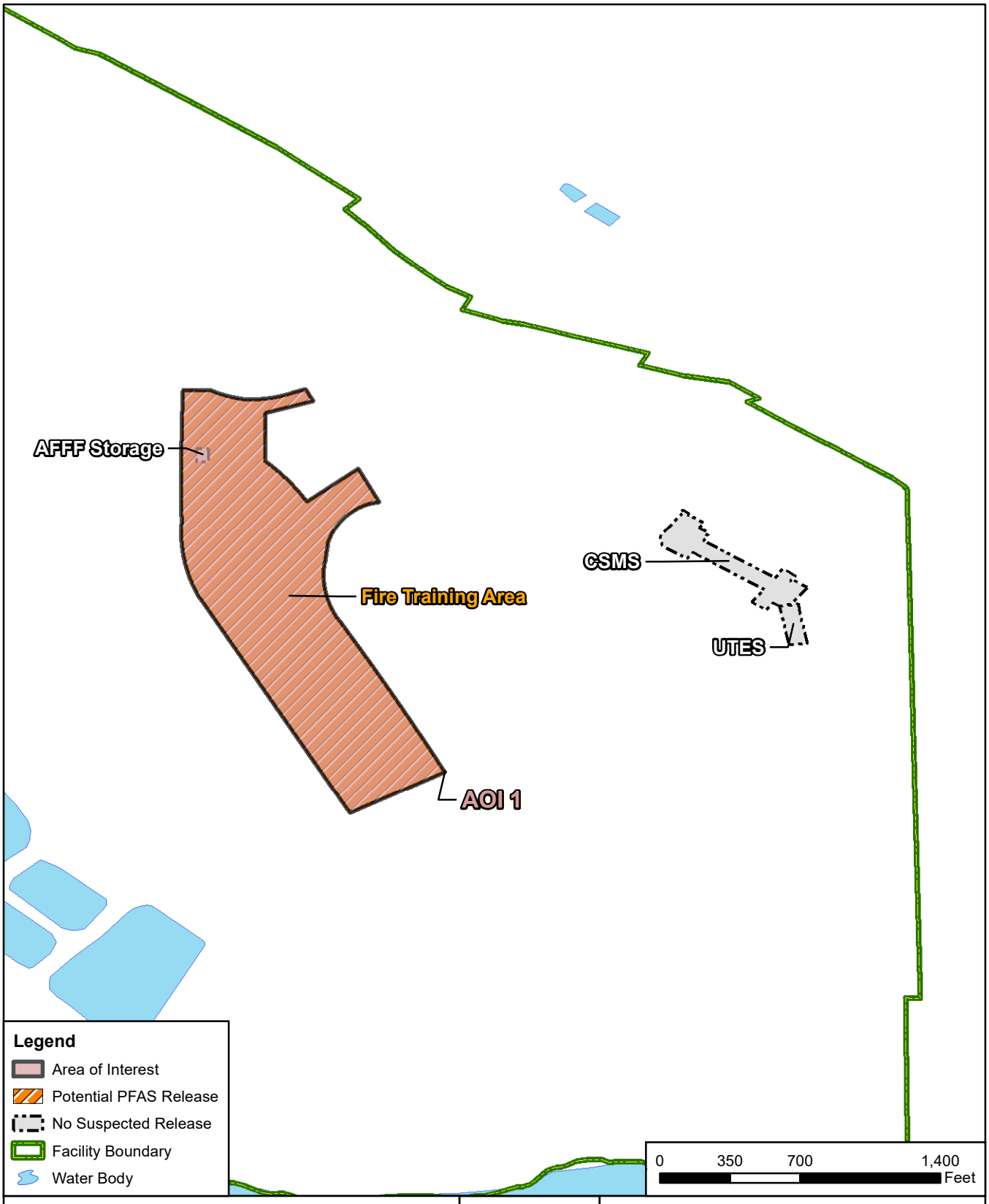
7.3 Potential Future Actions

Interviews indicate that former ARNG activities (covering 1990s to present) may have resulted in potential PFAS releases at the AOI identified during the PA. Based on the CSM developed for the AOI, there is potential for receptors to be exposed to PFAS contamination in soil, groundwater, surface water, and sediment. **Table 7-3** summarizes the rationale used to determine if the AOI should be considered for further investigation under the CERCLA process and undergo a Site Inspection (SI).

ARNG evaluates the need for an SI at Camp Guernsey based on the presence of a PFAS release, possible receptors, and the migration potential of PFAS contamination to receptors.

Table 7-3: PA Findings Summary

Area of Interest	AOI Location	Rational	Potential Future Action
AOI 1 Camp Guernsey Air Field	46°36'36.8"N and 111°59'24.7"W	Approximately five (5) releases of AFFF during the 1990s.	Proceed to an SI, focus on soil, groundwater, surface water, sediment



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Camp Guernsey, WY			
REVISED	1/17/2020	GIS BY	MS	1/17/2020
SCALE	1:8,400	CHK BY	VK	1/17/2020
Base Map:		PM	RG	1/17/2020

Summary of Findings

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 7-1

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Appendix A
Data Resources

Data Resources will be provided separately on CD. Data Resources for Camp Guernsey includes:

Camp Guernsey AFFF Release Documentation

- 2017 PFAS Data Call Correspondence

Previous Investigations Completed at Camp Guernsey

- 2014 Operational Range Assessment Phase II Report
- 2015 Integrated Natural Resources Management Plan

Camp Guernsey EDR Report

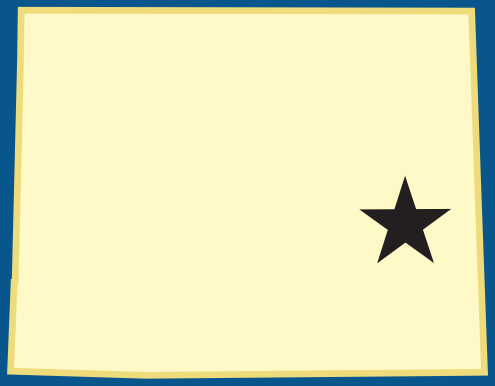
- 2018 Camp Guernsey EDR Report

December 16, 2016

Camp Guernsey has one area that is suspect release and it is located in the cantonment area at the joint use airport. An interview with [redacted] previous Fire Chief for Camp Guernsey determined that the fire department trained with foam every two years on the airfield. They only did this every two years because the foam would expire every two years. They did this approximately 5 times and then ceased the operation. When I arrived in 2004 they were no long doing this, most of this was done in the 1990s. The airport is label and highlighted on the GIS data that was sent to your office. We are not aware of any other releases in the state of Wyoming by the military department or other.

Operational Range Assessment Phase II Report Camp Guernsey, Wyoming

April 2014



Prepared for:

US ARMY CORPS OF ENGINEERS, BALTIMORE DISTRICT
10 South Howard Street, Baltimore, MD 21201

Under Contract / Delivery Order: W912DY-09-D-0061 / DA01

And

ARMY NATIONAL GUARD DIRECTORATE
111 S. George Mason Drive, Arlington, VA 22204

Prepared by:

URS GROUP, INC.
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876

And

ARCADIS
640 Freedom Business Center Drive, Suite 310
King of Prussia, PA 19406

OPERATIONAL RANGE ASSESSMENT PHASE II REPORT
CAMP GUERNSEY, WYOMING

To meet Department of Defense (DoD) requirements and support the U.S. Army's Sustainable Range Program, the Army National Guard (ARNG) Directorate is conducting assessments to determine whether a release or a substantial threat of release of munitions constituents of concern (MCOC) from an operational range to an off-range area creates a potentially unacceptable risk to human health or the environment.

An Operational Range Assessment (ORA) Phase I (Phase I) was performed in 2007 (USACE, 2008) to assess whether a potential MCOC source exists on the operational range, a potential MCOC migration mechanism exists, and human and/or sensitive ecological receptors are present at the installation. The Phase I determined that potentially complete source-receptor pathways are present at Camp Guernsey.

For operational ranges determined in the Phase I to have a potentially complete source-receptor pathway, the ARNG Directorate conducts an ORA Phase II (Phase II) of potentially complete pathways of MCOC to non-operational areas. This Phase II report presents the evaluation of source-receptor pathways at Camp Guernsey in Guernsey, WY. URS Group, Inc. (URS) and ARCADIS U.S., Inc. (ARCADIS) conducted the assessment under contract W912DY-09-D-0061/DA01 with the U.S. Army Corps of Engineers (USACE) Baltimore District in support of the ARNG Directorate.

The Phase II establishes whether the source-receptor pathway identified during the Phase I is complete or if new information is available that would affect previous conclusions. To determine whether MCOC were leaving the operational range by an identified pathway (e.g., groundwater, surface water) and pose a potential risk to off-site receptors, the ORA team considered existing and new data, including sampling data. The ORA team may accomplish the Phase II by re-evaluating existing information (e.g., prior sampling, reports), through the use of modeling, and/or collecting additional samples. All available information is used to update the conceptual site model (CSM) and to establish a weight-of-evidence case that determines whether there has likely been an MCOC release from the operational range that may pose an unacceptable risk to an off-range receptor.

Camp Guernsey is located in southeastern Wyoming approximately 80 miles north of Cheyenne, 90 miles southeast of Casper, and 15 miles east of Interstate 25 (I-25). Camp Guernsey partially surrounds the towns of Guernsey and Hartville and is located between the towns of Wheatland, Fort Laramie, and Glendo in Platte County. Camp Guernsey encompasses approximately 80,000 acres and 64 square miles of air space. The Camp Guernsey Cantonment Area (the permanent residential section of a military installation) is adjacent to the Town of Guernsey. The installation opened in 1939 as a National Guard Training Camp. Today Camp Guernsey's primary mission is to serve as a major training facility for the Wyoming Army National Guard and Wyoming Air National Guard for infantry, engineer, aviation, maintenance, and medical units.

Camp Guernsey is divided into three general areas, the Cantonment Area and maneuver/training lands making up the North Training Area (NTA – lands north of the North Platte River) and the South Training Area (STA – lands south of the North Platte River).

The Cantonment Area covers approximately 500 acres and contains facilities primarily for administrative, supply, and maintenance in support of training activities on Camp Guernsey. Facilities include, but are not limited to, barracks, classrooms, warehouses, motor pools and maintenance facilities, a wastewater treatment plant, fuel storage, a heliport, and a paved airstrip/airfield. Service facilities include recreational areas and a vehicle wash rack. The Camp Guernsey Joint-Use Airfield, located in the eastern portion of the Cantonment Area, is used by Camp Guernsey and the Town of Guernsey as their municipal/regional airport.

The 52,000-acre NTA consists of a duded impact area, an ammunition supply point, five firing ranges, a light demolition area, three training areas, six parachute drop zone sites (four of the drop zones are classified as dual directional), a tactical air strip, a Range Control office, target storage facilities, a solid waste accumulation point, and two shower points. Six firing points for aerial gunnery are used for military aircraft ground attack training. Since 2004, WYARNG has acquired multiple properties increasing the size of the NTA by more than 25,000 acres.

The 25,000-acre STA consists of three training ranges, an obstacle course, a floating bridge training site (just south of the Cantonment Area), an Improvised Explosive Device (IED) course, a rappelling site, and a drop zone. In 2006, the 21,000-acre Gray Rocks Ranch property was acquired expanding the STA to its current size. Construction of a Live-Fire Shoot House, a Live-Fire Breech Facility, and an Urban Assault Course are planned within the STA in the coming year.

Forty-four ranges, totaling approximately 43,000 acres, were identified as *Inconclusive* in the Phase I Assessment and have potential MCOC pathways. MCOC sources from current or historical munitions use at operational areas include small, medium, and large caliber arms; pyrotechnics and obscurants; and other munitions systems including hand grenades, bombs, rockets, and missiles.

Due to the location of training activities at Camp Guernsey, there is one general primary source area and several secondary source areas identified for the Phase II Assessment. The primary source area, where the majority of training occurs, is located in the NTA. Five secondary source areas are located throughout the NTA and STA. Distinct potential MCOC source areas identified for the Phase II Assessment include:

NTA Dudded Impact Area and Associated Ranges – The primary source area is the dudded impact area, two demolition sites, live-fire convoy area, and 10 other additional ranges within and/or overlapping the dudded impact area used for a variety of activities including small arms artillery and mortar firing. Metals (copper, lead, antimony, and zinc), explosives, and perchlorate are all potential MCOC.

NTA Eastern Ranges – These ranges include drop zones used as large-caliber high-explosives projectile firing points, for the use of pyrotechnics and obscurants, and demolition areas used as powder bag burn areas. Potential MCOC include explosives and perchlorate.

NTA Central Ranges – These ranges include an Engineer Training Area currently used for pyrotechnics, obscurants, booby trap simulators, and detonation simulators. Drop zones with pyrotechnic/obscurant and large-caliber high explosives use are also found in this group of ranges. Potential MCOC include metals, explosives, and perchlorate.

STA Firing Range - The range is currently used for light maneuver, dismounted land navigation, and bivouacking, and includes use of pyrotechnics and small caliber blank

munitions. Historically, this area was used as a Rocket Propelled/Recoilless Rifle Grenade Range, a Combat Pistol Range, and a Highway Patrol Pistol Range. Potential MCOC include metals, explosives, and perchlorate.

STA Small Arms Ranges - Four small arms ranges within the STA surround or are near unnamed ephemeral drainages. Potential MCOC are metals.

STA Drop Zone - One drop zone, located in the cantonment area, has reported high pyrotechnics use and could potentially contain perchlorate.

MCOC may migrate from the potential source areas to human and ecological receptors via surface water pathways and/or surface water infiltration to groundwater. Groundwater in turn is also a source of water for springs located at the installation. Human receptors include recreational users of surface water and those using groundwater as a source of drinking water. Ecological receptors include the North Platte River recreational fishery, and potential off-range threatened and endangered species, including their preferred habitats, such as riparian wetlands.

Surface water, sediment, and groundwater samples were collected from locations downgradient of the source areas and several reference locations upgradient. **Figures 1, 2, 3, and 4** illustrate these locations and summarize the analytical results discussed below.

For the Phase II, surface water samples were collected at three NTA locations (GU02, GU04, and GU05) downstream of potential source areas and one reference location (GU01) during the wet season (May-June 2013), when streamflow was likely in the intermittent channels (**Figure 1**). These locations were located downgradient of springs/seeps. The downstream samples were analyzed for perchlorate, explosives, and metals MCOC. Reference samples were not analyzed for explosives as they are not naturally occurring and there was no potential source upstream of the reference location (**Table 1**). Potential diurnal variations in source water were accounted for by collecting 24-hour composite samples.

Sediment samples were collected as 30-increment composite samples from stream channels at six downstream locations and two reference locations in the NTA and STA (**Table 1**). Sediment samples were collected in the wet season and analyzed for metals. Samples for acid volatile sulfide / simultaneously extracted metals, and total organic carbon were also collected at NTA locations, as water was present during sampling. Given the high solubility of explosives and perchlorate, sediment samples were not analyzed for these constituents.

Groundwater samples were collected at eight downgradient locations and two background locations in the NTA and STA **(Table 1)**. Seasonal variations in groundwater were accounted for by collecting samples in both dry and wet seasons (September-October 2012 and May-June 2013). Samples were collected from eight existing Camp Guernsey wells and from two NTA groundwater springs/seeps. Monitoring well samples were collected using low-flow sampling protocols, and were purged prior to sampling. Spring/seep samples were collected as grab samples. Groundwater samples were analyzed for metals, explosives, and/or perchlorate as determined by upstream range activities.

Each MCOC was detected in samples from at least one sampling medium at Camp Guernsey. However, no MCOC concentration approaches or exceeds the respective project action limit (PAL) in any medium. The results of surface water, sediment, and groundwater sampling indicate that there are no unacceptable risks to off-range receptors due to MCOC migration.
Specific analytical findings supporting this conclusion for each media are discussed below:

Surface Water and Sediment:

Explosives MCOC were not detected in any Phase II surface water samples.

Perchlorate detections in downstream samples were similar to or below concentrations at the reference location and were orders of magnitude below the PAL.

Lead and zinc were below the limits of detection at all surface water locations.

Concentrations of antimony and copper detected at downstream surface water locations were similar to or slightly above concentrations detected at the reference location, but were orders of magnitude below respective PALs.

Metals concentrations at the majority of downstream sediment locations were consistent with or below reference concentrations, with the exception of GU05, along Sawmill Creek in the NTA. Although lead is approximately three times higher than the reference concentration, it is still less than half of the PAL and, therefore, not a concern.

Groundwater:

Explosives MCOC were detected in groundwater at low concentrations well below respective PALs during the dry season sampling events only. No explosives were detected in groundwater samples collected during the wet season.

At all downgradient groundwater locations, perchlorate was detected at concentrations orders of magnitude below the PAL.

In the NTA, metals MCOC at downgradient locations were either below the limits of detection or detected at concentrations lower than the reference location. All positive detections were orders of magnitude below the PALs.

In the STA, downgradient concentrations of antimony were similar to or lower than the reference concentrations and orders of magnitude below the PAL.

Downgradient concentrations of lead in the STA were consistently higher than reference concentrations but still orders of magnitude below the PAL. A minor exception was lead in MW08, where the maximum detection was approximately half the PAL.

Copper and zinc concentrations in downgradient wells in the STA were similar to or below reference concentrations. During one of the four groundwater sampling events, concentrations of each analyte were elevated, but still remained below their respective PALs.

Furthermore, surface water overland flow at Camp Guernsey is limited by low annual precipitation (13.8 inches per year [The Weather Channel, 2013]) and high infiltration and evapotranspiration rates, thereby restricting solid MCOC migration via soil erosion.

Based on the data collected and conditions observed in 2012 and 2013, there is no unacceptable risk to off-range human or ecological receptors from potential sources associated with the operational footprint at Camp Guernsey. Potential MCOC source-receptor pathways are currently incomplete at Camp Guernsey. Operational areas are placed into a review cycle to periodically evaluate whether changes in conditions pose unacceptable risk to off-range human or ecological receptors. Implementation of appropriate best management practices will reasonably ensure

limited MCOC migration from the potential sources associated with the Camp Guernsey operational footprint.

Table 1: Camp Guernsey Sampling Program

MCOC	Surface Water/Sediment Location																	
	GU01 (reference) NTA		GU02 NTA		GU03 NTA		GU04 NTA		GU05 NTA		GU06 STA		GU07 STA		GU08 STA		GU09 (reference) STA	
	SW	SD	SW	SD	SW	SD	SW	SD	SW	SD	SW	SD	SW	SD	SW	SD	SW	SD
Metals	X	X	X	X		X			X	X		X		X		X		X
Explosives			X				X		X									
Perchlorate	X		X				X		X									

MCOC = munitions constituents of concern
NTA = Northern Training Area
STA = Southern Training Area
SW = surface water
SD = sediment
Surface water and sediment samples were collected May-June 2013

MCOC	Groundwater Location									
	MW01 (background) NTA	MW02 NTA	SP03 NTA	SP04 NTA	MW05 NTA	MW06 (background) STA	MW07 STA	MW08 STA	MW09 STA	MW10 STA
Metals	X		X	X		X	X	X	X	
Explosives		X	X	X	X		X			
Perchlorate	X	X	X	X	X	X	X			X

MCOC = munitions constituents of concern
NTA = Northern Training Area
STA = Southern Training Area
Groundwater samples were collected September-October 2012 and May-June 2013

Camp Guernsey - Figure - 1
Surface Water & Sediment Results – Northern Training Area
May-June 2013
Operational Range Assessment Phase II

GU05		
Analyte	SW (µg/L)	SD (mg/kg)
Explosives	ND	NS
Perchlorate	0.23-0.27	NS
Sb	0.066-0.081	0.32-0.36
Cu	ND-0.545	12.7-13.6
Pb	ND	19.2-21.4
Zn	ND	54.1-57.8

GU01 (reference)		
Analyte	SW (µg/L)	SD (mg/kg)
Explosives	NS	NS
Perchlorate	0.31-0.36	NS
Sb	0.066-0.073	0.18-0.19
Cu	ND-0.388	6.96-7.69
Pb	ND	7.84-8.86
Zn	ND	38-41.4

GU04		
Analyte	SW (µg/L)	SD (mg/kg)
Explosives	ND	-
Perchlorate	0.3-0.36	-
Sb	NS	-
Cu	NS	-
Pb	NS	-
Zn	NS	-

GU02		
Analyte	SW (µg/L)	SD (mg/kg)
Explosives	ND	NS
Perchlorate	0.27-0.4	NS
Sb	0.068-0.15	0.17-0.2
Cu	ND-0.552	5.95-6.52
Pb	ND	6.93-7.87
Zn	ND	25.3-27.3

GU03		
Analyte	SW (µg/L)	SD (mg/kg)
Explosives	-	NS
Perchlorate	-	NS
Sb	-	0.28-0.3
Cu	-	8.24-8.74
Pb	-	9.84-10.7
Zn	-	38.2-39.6

Project Action Limits (PAL)		
Analyte	Surface Water (SW) µg/L (Hardness = 214 mg/L)	Sediment (SD) mg/kg
Perchlorate	9,300	NA
Antimony (Sb)	30	12
Copper (Cu)	17.16	34
Lead (Pb)	5.7	47
Zinc (Zn)	225	150

NS Not Sampled
ND Concentration below detection limit
- Media not collected at this sampling location

Legend

Installation
- Camp Guernsey, WY
- Other than Operational

Phase I Category
- Inconclusive
- Unlikely

Sampling Locations
- Stream Sampling Location

Hydrology
- River/Stream
- Water Body
- Surface Water Flow Direction
- NWI Wetland

Data Sources:
AEC, 2007
WY State Engineer's Office, Wells, 2011
Street Map: ESRI Street Maps 9.3, North America
Shaded Relief: ESRI ArcGIS Online and data partners, 2009
Surface Water: Modified from National Hydrography Dataset

Date.....March 2014
Prepared by.....URS Group, Inc.

Camp Guernsey - Figure - 2
Sediment Results – Southern Training Area
May-June 2013
Operational Range Assessment Phase II

GU06	
Analyte	**SD (mg/kg)**
Sb	0.04-0.06
Cu	1.87-2.21
Pb	1.7-2.01
Zn	6.4-7.49

GU07	
Analyte	**SD (mg/kg)**
Sb	0.24-0.28
Cu	7.26-8.4
Pb	7.27-7.76
Zn	29.8-33.2

GU08	
Analyte	**SD (mg/kg)**
Sb	0.15-0.16
Cu	6.55-7.08
Pb	6.45-6.74
Zn	31.3-33

GU09 (reference)	
Analyte	**SD (mg/kg)**
Sb	0.24-.026
Cu	7.81-7.96
Pb	9.04-9.32
Zn	33.1-35.3

Project Action Limits (PAL)	
Analyte	**Sediment (SD) mg/kg**
Antimony (Sb)	12
Copper (Cu)	34
Lead (Pb)	47
Zinc (Zn)	150

Legend

Installation
- Camp Guernsey, WY
- Other than Operational

Phase I Category
- Inconclusive
- Unlikely

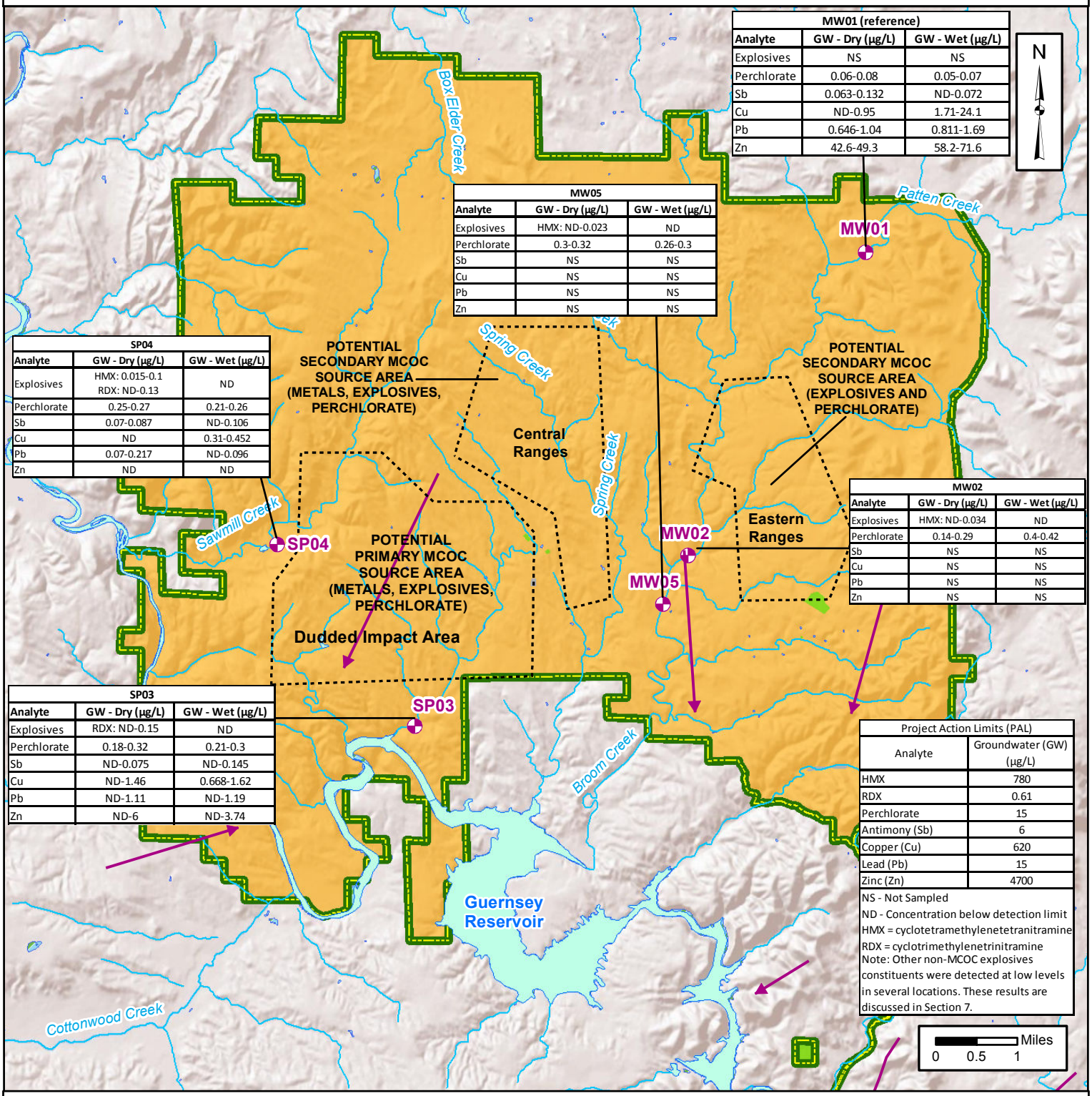
Sampling Locations
- Stream Sampling Location
- Groundwater Sampling Location

Hydrology
- River/Stream
- Water Body
- Surface Water Flow Direction
- NWI Wetland

Data Sources:
AEC, 2007
WY State Engineer's Office, Wells, 2011
Street Map: ESRI Street Maps 9.3, North America
Shaded Relief: ESRI ArcGIS Online and data partners, 2009
Surface Water: Modified from National Hydrography Dataset

Date.....March 2014
Prepared by.....URS Group, Inc.

Camp Guernsey - Figure - 3
Groundwater Results – Northern Training Area
Dry (September-October 2012) & Wet (May-June 2013) Seasons
Operational Range Assessment Phase II



MW01 (reference)		
Analyte	GW - Dry (µg/L)	GW - Wet (µg/L)
Explosives	NS	NS
Perchlorate	0.06-0.08	0.05-0.07
Sb	0.063-0.132	ND-0.072
Cu	ND-0.95	1.71-24.1
Pb	0.646-1.04	0.811-1.69
Zn	42.6-49.3	58.2-71.6

MW05		
Analyte	GW - Dry (µg/L)	GW - Wet (µg/L)
Explosives	HMX: ND-0.023	ND
Perchlorate	0.3-0.32	0.26-0.3
Sb	NS	NS
Cu	NS	NS
Pb	NS	NS
Zn	NS	NS

SP04		
Analyte	GW - Dry (µg/L)	GW - Wet (µg/L)
Explosives	HMX: 0.015-0.1 RDX: ND-0.13	ND
Perchlorate	0.25-0.27	0.21-0.26
Sb	0.07-0.087	ND-0.106
Cu	ND	0.31-0.452
Pb	0.07-0.217	ND-0.096
Zn	ND	ND

MW02		
Analyte	GW - Dry (µg/L)	GW - Wet (µg/L)
Explosives	HMX: ND-0.034	ND
Perchlorate	0.14-0.29	0.4-0.42
Sb	NS	NS
Cu	NS	NS
Pb	NS	NS
Zn	NS	NS

SP03		
Analyte	GW - Dry (µg/L)	GW - Wet (µg/L)
Explosives	RDX: ND-0.15	ND
Perchlorate	0.18-0.32	0.21-0.3
Sb	ND-0.075	ND-0.145
Cu	ND-1.46	0.668-1.62
Pb	ND-1.11	ND-1.19
Zn	ND-6	ND-3.74

Project Action Limits (PAL)	
Analyte	Groundwater (GW) (µg/L)
HMX	780
RDX	0.61
Perchlorate	15
Antimony (Sb)	6
Copper (Cu)	620
Lead (Pb)	15
Zinc (Zn)	4700

NS - Not Sampled
ND - Concentration below detection limit
HMX = cyclotetramethylenetetranitramine
RDX = cyclotrimethylenetrinitramine
Note: Other non-MCOC explosives constituents were detected at low levels in several locations. These results are discussed in Section 7.

Legend

Installation
- Camp Guernsey, WY
- Other than Operational

Phase I Category
- Inconclusive
- Unlikely

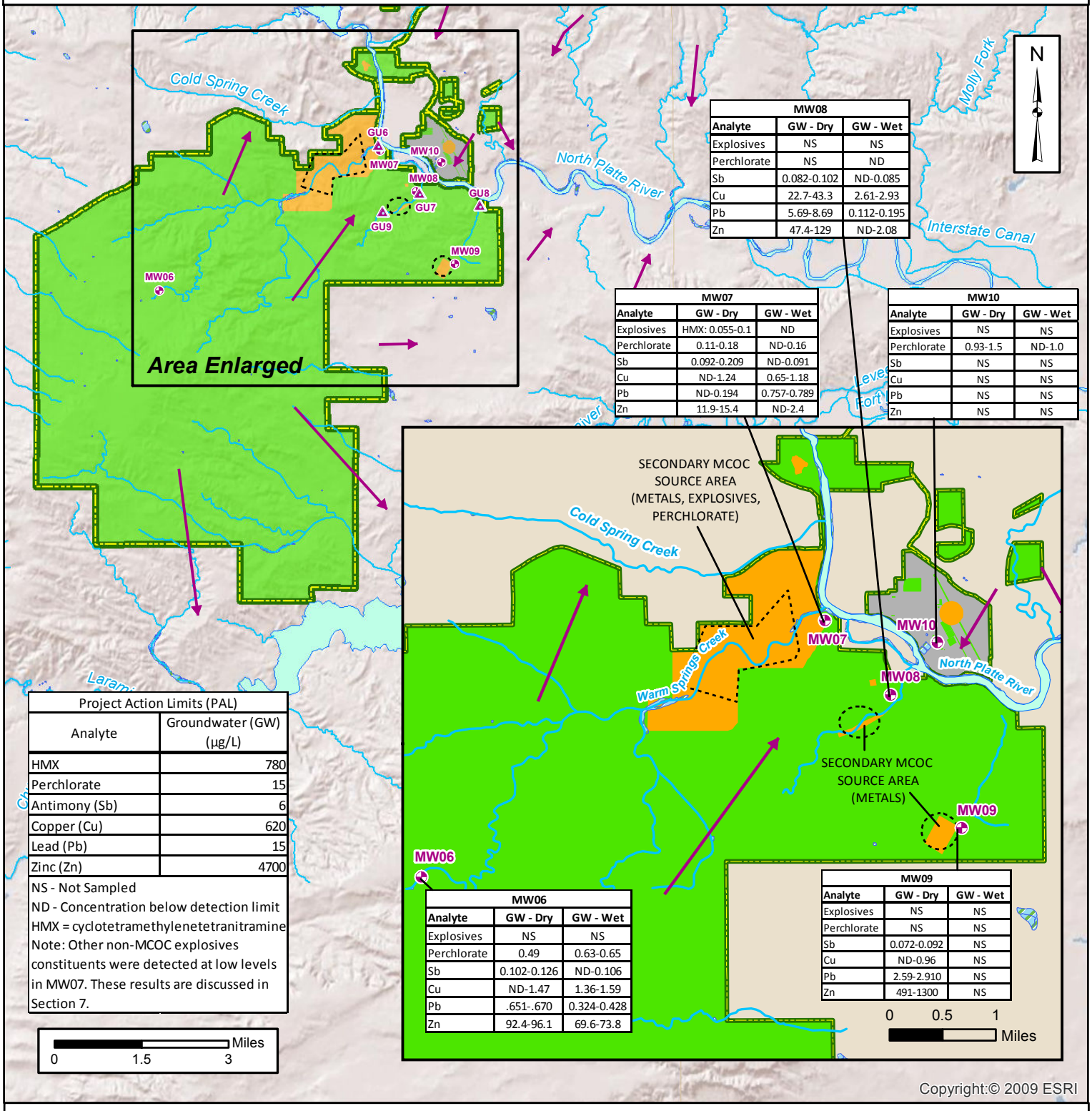
Sampling Locations
- Groundwater Sampling Location

Hydrology
- River/Stream
- Water Body
- Groundwater Flow Direction
- Wetland

Data Sources:
AEC, 2007
WY State Engineer's Office, Wells, 2011
Street Map: ESRI Street Maps 9.3, North America
Shaded Relief: ESRI ArcGIS Online and data partners, 2009
Surface Water: Modified from National Hydrography Dataset

Date.....October 2013
Prepared by.....URS Group, Inc.

Camp Guernsey - Figure - 4
Groundwater Results – Southern Training Area
Dry (September-October 2012) & Wet (May-June 2013) Seasons
Operational Range Assessment Phase II



MW08		
Analyte	GW - Dry	GW - Wet
Explosives	NS	NS
Perchlorate	NS	ND
Sb	0.082-0.102	ND-0.085
Cu	22.7-43.3	2.61-2.93
Pb	5.69-8.69	0.112-0.195
Zn	47.4-129	ND-2.08

MW07		
Analyte	GW - Dry	GW - Wet
Explosives	HMX: 0.055-0.1	ND
Perchlorate	0.11-0.18	ND-0.16
Sb	0.092-0.209	ND-0.091
Cu	ND-1.24	0.65-1.18
Pb	ND-0.194	0.757-0.789
Zn	11.9-15.4	ND-2.4

MW10		
Analyte	GW - Dry	GW - Wet
Explosives	NS	NS
Perchlorate	0.93-1.5	ND-1.0
Sb	NS	NS
Cu	NS	NS
Pb	NS	NS
Zn	NS	NS

Project Action Limits (PAL)	
Analyte	Groundwater (GW) (µg/L)
HMX	780
Perchlorate	15
Antimony (Sb)	6
Copper (Cu)	620
Lead (Pb)	15
Zinc (Zn)	4700

NS - Not Sampled
ND - Concentration below detection limit
HMX = cyclotetramethylenetetranitramine
Note: Other non-MCOC explosives constituents were detected at low levels in MW07. These results are discussed in Section 7.

0 1.5 3 Miles

MW06		
Analyte	GW - Dry	GW - Wet
Explosives	NS	NS
Perchlorate	0.49	0.63-0.65
Sb	0.102-0.126	ND-0.106
Cu	ND-1.47	1.36-1.59
Pb	.651-.670	0.324-0.428
Zn	92.4-96.1	69.6-73.8

MW09		
Analyte	GW - Dry	GW - Wet
Explosives	NS	NS
Perchlorate	NS	NS
Sb	0.072-0.092	NS
Cu	ND-0.96	NS
Pb	2.59-2.910	NS
Zn	491-1300	NS

Legend

Installation
- Camp Guernsey, WY
- Other than Operational

Phase I Category
- Inconclusive
- Unlikely

Sampling Locations
- Stream Sampling Location
- Groundwater Sampling Location

Hydrology
- River/Stream
- Water Body
- Groundwater Flow Direction
- Wetland

Data Sources:
AEC, 2007
WY State Engineer's Office, Wells, 2011
Street Map: ESRI Street Maps 9.3, North America
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Surface Water: Modified from National Hydrography Dataset

Date.....October 2013
Prepared by.....URS Group, Inc.

INTEGRATED NATURAL RESOURCE MANAGEMENT PLAN FOR CAMP GUERNSEY

2015

WYOMING ARMY NATIONAL GUARD

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CAMP GUERNSEY INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

This Integrated Natural Resources Management Plan (INRMP) meets the requirements for INRMPs as specified in the Sikes Act, as amended (16 USC §670a et seq.). It has set appropriate and adequate guidelines for the conservation, utilization, and rehabilitation of natural resources on Camp Guernsey (a State-owned National Guard Installation) consistent with its use as a military training and maneuver range.

Approving Officials:

_____ Date: _____
Erik Gordon
Colonel, U.S. Army
Division Chief, ARNG-IE

_____ Date: _____
K. Luke Reiner
Major General, Wyoming Military Department
Adjutant General

Implementation of the activities in this INRMP will adequately conserve and protect fish and wildlife resources under our jurisdiction.

Mark Sattelberg Date: 11-10-15
R. Mark Sattelberg
US Fish and Wildlife Service
Wyoming Ecological Services Field Office Field Supervisor

John Kennedy Date: 11/12/15
John Kennedy
Wyoming Game and Fish Department
Deputy Director

As a land management agency with jurisdiction over property within the installation boundary, we concur with implementation of the proposed land management activities in this INRMP.

_____ Date: _____
Stephanie Connolly
Bureau of Land Management
High Plains District Manager

_____ Date: _____
Bridget Hill
WY Office of State Lands and Investments
Director

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Acronyms

AIS	Aquatic Invasive Species
AQCR	Air Quality Control Region
AR	Army Regulation
ARNG-ILE	Army National Guard Installations, Logistics, and Environmental
AUD	Animal Unit Day
AUM	Animal Unit Month
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	Best Management Practice
BoR	Bureau of Reclamation
CFMO	Construction and Facilities Management Office
DoA	Department of the Army
DoD	Department of Defense
DoDI	Department of Defense Instruction
EA	Environmental Assessment
EMD	Environmental Management Division
EPA	Environmental Protection Agency
ºF	degrees Fahrenheit
FEMA	Federal Emergency Management Agency
FMU	Fire Management Unit
FNSI	Finding of No Significant Impact
ft	feet
GIS	Geographic Information Systems
HMA	Hunter Management Area
ICS	Incident Command System
IED	Improvised Explosive Device
in	inches
INRMP	Integrated Resource Management Plan
ITAM	Integrated Training Area Management
IWFMP	Integrated Wildland Fire Management Plan
MCOC	Munitions Constituents Of Concern
MOU	Memorandum of Understanding
MOUT	Military Operations in Urban Terrain
MPH	Miles per hour
NAAQS	National Ambient Air Quality Standards
NHD	Natural Hydrography Dataset
NWI	Natural Wetlands Inventory
NGB	National Guard Bureau
NWCG	National Wildfire Coordinating Group
NEPA	National Environmental Policy Act
NTA	North Training Area
NRCS	Natural Resources Conservation Service
O&M	Operation and Maintenance
ORV	Off Road Vehicle

PARC	Partners in Amphibian and Reptile Conservation
PLS	Planning Level Survey
PPE	Personal Protective Equipment
RAWS	Remote Automated Weather Station
ROW	Right of way
SAM-SCUD	Surface-to-Air Missile-SCUD
SHPO	State Historic Preservation Office
SPCC	Spill Prevention, Control, and Countermeasure
STA	South Training Area
STEP	Status Tool for the Environmental Program
SWAP	State Wildlife Action Plan
TAG	The Adjunct General
T&E	Threatened and Endangered
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WAAQS	Wyoming Ambient Air Quality Standards
WDEQ	Wyoming Department of Environmental Quality
WGFD	Wyoming Game and Fish Department
WYARNG	Wyoming Army National Guard
WYMD	Wyoming Military Department
WYPDES	Wyoming Pollutant Discharge Elimination System

EXECUTIVE SUMMARY

The U.S. Department of Defense is responsible under the Sikes Act (most recently amended through Public Law 113-291, December 19, 2014 and codified at 16 U.S.C. §670 - 670f) for implementing a program to provide for the conservation and rehabilitation of natural resources on military installation and State-owned National Guard installations. The purpose of this program is to ensure the preparedness of the Armed Forces and to provide for:

- *the conservation and rehabilitation of natural resources on such installations;*
- *the sustainable multipurpose use of the resources on such installations, which shall include hunting, fishing, trapping, and non-consumptive uses; and*
- *subject to safety requirements and military security, provide public access to military installations.*

The Army's *Strategy for the Environment* (Department of the Army [DoA] 2004) establishes a long-range vision for the Army to meet its mission today and into the future. Sustainability is placed at the core of the *Strategy* and moves the focus beyond simple compliance with environmental regulations towards a focus on environmental stewardship. The *Strategy* applies a community, regional, and ecosystem approach to managing natural resources. The programs and actions in this Integrated Natural Resource Management Plan (INRMP) not only achieve compliance with laws and regulations (e.g. Migratory Bird Treaty Act, Endangered Species Act, etc.…) but also outline a program that will sustain ecosystems on Camp Guernsey through active management and stewardship.

The INRMP is also designed to support the mission of Camp Guernsey which is to provide "…relevant, ready, responsive air and ground training space, training ranges, support facilities and services in order to enable operational elements to train to standard for Federal and State Mission requirements and enable generating elements to support operational requirements."

The INRMP process includes annual updates and five year reviews for operation and effect which provides an opportunity for all stakeholders to comment on natural resource issues. Mandatory annual coordination with United States Fish and Wildlife Service (USFWS) and Wyoming Game and Fish Department (WGFD) ensures that federally protected species and wildlife resources are appropriately addressed.

The *Integrated Wildland Fire Management Plan*, *Grazing Management Plan*, *Integrated Training Area Management (ITAM) Plan*, and *Integrated Pest Management Plan* are, or will be, supporting plans. All supporting plans must integrate the management goals and objectives detailed in the INRMP.

There are six primary military drivers that provide the focus for the natural resource management objectives in the INRMP:

1. Ensure sustained use of lands for military training and align natural resource management activities with training and readiness activities.

2. Enhance future training uses of the Camp Guernsey training ranges, training areas and airspace by fully integrating the *Range Complex Master Plan*.
3. Support all military training activities while maintaining existing habitats to support known populations of federally protected species in compliance with the Endangered Species Act, the Bald and Golden Eagle Act, and the Migratory Bird Treaty Act.
4. Ensure continued military training use through the management of watersheds to protect diverse natural aquatic and riparian communities and by complying with the Clean Water Act.
5. Manage training site data to facilitate decision-making that integrates military training requirements with natural resources information and minimizes new environmental restrictions on the installation.
6. To the extent possible, enhance the multiple use and recreational opportunities at Camp Guernsey.

The overriding goal of the INRMP is to maintain and improve the ecological integrity of lands in Camp Guernsey in order to ensure that the maximum amount of land is available to provide quality military training. This INRMP identifies nineteen Program Elements for which natural resource management will focus on over the next five years. Most of these Program Elements have a defined goal(s) which is supported by objectives and projects designed to meet the goal. Completion of projects will be dependent on funding, as well as changing priorities over the next five years.

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Appendices

1.0 OVERVIEW

1.1 AUTHORITY

In recognition that military lands have significant natural resources, Congress enacted the Sikes Act in 1960 to address wildlife conservation and public access on military installations. The 1997 amendments to the Sikes Act require the Department of Defense (DOD) to develop and implement an *Integrated Natural Resource Management Plan* (INRMP) for each military installation with significant natural resources. A 2012 amendment to the Sikes Act authorizes the preparation of INRMPs for State-owned National Guard installations used for training pursuant to Chapter 5 of Title 32 of the United States Code. INRMPs provide for the management of natural resources, including fish and wildlife and their habitats. To the maximum extent practicable, they incorporate ecosystem management principles, and describe procedures and projects that manage and maintain the landscapes necessary to sustain military-controlled lands for mission purposes. INRMPs also allow for multipurpose uses of resources, including public access appropriate for those uses, provided such access does not conflict with military land use, security requirements, safety, or ecosystem needs, including the needs of fish and wildlife resources.

The U.S. Department of Defense is responsible under the Sikes Act (most recently amended through Public Law 113-291, December 19, 2014 and codified at 16 U.S.C. §670 - 670f) for carrying out a program to provide for the conservation and rehabilitation of natural resources on military installations and State-owned National Guard installations. The purpose of this program is to ensure the preparedness of the Armed Forces and to provide for:

- *the conservation and rehabilitation of natural resources on such installations;*
- *the sustainable multipurpose use of the resources on such installations, which shall include hunting, fishing, trapping, and non-consumptive uses; and*
- *subject to safety requirements and military security, provide public access to military installations to facilitate the use.*

The Sikes Act requires the Secretary of each military department to prepare and implement an INRMP for each "military installation" that contains significant natural resources. The Sikes Act allows the Secretary of a military department to prepare and implement an INRMP for a "State-owned National Guard installation" on lands designated for use by the DoD. INRMPs on State-owned National Guard installations must be developed and implemented in coordination with the chief executive officer of the state in which the State-owned National Guard installation is located. Both types of INRMPs (military installation and State-owned National Guard installation) must be prepared in cooperation with the Secretary of the Interior, acting through the Director of the United States Fish and Wildlife Service (USFWS), and the head of each appropriate state fish and wildlife agency. The resulting plan for the installation shall reflect the mutual agreement of these parties concerning conservation, protection, and management of fish and wildlife resources.

Under the Sikes Act, Camp Guernsey is a "State-owned National Guard installation" and not a "military installation". The appropriate state fish and wildlife agency in Wyoming is the Wyoming Game and Fish Department (WGFD) and the delegated chief executive officer for the Wyoming Military Department (WYMD) is the Wyoming National Guard Adjutant General (TAG).

The Army's *Strategy for the Environment* (DoA 2004) establishes a long-range vision for the Army to meet its mission today and into the future. Sustainability is placed at the core of the *Strategy* and moves the focus beyond simple compliance with environmental regulations towards a focus on environmental stewardship. The *Strategy* applies a community, regional, and ecosystem approach to managing natural resources. The programs and actions in this INRMP not only achieve compliance with laws and regulations (e.g. Migratory Bird Treaty Act, Endangered Species Act, et cetera) but also outline a program that will sustain ecosystems on Camp Guernsey through active management and stewardship.

Various other DoD, Department of Army (DoA), and National Guard Bureau (NGB) documents provide additional guidance for INRMP coordination and implementation. The primary guidance documents are: *DoD Manual, Number 4715.03* (Nov 2013), *INRMP Implementation Manual; DoD Instruction, Number 4715.03* (March 2011), *Natural Resources Conservation Manual; and NGB Army National Guard Guidance for Creation, Implementation, Review, Revision, and Update of INRMPs* (April 2012).

1.2 AGENCY AND PUBLIC COORDINATION, REVIEW, AND INVOLVEMENT

This INRMP has been developed and will be implemented in coordination with the chief executive officer for the Wyoming Military Department (TAG) and the Chief Army National Guard Environmental Program Division. The United States Fish and Wildlife Service (USFWS) and the Wyoming Game and Fish Department (WGFD) have mutually agreed that the activities in this INRMP will adequately conserve and protect fish and wildlife resources under their jurisdiction. The Bureau of Land Management (BLM) and WY Office of State Lands and Investments, who have jurisdiction over property within the Installation boundary, have declined to sign the INRMP until a broader land use agreement is in place. The Bureau of Reclamation (BoR), pursuant to the terms of Free Use Permit issued to the Stateof Wyoming, has no objections to the implementation of the INRMP.

The INRMP Environmental Assessment ([EA] Appendix G) contains a detailed description of the public and agency coordination, review, and involvement process that was conducted in preparation of this INRMP.

1.3 INRMP REVIEW AND REVISION PROCESS

The INRMP is a living document. It will be continuously updated and refined as it is coordinated within the Wyoming Army National Guard (WYARNG) and with the USFWS and WGFD. The WYARNG, USFWS, and WGFD will meet annually to review the accomplishments and planned natural resource projects. The Sikes Act requires the INRMP to be "*reviewed as to operation and effect by the parties thereto on a regular basis, but not less often than every 5 years*." Based on such review, a revision may be necessary, but the timeframe for publication of such revision is not mandated by statute. During the revision process, the current INRMP remains in effect and the responsibility and authority of the USFWS and the WGFD towards applicable natural resource laws and regulations also remains in full effect. If all three parties agree that this INRMP is effective and needs no significant changes, then it can be extended by signatures or letters of concurrence by all three parties. The annual review will discuss, at a minimum, the metrics specified in *Department of Defense Instruction (DoDI) 4715.03* for assessing annually how well

the INRMP applies conservation efforts in order to ensure no net loss of military training land capacity of the installation.

INRMPs are classified into one of four phases (DoD 2013):

Compliant INRMP - An INRMP that has been both approved in writing, and reviewed, within the past five years, as to the operation and effect, by authorized officials of the DoD (e.g., NGB), Department of the Interior (DoI) (e.g., USFWS), and each appropriate state fish and wildlife agency (e.g., WGFD).

Review for Operation and Effect - A comprehensive, joint review by the parties to the INRMP (e.g., WYARNG, NGB, USFWS, and WGFD), conducted no less often than every five years, to determine whether the plan needs an update or revision to continue to adequately address Sikes Act purposes and requirements.

INRMP Update - Any change to an INRMP that, if implemented, is not expected to result in consequences materially different from those in the existing INRMP and analyzed in an existing National Environmental Policy Act (NEPA) document. Such changes will not result in a significant environmental impact, and installations are not required to invite the public to review or to comment on the decision to continue implementing the updated INRMP.

INRMP Revision - Any change to an INRMP that, if implemented, may result in a significant environmental impact, including those not anticipated by the parties to the INRMP when the plan was last approved and/or reviewed as to operation and effect. All such revisions require approval by all parties to the INRMP, and will require a new or supplemental NEPA analysis.

The DoD, USFWS, and state wildlife agencies have released *Guidelines for Streamlined INRMP Review* (DoD 2015) which streamline the processes for making minor updates to existing INRMPs. The guidelines clarify and describe the process for review and concurring on updates to existing INRMPs. These Guidelines do not apply to newly developed INRMPs or to INRMPs undergoing major changes (i.e., revisions). The use of updates is intended to reduce the workload for all involved agencies while maintaining both INRMP currency and mission flexibility.

1.3.1 INRMP Updates

When the WYARNG updates this INRMP, the update will be clear and concise, and its format will match or be complementary to the INRMP. The update will clearly describe the scope and location of all proposed changes in an accompanying text, table, or matrix format, and the changes themselves will be captured in the INRMP using the track changes function. A transmittal letter to the WGFD and USFWS summarizing the changes will accompany the package, which will include the track changes INRMP and the text, table, or matrix describing the proposed update. All proposed changes will be clear and easy to understand.

The existing/operational INRMP will remain in effect while the update is under review. Once all parties agree to the requested changes, the WGFD, USFWS, and WYARNG representatives will sign the update. Once finalized, the updated INRMP will be considered reviewed for operation and effect, and will restart the five-year window for being compliant.

1.4 SCOPE

Camp Guernsey is the major training area in Wyoming for realistic combat training and may be used for training events for up to a brigade size element (3,500 soldiers). Camp Guernsey encompasses approximately 79,000 acres of land that is primarily owned by the Wyoming Military Department (WYMD). Other land owners within the Installation boundary include the BLM, BoR, and Wyoming Office of State Lands and Investments (State School Trust).The INRMP includes input from diverse stakeholders including federal, state and local agency representatives, conservation organizations, lessees and interested individuals.

This INRMP outlines natural resource efforts for Camp Guernsey and establishes work priorities to ensure compliance with related environmental laws and regulations for the next five years, while maintaining and providing realistic training with minimal restrictions. The INRMP considers resources on installation and regional levels. National Historic Preservation Act requirements are addressed within the Integrated *Cultural Resource Management Plan* (Wyoming Army National Guard [WYARNG] *Draft*)

As required under the Sikes Act, this INRMP reflects mutual agreement of the USFWS and the WGFD concerning conservation, protection and management of federally protected species and fish and wildlife resources. It does not replace or affect federal laws, or state responsibility and authority for protecting fish and wildlife resources.

WYARNG first developed an INRMP for Camp Guernsey that served as a planning document for 2002-2006. There were draft revisions to the INRMP in 2006 and 2010, but neither was finalized. Lands acquired since the 2002 INRMP and an increased training demand trigger a plan revision. Since 2002, 38,925 acres have been acquired by WYARNG from private land owners. (Table 1; Appendix A, Figure A-1). These private lands encompassed an additional 3,000 acres of BLM and 2,000 acres of State School Trust lands that now fall within the Camp Guernsey installation boundary. Due to the significant increase in training lands acquired since the last INRMP and the expansion in military uses of Camp Guernsey, an Environmental Assessment (EA) is required.

Table 1. Private land additions to Camp Guernsey since 2002 INRMP.

Purchased From	Year	Acres
Cundall	2004	600
Osburn[1]	2004	5,450
Walsh/Pruss	2005	958
Gray Rocks	2006	16,483
Sincher	2006	565
Smith	2006	2,195
Dunham	2007	80
Heidner[2]	2008	1240
Heidner	2010	1317
Osburn	2010	7913
Schamel	2010	1622
Borden	2011	40
Duerden	2012	462
Total		**38,925**

[1]There are two Osburn acquisitions
[2]There are two Heidner acquisitions

1.5 RESPONSIBILITIES

Per amendments to 10 United States Code (USC) 10501, described in DoD Directive 5105.77 (21 May 2008), the National Guard Bureau (NGB) is a joint activity of the Department of Defense. NGB serves as a channel for communication and funding between the U.S. Army and State Guard organizations in the 54 U.S. states and territories. The Army National Guard is a Directorate within NGB. The Army National Guard -Installations, Logistics, and Environmental (ARNG-ILE) division is responsible for Army National Guard environmental topics. The Army National Guard - Environmental Programs Division Chief is the federal decision-maker responsible for review and approval of this INRMP. The ARNG-ILE is also

involved in programming, funding, and reviewing the implementation of projects set forth in the INRMP.

The Wyoming National Guard Adjutant General (TAG) is responsible for natural resource management on lands owned by the Wyoming Military Department (WYMD) and the acquisition and compliance with land use leases and agreements on lands not owned by, but used by, the WYARNG. As the responsible party for WYARNG natural resources, the TAG has delegated implementation authority for natural resources management as specified in the approved INRMP, to the Construction and Facilities Management Office (CFMO)-Environmental Program Manager. The CFMO-Environmental Management Division (EMD), under the direction of the Environmental Program Manager, is responsible for the development and implementation of the INRMP, developing projects, securing required permits, conducting field studies, providing environmental awareness materials, identifying natural and cultural resources, and directing the NEPA process. The CFMO environmental staff also carry out the daily natural resource management activities specified in the approved INRMP and prepare management recommendations for the CFMO-Environmental Program Manager. Other WYARNG personnel, such as the Camp Guernsey Base Operations Manager, Integrated Training Area Manager (ITAM), Range Operations Managers, Department of Public Works, and Air Operations Manager have functions that involve the management of natural resources and they coordinate their activities with the CFMO-Environmental Program Manager.

The WGFD and USFWS are signatories on the INRMP and are annually solicited by the WYARNG for input on the management of natural resources under their jurisdiction at Camp Guernsey. The WGFD provides guidance on wildlife and their habitat. The USFWS provide guidance on the Endangered Species Act, Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, the Clean Water Act, and the Fish and Wildlife Coordination Act.

The Environmental Assessment in Appendix G presents the list of all agencies, local governments, Native American representatives, and interested parties that were contacted in preparation of this INRMP.

1.6 MANAGEMENT PHILOSOPHY

The WYARNG has a no-net-loss of training capacity policy which requires a comprehensive and detailed identification of the various environmental constraints and then development of focused and detailed management plans to address these constraints in full compliance with all applicable environmental laws. It is WYARNG's policy is to maintain 100% compliance with all applicable environmental laws. The WYARNG also recognizes that, in many cases, the voluntary protection of sensitive environmental resources can be accomplished with minimal impacts on military training. Thus, the incorporation of various best management practices (BMPs), which originate in various federal and state guidelines, have been integrated into this INRMP with the specific caveat that these recommendations result in no-net-loss of training land capacity.

1.6.1 Military Drivers

Camp Guernsey specific drivers are defined by the military mission, land uses to support the mission, geographic location and natural resources affected by the mission. There are six primary

military drivers for this revised INRMP. Military drivers provide the focus for the natural resource management objectives and management components found in the INRMP:

1. Ensure sustained use of lands for military training and align land management priorities with training and readiness priorities.
2. Enhance future training uses of the Camp Guernsey training ranges, training areas and airspace by fully integrating the *Range Complex Master Plan*
3. Support all military training activities while maintaining existing habitats to support known populations federally protected species in compliance with the Endangered Species Act, the Bald and Golden Eagle Protection Act, and the Migratory Bird Treaty Act
4. Ensure continued military training use through the management of watersheds to protect diverse natural aquatic and riparian communities and by complying with the Clean Water Act.
5. Manage training site data to facilitate decision-making that integrates military training requirements with natural resources information and minimizes new environmental restrictions on the training complex.
6. To the extent possible, enhance the recreational opportunities for the military and civilian communities.

1.6.2 Ecosystem Management

Management of natural resources will support sustainable military use through the application of an integrated approach to ecosystem management. An ecosystem, by definition is a dynamic and natural complex of living organisms interacting with each other and with their associated non-living environment.

> *All DoD natural resources conservation program activities shall work to guarantee DoD continued access to its land, air, and water resources for realistic military training and testing and to sustain the long-term ecological integrity of the resource base and the ecosystem services it provides, in accordance with section 670a-670o of title 16, United States Code* (U.S.C.) (DoD 2011).

The first priority of Camp Guernsey is to provide quality training for military personnel. To do this, the Camp must have facilities and training areas that support realistic training scenarios. The success of military training maneuvers depends on natural resources. For example, high quality vegetation is required to provide cover and concealment. It is in the military's best interest, therefore, to protect vegetation. It is WYARNG's intent to encourage all types of training on our installation and not to restrict use of land. We will use aggressive measures to remediate any areas damaged through training.

DoD Instruction (DoDI) 4715.3 outlines ten principles and guidelines to help accomplish the ecosystem management goals set by DoD. The INRMP process includes broad goals to guide management goals. The following principles and guidelines have been incorporated into the WYARNG management strategies:

1. **Maintain and/or improve the sustainability and native biological diversity of ecosystems.** Camp Guernsey is home to numerous plant and animal species and supports a number of unique biological communities.
2. **Administer with consideration of ecological units and timeframes.** Installation activities, if looked at spatially and temporally, can have cumulative ecological effects that may be significant for natural resources. If possible, the consideration of regional cumulative ecological effects from Camp Guernsey and surrounding landowners will be beneficial.
3. **Support sustainable human activities.** Consistent with mission requirements, actions should support sustainable development and multiple uses such as recreation and livestock grazing.
4. **Develop a vision of ecosystem health.** All stakeholders should collaborate in developing a shared vision of what constitutes desirable future ecosystem conditions for Camp Guernsey.
5. **Develop priorities and reconcile conflicts.** Successful approaches should include mechanisms for establishing priorities among the objectives and for conflict resolution during both the selection of the ecosystem management objectives and the methods for meeting those objectives.
6. **Develop coordinated approaches to work toward ecosystem health.** Coordination first takes place among the military operational community. As ecosystems rarely coincide with ownership and political boundaries, the WYARNG also coordinates with surrounding landowners.
7. **Rely on best science and data and develop adaptive management tools.** Camp Guernsey is committed to the collection, maintenance, and use of scientific data required for making sound natural resource and land use management decisions.
8. **Use benchmarks to monitor and evaluate outcomes.** This approach depends on specific measurable objectives to evaluate activities in the natural ecosystem. This revised INRMP will include goals and measurable objectives and project schedules for Camp Guernsey.
9. **Use adaptive management.** Based on periodic reviews of implementation, make adjustments to the standards and guidelines applicable to management activities affecting the ecosystem.
10. **Implement through installation plans and programs.** Management activities identified in this INRMP must be incorporated into other planning and budgeting documents which help direct land management planning at Camp Guernsey.

Camp Guernsey will use ecosystem management concepts to guide its program for the next five years and beyond. This management philosophy enables the installation to provide military training while protecting the natural resources upon which the quality of training ultimately depends. Ecosystem management also helps ensure compliance with environmental laws and production of renewable natural resource products.

1.7 IMPLEMENTATION

Formal adoption of this INRMP by the WY National Guard constitutes a commitment to seek funding and execute projects, subject to the availability of funding, resources, and command priorities. All actions in this INRMP are subject to the availability of funds properly authorized

and appropriated under federal and state law. Nothing in this INRMP is intended to be nor shall be construed to be a violation of the Anti-Deficiency Act, 31 USC § 13.

2.0 CURRENT CONDITIONS & USE

2.1 GENERAL DESCRIPTION

Camp Guernsey covers approximately 79,000 acres. The training site is located in southeastern Wyoming approximately 80 miles north of Cheyenne, 90 miles southeast of Casper, and 15 miles east of Interstate 25 (I-25). Camp Guernsey partially surrounds the towns of Guernsey and Hartville and is located between the towns of Wheatland, Fort Laramie, and Glendo in Platte County (Appendix A, Figure A-2).

Camp Guernsey consists of the Cantonment Area, North Training Area (NTA) and South Training Area (STA). The Cantonment Area lies adjacent to the Town of Guernsey which has a population of approximately 1,200. The STA lies south and southwest of the Cantonment Area, while NTA is north of Guernsey State Park (Appendix A, Figure A-2).

2.2 INSTALLATION HISTORY

The historic buildings in the Cantonment Area of Camp Guernsey were constructed in 1938 and 1939 by the Works Projects Administration. The U.S. Army leased 6,209 acres in 1943 (during World War II) from the state of Wyoming (historically known as the South Training Area) and acquired 4,500 acres in a land transfer from the Bureau of Land Management (BLM) in 1944 (within what is now Guernsey State Park) to train military personnel in maneuver and artillery and provide bivouac (camping). Between 1943 and 1945, the Army used the Camp Guernsey installation for bivouac and artillery maneuver training. In 1945, the lease with the U.S. Army on the state land was terminated and the buildings and improvements were transferred to the state of Wyoming. The 4,500 acres of former BLM land was declared excess by the Department of Defense (DoD) in 1950 (following the war) and returned to the Department of Interior. In 1951, the Wyoming National Guard took over management of the 6,209 acres of state property (Cantonment Area and South Training Area). Through 1960, over 13,463 acres of land to the north were added to Camp Guernsey to establish an artillery range, impact area, and maneuver lands. These land acquisitions were completed through private land purchases and BLM patents (federal land withdrawals). Numerous private land acquisitions occurred from 2004-2012 which added another 39,000 acres of land to the Installation. These most recent acquisitions also encompassed an additional 3,000 acres of BLM land and 2,000 acres of State School Trust land.

2.3 LAND OWNERSHIP

Camp Guernsey's Installation boundary encompasses approximately 79,000 acres that provides realistic, combat-based field training opportunities and support facilities. Since its establishment, the borders of Camp Guernsey have been in constant change with numerous land acquisitions, trades, and sales including several federal land withdrawals. Eighty three percent (83%) of the land within the Installation boundary is owned by the Wyoming Military Department (WYMD). Other landowners within the Installation boundary include the Office of State Lands and Investments (State School Trust) (~8,700 acres [11%]), Bureau of Land Management ([BLM] ~3,800 acres [5%]), and the Bureau of Reclamation ([BoR] ~920 acres [1%]) (see Appendix A, Figure A-3). The WYARNG holds the grazing leases on the State School Trust Lands within the Installation boundary. The BoR has issued a free use permit to the WYMD to use their lands within the Installation boundary for military training without consideration or compensation. The WYMD

does not have a land use agreement with the BLM or the Office of State Lands for their respective lands within the Camp Guernsey boundary.

There are three areas of private inholdings within the Installation boundary. There is a 161 acre parcel and a 313 acre parcel in the South Training Area that are privately owned. In the North Training Area, there is a 200 feet (ft) wide strip of land overlying the rail line along the southwest bank of the North Platte River that is owned by the Burlington-Northern Railroad. Two county roads, Emigrant Hill Road and Patten Creek Road, run through portions of the North Training Area (NTA). Additionally, a paved public road, the Old Guernsey Highway, runs through portions of the South Training Area (STA). There are also several facilities (cell towers, pipelines, roads, and power lines) that have easements or right-of-ways that cross the Installation area.

2.4 LAND USE

2.4.1 Regional Land Use

Land abutting Camp Guernsey is mostly privately owned. Much of the undeveloped surrounding land is used for livestock grazing. State lands, including Guernsey State Park, Guernsey Reservoir, and Wyoming State Trust Fund lands, adjoin Camp Guernsey. A small portion of neighboring lands are federally managed by the BLM and BoR.

In 2010, the Platte County population was 8,667. The towns of Wheatland (population 3,627) and Guernsey (population 1,147) are the major incorporated urban areas within Platte County (Appendix A, Figure A-2). Other nearby towns include Hartville and Glendo. In 2000, the number of housing units in Platte County was 2.17 units per square mile. While in 2009, the number of housing units was 2.28 units per square mile. This housing base represents a roughly 5% estimated increase in development from 2000 to 2009 (U.S. Census Bureau 2014).

Development adjacent to the boundary of Camp Guernsey is occurring in the Town of Guernsey and residential growth is expected to continue in this area. The Town of Guernsey, in conjunction with the WYANG and the Guernsey Economic Development Board, initiated the *Town of Guernsey Master Plan* in July 2008.

2.4.2 Military Operations and Training

To accomplish the national security mission, guardsmen and military personnel must be trained in all requirements for responding to national security threats. Camp Guernsey is the major training area in Wyoming for realistic combat training. Additionally, Camp Guernsey is used for weapons qualification and annual training by the WYARNG and Guard units from other states, as well as year round use by active duty units. Camp Guernsey is the only site in Wyoming that can support these mission requirements. Camp Guernsey is classified by the Army National Guard (ARNG) as a Maneuver Training Center-Heavy, which means that it can support tracked vehicles. Maneuver Training Center-Heavy facilities must be designed to support a Brigade Combat Team (3,500 soldiers) or equivalent.

Camp Guernsey has 34 active training range areas and one active impact area. Training activities include, but are not limited to: expeditionary operations, employment of combined arms, use of tracked vehicles, infantry and vehicle maneuvers, artillery and small arms firing, aerial weapons

delivery, engineer support operations, logistics support, field combat service support, communications, airlift support for troops and weapons, equipment maintenance and field medical treatment.

Cantonment Area

The Cantonment Area contains support facilities for training activities at Camp Guernsey. Facilities located in the Cantonment Area are mainly for administrative, supply, and maintenance purposes. Facilities include barracks, classrooms, warehouses, motor pools, a water treatment plant, fuel storage, a heliport, and a paved airstrip. Service facilities include sport areas and a vehicle wash rack. There are no outdoor firing range facilities in the Cantonment Area. There is a simulation center located in the Cantonment Area that provides a variety of virtual training opportunities.

North Training Area (NTA)

The NTA consists of maneuver areas, a 1,360-acre ammunition supply point, an impact area, and firing ranges. Firing Ranges include:

- Qualification Training Range and Combat Pistol Qualification Course
- 25m Night Fire Range
- M79/M203 Range
- Multi-Purpose Machine Gun Range
- 10m Machine Gun Transition Range
- Combat Pistol Qualification Course Range
- Light Demolition Range
- Hand Grenade Familiarization Range
- Hand Grenade Qualification Range
- MK-19 Range
- MK19 High Explosive Training Practice Range
- Light Demolitions Range
- Infantry Platoon Battle Course
- Field Artillery Direct Killer Junior Range
- Unknown Distance Sniper Range

Other facilities on NTA include a total of ten drop zones (four are classified as dual-directional), a Range Control office, target storage facilities, a solid waste accumulation point, and two shower points. Six firing points for aerial gunnery are located east of the impact area for military aircraft training. In addition there is a convoy live fire range, a counter-IED (Improvised Explosive Device) village, two MOUT (Military Operations in Urban Settings) sites, a SAM-SCUD (Surface-to-Air Missile) site, a special operations live fire area, a mine warfare area, and a compass/land navigation course.

South Training Area (STA)

Training facilities on STA include five training ranges:

- Modified Record Fire Range
- 25M Range

- Known Distance Range
- Combat Pistol Range
- Small Arms Range

Other training areas include an obstacle course, a compass/land navigation course, a high ropes course and a mine warfare area.

2.4.3 Future Military Operations and Training

It is the intent of the command staff of Camp Guernsey that the installation will be capable of supporting a 3,500 solider brigade level organization and be able to provide classroom instruction to soldiers to enhance their professional development. A new building would include classrooms, administrative offices, billeting, and an auditorium. Additional new buildings that are planned, but not limited to, would include a Motor Vehicle Maintenance building, a Trash Recycling Pad, a Dining Hall/Kitchen building, storage facilities, and a Medical Clinic building. Other infrastructure upgrades would include new/upgraded roads, parking lots and underground utilities; a new storm water detention pond and storm water ditch; new landscaping; and new security lighting and fencing. The *Master Plan Update for Camp Guernsey* was completed in August 2012.

There are eight future training ranges that are included in the *Camp Guernsey Range Complex Master Plan* (updated annually): Infantry Platoon Battle Course, Infantry Squad Battle Course, Scout/Recce Gunnery Complex, Convoy Live Fire Range, Digital Multipurpose Range Complex, Heavy Sniper Range, Light Anti-Armor Range and Light Demolition Range. These ranges are in the early planning stages and may or may not be approved and funded.

2.4.4 Public Access

The WYARNG allows multiple uses of Camp Guernsey, including grazing, hunting, fishing, firewood gathering, and other recreational activities. Camp Guernsey allows public firewood gathering and Christmas tree cutting. Camp Guernsey also participates in the WGFD's Hunter Management Area (HMA) program through the *Broom Creek HMA* In addition, Camp Guernsey provides access to the North Platte River near Wendover Bend through the WGFD walk-in fishing program (WIFA#14). All members of the public, except those accessing the North Platte River at Wendover Bend, must check in with the Camp Guernsey Operations Fire Desk at 307-836-7810. More detail about the hunting program can be found in *Section 4.15*.

2.4.5 Grazing Program

Camp Guernsey has issued eleven grazing leases (*Forage Utilization Contracts*) in the North Training Area (NTA), two grazing leases in the South Training Area (STA), and two grazing leases in outlining parcels (Figure 1). The Impact Area and ranges surrounding the Impact Area are not leased for grazing. Some of the grazing leases originated as part of the sale agreement when the WYMD purchased the land. All subsequent grazing leases have been issued utilizing an open competitive bid process with no preferential rights. In some cases, boundaries of the leased areas are not fenced; boundaries of other interior surface landowners (BLM, State School Trust, BoR, private lands) are often not fenced out. The *Forage Utilization Contracts* expressly state the purpose of the contract is to:

> *...support the primary objective of the Wyoming Military Department, which is military training. Military training shall take precedence over any other activity, including the Forage Utilization Program…Supporting objectives include improvements in wildlife, livestock, forage, and hydrologic production; improvement of landscape condition; and protection and improved access to socio-cultural resources.*

The *Forage Utilization Contracts* are issued for a seven year term with the ability to renew for an additional seven year term. They cannot be subleased.

Figure 1. Cattle grazing at Camp Guernsey.

The *Forage Utilization Contracts* generally specify a base stocking rate (total Animal Unit Days [AUDs]) of 45 acres per animal unit. This stocking rate is based on the forage utilization concept of "take half, leave half of the standing forage". The contract requires that an annual planning meeting be conducted between January 15 and March 1 with each Lessee to complete a written *Forage Utilization Plan* for the upcoming year, which may involve an increase or decrease in the AUDs. The annual *Forage Utilization Plan* is required to address:

- Habitat conservation goals;
- Type of livestock;
- Livestock stocking rate;
- Livestock density;
- Livestock control and movement;
- Access and control of access to contract area;
- Removal of livestock in response to requirements of the provider;
- Response by Lessee to forecast Wyoming Military Department activities and programs;
- Planned dates in and out of livestock;
- Water source maintenance, protection, and improvement;

- Mineral and supplement distribution;
- Feeding locations (if appropriate);
- Contacts and emergency procedures.

The Lessee is responsible for preparing the annual *Forage Utilization Plan* and they are reviewed and approved by the WYMD. The Lessee can then graze the upcoming year according to the approved annual plan.

A second annual meeting is conducted between October 15 and November 15, where the Lessee submits a written *Forage Utilization Evaluation Report* that evaluates and documents the past years grazing activities. The annual *Forage Utilization Evaluation Report* is to be kept on file at Camp Guernsey and available to interested parties upon request. The results of the annual *Forage Utilization Evaluation Report* is then used as a basis for the subsequent annual *Forage Utilization Plan* which is approved between January 15 and March 1. There is no evidence in the WYMD files that these annual *Forage Utilization Evaluation Reports* have ever been prepared or that the annual forage utilization meetings have been conducted.

2.5 NATURAL ENVIRONMENT

2.5.1 Climate

The climate in Platte County is semiarid with a total annual precipitation of approximately 13 inches. About 10 inches, or 77%, of the precipitation commonly falls during the growing season of April through September. Thunderstorms in July and August are common. The average seasonal snowfall is 41 inches. The average winter temperature is 31 degrees Fahrenheit (°F) and the average summer temperature is 70 °F. Due to low moisture and high elevation, Camp Guernsey commonly experiences wide ranges and extremes in temperature. The region is known for the steady, and sometimes intense, winds that prevail from the west. The winds add a considerable wind chill factor in the winter. The winds combined with high temperatures during late summer create a high risk for wildfire.

2.5.2 Ecoregions

An ecoregion is a regional landscape that supports distinctive groups of plants, animals, and natural communities due to regional patterns of climate, landform, geology, soil, hydrology, and land use. Numerous federal agencies and conservation organizations have developed ecoregional interpretations of the United States over the past two decades.

Camp Guernsey is located in the *High Plains Level 3 Ecoregion*, which is a subset of the *South Central Semiarid Prairies Level 2 Ecoregion*, which is a subset of the *Great Plains Level 1 Ecoregion* as described by the Commission for Environmental Cooperation and distributed by the U.S. Environmental Protection Agency (EPA). The North Training Area is located in the *Pine Bluffs and Hills Level 4 Ecoregion* and the South Training Area is located in the *Moderate Relief Plains Level 4 Ecoregion.*

The North Training Area at Camp Guernsey is located in *Major Land Resource Area (MLRA) 64, Mixed Sandy and Silty Tableland and Badland* while the South Training Area is located in *MLRA 67A, Central High Plains, Northern Part*, as described by the Natural Resource Conservation

Service (NRCS). Both of these MLRAs are *in Land Resource Region (LRR) G: the Western Great Plains Range and Irrigated Region*.

Regardless of which ecoregion classification is used to categorize Camp Guernsey, the Installation occupies an area where various ecoregions meet. Because Camp Guernsey is located in a transitional zone between ecoregions, ecological characteristics of different ecoregions occur across the Installation.

2.5.3 Land Cover

Camp Guernsey occurs in a landscape of rolling plains and tablelands formed by uplift and subsequent erosion of the Rocky Mountains. The rain shadow of the Rocky Mountains extends to Camp Guernsey making moisture a limiting factor for vegetation. As a result, drought resistant shortgrass and mixed-grass prairie dominate the landscape. The Great Plains grasslands east of the Rockies have scattered trees and shrubs and support all gradations of cover, from semi-desert to woodland. Vegetation ground cover can be sparse and some sites may contain a large proportion of bare ground (Bailey 2006).

2.5.4 Geology

Camp Guernsey is roughly split into two geologic and geomorphic regimes. The North Training Area (NTA) is located over ancient rocks exposed in the southwestern end of a fault known as the Hartville Uplift. The Hartville Uplift, has been subdued over time by erosion, with the current landscape showing little evidence of past tectonic activity. Along the anticline crest are exposed metavolcanic and granitic Precambrian age limestone and sandstone rocks that poke through the blanket of Cenozoic strata to form tree-covered hills along the crest of the Hartville arch.

The geology of the NTA includes three formations: The hills, consist primarily of variably weathered and eroded rock from the older Hartville Formation, which outcrops or subcrops over most of the NTA, projecting approximately 100 feet (ft) above the surrounding plains in the younger Arikaree Formation. The Hartville Formation is approximately 600 ft thick across the NTA. The base of the Hartville Formation is a brown-red streaked with white patches, medium-grained, resistant sandstone silica-cemented at most localities to a quartzite about 50 ft thick forms the base. The overlying rocks about 600 ft thick are gray, siliceous limestone with scattered chert as nodules and sheets and intercalated gray, buff, white, medium-grained calcareous sandstone. This Hartville Formation (composed of limestones, dolomites, sandstones, and siltstones) often forms cliffs and ledges with occasional caves in the NTA. There are also local beds and zones of chert present. The Arikaree Formation is composed of fine grained sandstone and silt. In the NTA this formation covers most of the lower lying valleys below the Hartville Formation hills. It consists mainly of gray, fine, loose to compact sand that has layers of hard, fine-grained dark-gray concretions which vary from a few inches to 15 in and often have tabular form. The formation includes a large amount of volcanic ash mixed in with the sand. The concretions trend east-northeast and west-northwest. This formation is divisible into a lower dark-gray sand with few concretions and an upper gray sand with pipy concretions. It is about 500 ft thick across the region. The third geologic formation mapped by the United States Geological Survey (USGS) in the NTA is unconsolidated Alluvium and Colluvium of Quaternary age along Sawmill Creek, the North Platte River and another unnamed tributary to the north. Alluvial deposits along the North Platte River are very thick and serve as a major groundwater resource in southeastern Wyoming and into Nebraska.

The Hartville Uplift does not extend south of the Platte River. However, a prominent ridge does run north to south down the middle of the South Training Area (STA) with the highest point named Black Butte. The geology of the STA includes five mapped formations: The uppermost being the Arikaree Formation, which again, is an ancient coastal plain and alluvial deposit of fine grained sandstone and silts that is about 500 ft thick and forms ridges. In the STA this formation covers most of elevated hills and ridgeline with numerous caprock sandstone outcrops and cliffs. Not being surrounded by the higher Hartville hills, as in the NTA, these Arikaree sandstone ridges have been highly sculpted by the wind in various outcrop and spire formations. A small area in the north-central edge of the STA, just south of the highway is mapped as Upper Miocene Rocks, which consist of light-colored tuffaceous claystone, sandstone, and conglomerate which again have been wind sculpted in various spires and a rough break topography. The three other mapped formations in the STA are of recent Quaternary age. Dune Sand and Loess deposits overlie much of the Arikaree Formation in the central portion of the STA. These dune and loess deposits in the STA are stable and well vegetated. There are some Alluvium and Colluvium deposits mapped along a historical (now dried up) creek bed in the southeast corner of the STA. The final mapped geologic unit includes a few small areas of Gravel, Pediment, and Fan deposits which are described as unconsolidated deposits of gravel, cobbles, and boulders intermixed and locally interlayered with clay, silt, and sand. These deposits are located on terraces and pediments above the present floodplain associated with the Laramie River in the far south end of the STA.

Although the landforms in Camp Guernsey and the Hartville Uplift were originally created by tectonic activity. Camp Guernsey is not located in an area that is seismically active or that contains active faults. Platte County is in the Uniform Building Code Seismic Zone 1 (http://www.ivi-intl.com/pdfs/IVI_seismic_map_zones.pdf).

2.5.5 Topography

The High Plains of eastern Wyoming slope gradually eastward from an altitude of about 5,000 ft above sea level at the base of the Laramie Mountains to approximately 4,000 ft, at the Nebraska state line 60 miles to the east. Today, there is very little topography to suggest that this is a structurally uplifted region (Hartville Uplift). The topography of the NTA includes dissected plateaus, bluffs, hills, escarpments, and steep valley side-slopes. The topography of the STA includes irregular plains with moderate slope and scattered sandstone outcrops.

Cantonment Area

The elevation at the Camp Guernsey airfield is 4,400 ft above sea level. Slopes within the Cantonment Area are level to nearly level, with the surface draining to the south and southeast towards the North Platte River.

Maneuver/Training Areas

Elevations within the NTA and STA range from 4,300 to 5,300 ft with rolling hills and scattered rock outcroppings, consisting of dolomite and sandstone. The NTA has diverse terrain with well-defined dendritic drainages that are generally oriented north to south. Several of these drainages are entrenched into deep gullies and canyons. The ridges between drainages are steep sloping and timbered with flat topped plateaus. The terrain in the STA is much more subdued and best described as rolling hills bisected by dry drainages oriented west to east. One prominent and rather

large butte (Black Butte) is centered in the STA. Numerous wind sculpted sandstone outcrops and rock spires are present in the STA.

2.5.6 Soils

Camp Guernsey is located in a geographic area that is composed predominantly of sandstone bedrock, resulting in primarily fine sandy loam soils. The soil depth varies from a few inches to 60 inches and the soils are well drained. Soil texture ranges from fine to coarse and occurs generally on plateaus, alluvial fans, and hills with gentle to steep slopes. The National Resources Conservation District (NRCS) has published soil survey of Platte County, Wyoming, that includes Camp Guernsey.

Soils in the Cantonment Area are mostly deep alluvial soils consisting of stratified sand, loam, and minor layers of clayey soils with coarse and moderately textured sand. The soils bordering the North Platte River are subject to periodic water saturation due to seasonal fluctuations in the water table and occasional flooding.

Soils in the North Training Area (NTA) are deep to moderately deep silty and loamy soils and are found on gently sloped to moderately steep rolling hills (NRCS 2011). In a few areas, there are shallow to moderately deep sandy and silty soils with numerous rock outcrops. Within narrow valleys on steep slopes, the soils are characterized as deep, sandy, and silty. Overall, the soils are well to excessively drained. Common Soil Series in the NTA are Brownrigg, Featherlegs, Wendover, Wibaux, Busher, Shingle, Tassel, Motoqua, Treon, Taluce, rock outcrops. Four soil associations comprise 80% of the NTA (Table 2).

Table 2. Description of the common soil associations in the North Training Area, Camp Guernsey, Wyoming. These associations all cover greater than 10% of the North Training Area; together they cover 80% of the North Training Area.

Soil Association	Description
Deight–Thirtynine–Glendo very fine sandy loams	These soils are found on hills and terraces at elevations of 4,300 to 5,700 feet. Soils are well-drained with moderately rapid permeability. Soils vary from very fine sandy loam to loam.
Mitchell very fine sandy loam	These soils are found on hills at elevations of 4,300 to 5,500 feet. Parent material is alluvium derived from siltstone. Soils are well-drained with moderate permeability. Soils vary from very fine sandy loam to silt loam.
Storsun–Sunup– rock outcrop complex	These soils are found on hills at elevations of 4,300 to 5,800 feet. Soils are well-drained with moderate permeability. Soils vary from very gravelly loam to very cobbly loam overlying unweathered bedrock.
Sunup–Snavee–rock outcrop complex	These soils are found on hills at elevations of 4,500 to 5,800 feet. Soils are well-drained with moderate permeability. Soils vary from very fine sandy loam to loam and overlie unweathered bedrock.

Loess covers the majority of the South Training Area (STA), but shallow to moderately deep loamy and sandy soils with numerous rock outcroppings also occur. In the narrow gullies and canyons there are some deep sandy soils, while some of the narrow, rolling hills have well to excessively drained silty soils. Slopes are moderately steep to steep. Common Soil Series in the South Training Area are Ascalon, Jayem, Vetal, Trelona, Shingle, Dwyer, Manter, Dix, Valent, Bayard, Treon, Nucla, rock outcrops (Table 3).

Soil erosion potential can be evaluated by categorizing soil into K factor groups, where K is a measure of the susceptibility of the soil to erosion by water. Soil K values can range from 0.01 to 0.69 with the most erodible soils having high K values. Visual evidence of erosion is evident at numerous locations throughout the installation. Much of the installation is drained by intermittent streams or generally dry channelized drainages. Some of these drainages show substantial erosion due to stormwater flow during heavy rains. The soils on the Installation have been analyzed for their vehicle trafficability for type 3 vehicles during the dry and wet season (Table 4). This can be used to identify which soils are most resistant to maneuver training during different times of the year.

Table 3. Descriptions of common soil association in the South Training Area, Camp Guernsey, Wyoming.

Soil Association	Description
Clarkelen wet–anvil loams	These soils are found on terraces and floodplains at elevations of 4,600 to 5,600 feet. Soils are moderately well- to well-drained with moderately rapid permeability. Available water capacity is moderate. Soils vary from loamy to predominantly sand.
Jayem–Mainter–Moskee fine sandy loams	These soils are found on hills at elevations of 4,300 to 5,800 feet. Soils are well-drained with moderately rapid permeability. Soils are primarily fine sandy loam.
Keeline fine sandy loam	These soils are found in benches and hills at elevations of 4,800 to 5,400 feet. Soils are well-drained with moderately rapid permeability and consist primarily of fine sandy loam. Soils are susceptible to wind erosion.
Keeline–Turncrest fine sandy loams	These soils are found in benches and hills at elevations of approximately 4,500 to 5,000 feet. Soils are well-drained with moderately rapid permeability. Soils vary from sandy loam to very fine sandy loam and overlie unweathered bedrock.
Mainter–Keeline fine sandy loams	These soils are found in hills at elevations of 4,300 to 5,700 feet. Soils are well-drained with moderately rapid permeability. Soils are primarily fine sandy loam with the parent material being alluvium.
Mitchell very fine sandy loam	These soils are found in hills at elevations of 4,300 to 5,500 feet. Soils are well-drained with moderately rapid permeability. In a typical profile, very fine sandy loam layers are found to 60 inches.
Taluce, Thin Solum–rock outcrop complex	These soils are found in hills at elevations of 4,500 to 5,600 feet. Soils are well-drained with moderately rapid permeability. Soils are primarily gravelly fine sandy loam overlying unweathered bedrock.
Taluce–rock outcrop–Turnercrest complex	These soils are found in hills at elevations 4,300 to 5,800 feet. Soils are well drained with moderately rapid permeability. Soils consist of sandy to very fine sandy loam overlying unweathered bedrock, which occurs at approximately 20 to 46 inches.

Approximately 60% of soils in the NTA have a low soil erosion potential ($K < 0.20$), 10% have a moderate erosion potential ($0.20 < K < 0.40$) and 26% have a high erosion potential ($K > 0.40$; Appendix A, Figure A-4). In the STA, 18% of soils have low soil erosion potential, 44% have a moderate erosion potential and 15% have a high erosion potential. Because of the large areas in the STA that are rock outcrops, 24% of the STA is not rated for erosion potential (Appendix A; Figure A-5).

Soils in both the NTA and STA are capable of supporting maneuver training during the dry and wet seasons. During the dry season, 96% and 72% of the soils in the NTA and STA, respectively, are rated as Excellent or Good for Type 3 vehicle trafficability (Appendix A, Figure A-6, A-7). During the wet season, 69% and 57% are rated as Good for trafficability (Appendix A, Figure A-8, A-9).

Table 4. Percentage of the North and South Training Areas that are rated as excellent, good, fair, and poor for trafficability for type 3 vehicles during the dry and wet season based on soils. One percent of soils in the North Training Area and 26% of soils in the South Training Area are not rated for trafficability.

	North Training Area		South Training Area	
Rating[1]	Dry Season (%)	Wet Season[2](%)	Dry Season (%)	Wet Season[2] (%)
Excellent	73	0	45	0
Good	23	69	27	57
Fair	3	30	1	17
Poor	0	0	0	0

[1] Excellent: best for maneuver, trafficability not limited, low maintenance
Good: good for maneuver, trafficability may be limited, low maintenance
Fair: maneuver not recommended, trafficability limited, special design features needed
Poor: maneuver not recommended, trafficability severely limited, soil damage severe (NRCS 2013)
[2] 50 passes

2.5.7 Aquatic Resources

The U.S. Army Corps of Engineers (ACOE) regulates the placement of dredged and fill material into wetlands and other waters of the United Sates as authorized under Section 404 of the Clean Water Act (CWA). Executive Order 11990, *Protection of Wetlands*, requires federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. It also requires that agencies avoid construction or avoid providing assistance for new construction located in wetlands, to the extent practicable.

Camp Guernsey is within the *North Platte River Basin*. The *Glendo Reservoir Sub-Basin* contains the North Training Area (NTA) and northern half of the South Training Area (STA). The *Lower Laramie Sub-Basin* contains the southern half of the STA (WyGISC 2002). Waters within the *Glendo Reservoir Sub-Basin* enter the North Platte River. Waters in the *Lower Laramie Sub-Basin* drain into the Laramie River which in turn empties into the North Platte River.

Rivers and Streams

The North Platte River follows the southern boundary of the North Training Area and the northern boundary of the South Training Area (Appendix A, Figure A-10, A-11). There are 12.4 miles (20 km) of the North Platte River that are within Camp Guernsey (WYARNG 2009a). There are no major reservoirs or impoundments on Camp Guernsey. Three major reservoirs, Glendo, Guernsey, and Grayrocks Reservoirs occur in close proximity to the Camp. Water levels of the portion of the North Platte River that runs through Camp Guernsey are controlled by the management of Glendo and Guernsey Reservoirs.

Other lotic systems consist mainly of intermittent and ephemeral streams; there are approximately 232 miles (373 km) of intermittent and ephemeral streams occurring within Camp Guernsey. There are approximately 1.6 miles (2.5 km) of perennial streams (USDA-NRCS et al. 2012; WYARNG 2009a). Perennial streams include Warm Springs Creek and Little Warm Springs Creek in the STA and Deercorn Springs Creek, Cottonwood Creek, Spring Creek, and Sawmill Canyon Creek in the NTA. In addition, there are 50 miles (81 km) of stream that has not yet been identified as perennial,

intermittent, or ephemeral. A majority of these are most likely intermittent or ephemeral except for portions of Patten Creek in the recently acquired Heidner parcel (Appendix A, Figure A-10).

Surface water at Camp Guernsey flows in a southerly direction on the NTA and a northeasterly direction on the northern portion of the STA to the North Platte River. The southern part of the STA has ephemeral streams that flow southeasterly into the Laramie River. Snowmelt in spring and early summer provides the major source of runoff for perennial streams, with subsurface flow being a contributor during the remainder of the year (Appendix A, Figure A-11).

The Wyoming Department of Environmental Quality (WYDEQ) does not classify any waters on Camp Guernsey as Class 1 waters. Guernsey Reservoir, Broom Creek, Patten Creek, and Cottonwood Creek are classified as 2AB waters. Spring Creek, Little Cottonwood Creek, and Sawmill Canyon Creek are classified as 3B waters (Wyoming Department of Environmental Quality 2013). Surface water use designations of classified waters on Camp Guernsey are as follows:

- 2AB: Drinking Water, Game Fish, Non-Game Fish, Fish Consumption, Other Aquatic Life, Recreation, Wildlife, Agriculture, Industry, Scenic Value

- 3B: Other Aquatic Life, Recreation, Wildlife, Agriculture, Industry, Scenic Values

Wetlands, Springs, Ponds

WYARNG uses the National Wetlands Inventory data in conjunction with past delineations (WYARNG 2009a, WYARNG 2012), and aerial imagery to quantify wetlands. Project specific delineations are carried out during the planning phase of a project.

There are approximately 173 wetlands comprising 121 acres on Camp Guernsey (U.S. Fish and Wildlife Service 2010, WYARNG 2009a, WYARNG 2012, Appendix A, Figure A-10, A-11). Many of these wetlands are associated with stock ponds, livestock tank overflow, and reservoirs. This does not include the 43 acres of Guernsey Reservoir or the 409 acres of the North Platte River that occur on Camp Guernsey and are open water for a portion of the year. Twenty-two of these wetlands may be associated with springs (WYARNG 2009a; CIR NAIP 2009; WYARNG 2011); although field verification has not been completed. A large wetland was located at Warm Springs in the South Training Area; however, in May 2014, a storm produced flooding that removed a majority of this wetland. Many wetland areas at Camp Guernsey have been impacted by livestock and noxious weeds (WYARNG 2009a; Figure 2, 3).

There are 23 springs on Camp Guernsey (Appendix A, Figure A-10, A-11; CIR NAIP 2009, WYARNG 2011, WYARNG 2012, USDA-NRCS et al. 2012). There are most likely additional springs that have not yet been identified. Named springs include Albert Martin Spring, Box Spring, Broom Creek Spring, Deercorn Spring, Haushar Spring, Lower Patten Creek Spring, Lower Ryan Spring, Pattern Creek Spring, PET Spring, Sawmill Canyon East Pond Spring, Sawmill Canyon West Spring, Upper Ryan Spring, and Warm Spring. Many of these springs/seeps have downstream impoundments for stock watering. Several of the spring areas have also been developed with adjoining wells. Most of these springs have infestations of noxious weeds and are impacted by livestock.

Figure 2. Sawmill Canyon Pond wetland with plumeless thistle

Figure 3. Warm Spring wetland.

2.5.8 Vegetation

The BLM has management jurisdiction over plants and plant communities on BLM lands within the Camp Guernsey Installation boundary. The USFWS has jurisdiction over plants federally listed under the Endangered Species Act within the Installation. The state of Wyoming has no state regulation that protects rare or sensitive plant species or plant communities, with the exception of noxious weeds, which are discussed in *Section 2.7.5.* . In addition, the Platte County Weed and Pest District has jurisdiction of County-designated noxious weeds (*Section 2.7.5*).

Plant inventories conducted at Camp Guernsey have identified 584 species from 74 families (Appendix B, Table B-5; WYARNG 1997, 2003, 2007, 2010a, 2013f). The plant family with the

greatest diversity is Asteraceae with 115 species. Overall the dominant species belong to the family Poaceae (grass) Family.

Ecological Systems and Common Plant Associations

WYARNG mapped the ecological systems that occur on Camp Guernsey in 2013 using the NatureServe Terrestrial Ecological Classification (Appendix A, Figure A-12, 13; WYARNG 2014a). Mapping and delineation of ecological systems was completed using remote sensing techniques and field verification. The map that was created fulfils the Planning Level Survey (PLS) Vegetation Communities Map requirement. Within each ecological system, there are plant associations that can be expected to occur. There are eleven ecological systems as defined by NatureServe on Camp Guernsey. In addition, there are four other vegetation types that do not fall within the NatureServe classification: Previously Burned Woodland, Farmland/Pasture, Disturbed/Developed (e.g. roads, buildings, parking lots), and Invasive Grass. The Northwestern Great Plains Mixedgrass Prairie is the most common ecological system on the training areas, covering 36% of the North (NTA) and South Training Areas (STA; Table 5). None of these systems are unique, rare, or imperiled.

Table 5. Ecological systems and vegetation types occurring over the North and South Training Areas (WYARNG 2014a; ordered from the most to least common).

Ecological System / Vegetation Type	Area (acres)	Percentage of training areas (%)
Northwestern Great Plains Mixedgrass Prairie	28,215	35.9
Northwestern Great Plains-Black Hills Ponderosa Pine Woodland and Savanna	12,858	16.3
Western Great Plains Sand Prairie	10,643	13.5
Previously Burned Woodland	9,715	12.3
Western Great Plains Cliff and Outcrop	6,954	8.8
Inter-Mountain Basins Big Sagebrush Steppe	4,196	5.3
Rocky Mountain Lower Montane-Foothill Shrubland	2,525	3.2
Farmland/Pasture	1,807	2.3
Disturbed/Developed	539	0.7
Water	371	0.5
Northwestern Great Plains Riparian	232	0.3
Western Great Plains Floodplain	182	0.2
Rocky Mountain Foothill Limber Pine-Juniper Woodland	182	0.2
Northwestern Great Plains Canyon	173	0.2
Invasive Grass	91	0.1
North American Arid West Emergent Marsh	7	<0.1

Northwestern Great Plains Mixedgrass Prairie — At Camp Guernsey, 28, 215 acres (35.9%) can be classified as Northwestern Great Plains Mixedgrass Prairie; this is the most common ecological system occurring on the training areas (Figure 4). This system occurs over both the NTA and STA and contains a mix of mid-grass and shortgrass. As a result of the cool climate, cool season grasses are more prevalent (greater than 50% cover) that warm season grasses. The soils on these sites, clay loam, silt loam, or loam, are usually deep and fertile. Common plant associations are:

- western wheatgrass (*Pascopyrum smithii*) – blue grama (*Bouteloua gracilis*) – threadleaf sedge (*Carex filifolia*)
- needle and thread (*Hesperostipa comata*) – blue grama – threadleaf sedge

Forbs and shrubs are not important components in this ecological system. However, a wide diversity of forbs are encountered, with various species emerging over the growing season. Long-term drought in this ecological system can increase short grass cover while decreasing the mid-grass cover. Cool season exotics (e.g. cheatgrass [*Bromus tectorum*]), can increase as a response to high grazing pressure. Overgrazing and fire suppression may cause an increase in shrub cover at these sites. This system is one of the most disturbed systems in North America (WYARNG 2014a).

Figure 4. Northwestern Great Plains Mixedgrass Prairie

Northwestern Great Plains-Black Hills Ponderosa Pine Woodland and Savanna —This ecological system occurs in both the NTA and STA and occurs over 13,040 acres (16.3%) on bluffs, rock outcrops, and breaks (Figure 5). The tree cover in this system varies from quite sparse to closed canopy depending on the moisture regime of the site. The herbaceous layer is sparse to non-existent. Fire is the primary driver in this ecological system. The expansion of this system into the central Great Plains may be due to fire suppression. Soils typically range from well-drained loamy sands to sandy loams formed in colluvium, weathered sandstone, limestone, scoria or eolian sand.

- Ponderosa pine (*Pinus ponderosa*) – Rocky Mountain juniper (*Juniperus scopulorum*) woodland
- Ponderosa pine limestone cliff sparse vegetation

The ponderosa pine - Rocky Mountain juniper association is dominated by ponderosa pine with juniper forming a sub-canopy. On Camp Guernsey, this association is commonly found on north and east facing slopes. Common shrubs include: mountain mahogany (*Cercocarpus montanus*), skunkbush sumac (*Rhus trilobata*), western snowberry (*Symphoricarpos occidentalis*), and yucca (*Yucca glauca*).

The ponderosa pine limestone cliff sparse vegetation association is common on moderately to very steep slopes. Shrubs may include chokecherry (*Prunus virginiana*), skunkbush sumac, and western snowberry (WYARNG 2014a).

On open sites with favorable moisture conditions, ponderosa pine seedlings often establish in large numbers. The young trees are capable of growing exceptionally fast if favorable conditions. Dense seedlings often develop into "dog-hair" sapling thickets if stands are not thinned by fire or other disturbance. At Camp Guernsey, many of the woodlands are comprised of dense stands of even-aged trees approximately 50 years of age. These dense, even-aged pine stands are now highly susceptible to catastrophic high-intensity canopy fires.

Figure 5. Northwestern Great Plains-Black Hills Ponderosa Pine Woodland and Savanna

Ponderosa pine and Rocky Mountain juniper plant communities occur in the absence of fire. After fire, the system reverts to an herbaceous-shrub plant community and will transition back to a ponderosa pine and juniper plant community after 50 to 100 years without fire.

Certain gazing regimes favor ponderosa pine seedling establishment. It has been reported that heavy cattle grazing that reduced grasses, followed by light cattle grazing that allowed tree seedlings to survive, favored ponderosa pine over herbaceous and shrub species.

Western Great Plains Sand Prairie — Western Great Plains Sand Prairie occurs over 10,643 acres (13.5%) in the South Training Area (Figure 6). This is one of the more unique systems on Camp Guernsey. Coarse-textured soils (i.e. sandy and sandy loam) dominate and blowouts and sand draws are common. Wind is a driving process in this system. Forbs are sparse. The common plant associations are:

- silver sagebrush (*Artemisia cana* spp. *cana*)− needle and thread
- needle and thread –blue grama- threadleaf sedge

In the silver sagebrush – needle and thread association, silver sagebrush cover is typically around 25%. Cover of fringed sagebrush (*Artemisia frigida*), the only subshrub found in this association, does not exceed 3%.

In the needle and thread – blue grama – threadleaf sedge association, prairie sandreed and prairie junegrass can have high cover values depending on site conditions; western wheatgrass is consistently present. Woody (shrub and subshrub) cover in this association is rarely greater than 5%; although, this may become higher in response to overgrazing (WYARNG 2014a).

Figure 6. Western Great Plains Sand Prairie

Previously Burned Woodland — There are 9,715 acres (12.3%) of previously burned woodland in the NTA (Figure 7). These areas were burned in the Old Chicago and Tracer Fires in 2006 and in the Sawmill Canyon Fire in 2012. Pre-fire these areas were ponderosa pine woodlands. Ponderosa pine still occurs in this area, but the canopy was opened by the fire allowing the understory to become more dominant (WYARNG 2014a).

Western Great Plains Cliff and Outcrop — The Western Great Plains Cliff and Outcrop ecological system occurs over 6,954 acres (8.8%) of Camp Guernsey in the NTA (Figure 8). This system is found on cliffs and rock outcrops with vegetation occurring on shelves, cracks and crevices. The common plant association is:

- Longleaf wormwood (*Artemisia longifolia*) – prairie sandreed sparse vegetation

Cover of longleaf wormwood ranges from 4 to 15%. Grass and shrub cover may exceed 10% in some areas, although vegetation is always sparse overall. Prairie rose (*Rosa arkansana*) is the most commonly found shrub.

Figure 7. Previously Burned Woodland

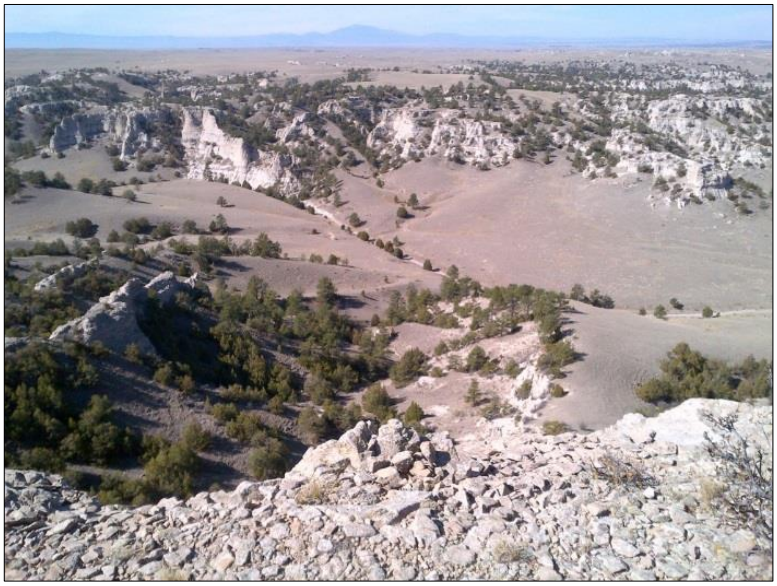

Figure 8. Western Great Plains Cliff and Outcrop

Inter-Mountain Basins Big Sagebrush Steppe — The Inter-Mountain Basin Big Sagebrush Steppe system occurs over 4,196 acres (5.3%) in the NTA and STA (Figure 9). This ecological system forms a matrix with grassland over the landscape. Soils are typically deep and non-saline often with a microphytic crust. The common vegetation associations that occur at Camp Guernsey are:

- Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) / mixed grasses shrub herbaceous vegetation
- Wyoming big sagebrush / western wheatgrass shrub herbaceous vegetation
- Silver sagebrush / western wheatgrass shrub herbaceous vegetation
- Wyoming big sagebrush / needle and thread shrubland

Perennial grasses and forbs comprise greater than 25% of cover in this system, while shrub cover can range from 10 to 40%.

This ecological system is historically maintained by fire which preserves a mosaic of shrubs and grasses. A lack of fire can lead to an increase in shrub cover and a decrease in grass cover, as can heavy livestock grazing. However, large fires can completely remove the sagebrush component in these systems, which can take more than 100 years to recover. Both fire and heavy grazing can promote the invasion of cheatgrass into this system

Figure 9. Inter-Mountain Basin Big Sagebrush Steppe

Rocky Mountain Lower Montane-Foothill Shrubland—In the North Training Area, there are 2,525 acres (3.2%) of Rocky Mountain Lower Montane-Foothill Shrubland. This ecological system is associated with dry conditions that occur on exposed sites and rocky substrates (Figure 10). Soils are poorly developed, with the majority of occurrences being on shallow loamy sands derived from calcareous Tertiary sandstones. To a lesser degree, this community occurs on shallow silt loams associated with siltstone. Rock outcrops with little to no soil development are common within this community. The common plant association that occurs on Camp Guernsey is:

- Mountain mahogany / needle and thread

The shrub layer, dominated by mountain mahogany, provides 20 to 35% cover. The herbaceous layer provides 5 to 20% cover; a majority of this cover is perennial bunchgrass; forbs occur in low abundance. A lack of fire in this system can allow ponderosa pine and Rocky Mountain juniper to invade this system in more mesic sites, as well as allow shrub cover to become extremely dense, increasing the risk of a hot stand replacing fire (WYARNG 2014a).

At Camp Guernsey, this system is often present under a very open ponderosa pine or juniper canopy with exposed bedrock outcrops or bare ground common.

Figure 10. Rocky Mountain Lower Montane Foothill Shrub.

Farmland/Pasture —There are approximately 1,807 acres (2.3%) classified of farmland/pasture in the North and South Training Area. Historically, these areas have been seeded with introduced grasses to increase forage production for livestock or for haying. The seedings are no longer maintained.

Disturbed/Developed —There are 539 acres (0.7%) of disturbed or developed land at Camp Guernsey. This includes the Tactical Air Strip, the Cantonment Area, and other infrastructure.

Open Water — There are approximately 371 acres of open water (0.5%) at Camp Guernsey (Figure 11). Open water systems include lakes, reservoirs, large ponds and the surface areas of rivers. The North Platte River accounts for a majority of the coverage on Camp. There is generally less than 25% cover of vegetation or bare soil. Emergent vegetation is not common in open water systems, except around the margins. Species associated with open water systems are those that tolerate permanent or semi-permanent flooding, such as sedges and rushes. Floating-leaved hydrophytes may be present in shallower areas of lakes, ponds and reservoirs, or in river backwaters.

Northwestern Great Plains Riparian — This system is associated with perennial to intermittent, medium and small rivers, throughout the northwestern Great Plains. There is 232 acres (0.3%) of Northwestern Great Plains Riparian ecosystem occurring on Camp Guernsey, with the majority of this occurring in the NTA along the North Platte River and its larger tributaries (Figure 12). The common plant association on Camp Guernsey is:

- Silver sagebrush / western wheatgrass shrubland

This community is dominated by cottonwood (*Populus* spp.) in the overstory, willow (*Salix* spp.) and silver sagebrush in the shrublayer, and western wheatgrass in the understory. These areas are often subjected to heavy grazing and/or agriculture and can be heavily degraded. Lack of fire and

groundwater depletion may also lead to species composition changes (NatureServe 2015; WYARNG 2014a).

Figure 11. Open Water

Figure 12. Northwestern Great Plains Riparian

Western Great Plains Floodplain — This system is found in the floodplains of medium and large rivers of the Western Great Plains. This ecological system occurs along the North Platte River in both the NTA and STA and occupies 182 acres (0.2%; Figure 13). Soils are primarily alluvial and range from sand to dense clays. In the absence of disturbance, periodic flooding of fluvial and alluvial soils and channel migration will create depressions and backwaters that support a mosaic of wetland and riparian vegetation, whose composition and structure is sustained, altered and redistributed by hydrology. The common vegetation association is:

- Eastern cottonwood (*Populus deltoids*) – (peachleaf willow [*Salix amygdaloides*]) / Willow (*Salix* [*exigua*, *interior*]) woodland

The cottonwood- willow vegetation community is dominated by cottonwood. Grass cover in this system consists mainly of tall grass species. Because of the disturbance regimes typical in these systems, they are highly susceptible to invasion by exotic species such as Russian olive (*Elaeagnus angustifolia*) and cheatgrass (*Bromus tectorum*).

The hydrology of these floodplain systems has been affected by dams, highways, railroads and agricultural ditches, and as a result, they have lost their characteristic wetland /riparian mosaic structure. Periodic flooding (i.e., every 5-25 years) constitutes the major process influencing this system. Because of the numerous dams, much of the North Platte River is degraded to the point where the cottonwood overstory is the only remaining natural component. This has resulted in a highly altered community consisting of relict cottonwood stands with little regeneration (NatureServe 2015, WYARNG 2014a).

Figure 13. Western Great Plains Floodplain

Rocky Mountain Foothill Limber Pine-Juniper Woodland — This ecological system occurs in foothill and lower montane zones in the northern Rocky Mountains and island mountain ranges of the Great Plains and on escarpments extending out to the western Great Plains grasslands. Rocky Mountain juniper stands are often found in complex transitional zones or growing on exposed or severe sites within other forest systems. This ecological system is rare on Camp Guernsey, occurring over 182 acres (0.2%) in the NTA (Figure 14). This system occurs mainly on limestone substrates, where roots follow the pattern of fractured and weathered rock. Soils have a high rock component (typically over 50% cover) and are coarse- to fine-textured, often gravelly and calcareous. Soils are generally poorly developed, shallow, have low moisture holding capacity and are easily erodable, so in some occurrences, little topsoil is present.The plant association that occurs on Camp Guernsey is:

- Rocky Mountain juniper / mountain mahogany woodland

This vegetation association occurs on moderately steep to very steep slopes. Tree cover, comprised of Rocky Mountain juniper, is sparse (10% canopy cover). Mountain mahogany dominates the shrub layer which typically has 20 to 25% cover. Grass and forb cover is less than 20% and is dominated by bunchgrasses.

Major disturbances in this system include fire, soil erosion from over-used range, and biotic vectors. Fire can easily kill young trees because of their thin bark, however, fuel loads in this system are usually light due to open rocky terrain, and usually do not generate severe fire damage. These woodlands often originate with and are likely maintained by fire. Cheatgrass can be abundant (WYARNG 2014a).

Figure 14. Rocky Mountain Foothill Limber Pine Juniper Woodland

Northwestern Great Plains Canyon — This ecological system occurs in the NTA on 173 acres (0.1%), mostly along the North Platte River. Northwestern Great Plains Canyon exists as a mosaic with other systems along canyons (Figure 15). Limestone and sandstone rock outcrops are common. Vegetation varies locally depending on aspect, slope position and substrate. The common plant associations are:

- Mountain mahogany / sideoats grama (*Bouteloua curtipendula*) shrubland
- Longleaf wormwood – prairie sandreed sparse vegetation
- Eastern cottonwood – (peachleaf willow) / willow (coyote, sandbar) woodland

Vegetation in this ecological system can vary from riparian vegetation to more mesic vegetation types (WYARNG 2014a).

Invasive Grass —There are 91 acres (0.1%) on Camp Guernsey that are dominated by invasive grasses (Figure 16). While only 91 acres have been delineated, invasive grasses, such as cheatgrass, also occur at low densities across the Installation.

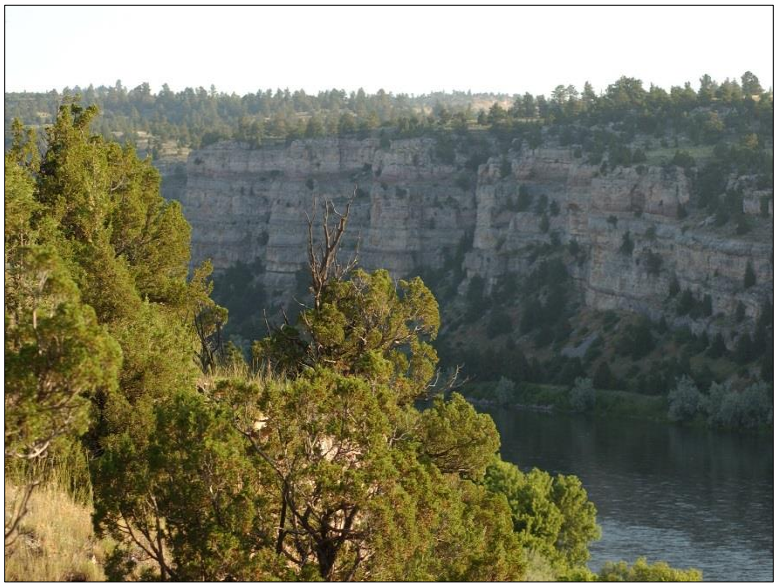

Figure 15. Northwestern Great Plains Canyon

Figure 16. Cheatgrass in the South Training Area.

North American Arid West Emergent Marsh — There are 7 acres (<0.1%) of North American Arid West Emergent Marsh in Sawmill Canyon in the North Training Area (Figure 17). The common plant association that is present at Camp Guernsey is:

- Baltic rush (*Juncus balticus*) herbaceous vegetation

Rushes dominate the herbaceous layer and form dense mats. Forb cover is low and shrubs are uncommon. This plant community must have a continuous water source throughout the year; a disruption of the water supply would cause the plant composition to shift to a community adapted to drier conditions. While this may be a late-seral plant community, it is often considered to be grazing-induced (NatureServe 2015, WYARNG 2014a).

Figure 17. North American Arid West Emergent Marsh

2.5.9 Wildlife

Within the state of Wyoming, jurisdiction over wildlife is shared by the Wyoming Game & Fish Department (WGFD) and the United States Fish and Wildlife Service (USFWS). The WGFD is charged to "provide an adequate and flexible system for control, propagation, management, protection, and regulation of all Wyoming wildlife" (WY Stat. 23-1-103). There is no statutory authority for the WGFD to protect, restore or enhance wildlife habitat on any lands other than those owned by the WGFD. The USFWS is charged with administering: federally threatened and endangered species and designated critical habitat under the Endangered Species Act (ESA); migratory birds under the Migratory Bird Treaty Act; and eagles under the Bald and Golden Eagle Protection Act. Hunting by the public is managed through the *Broom Creek Hunter Management Area* (*HMA*) program. Public fishing is available along the North Platte River through the WGFD Walk-In Fishing Program (WIFA#14). Employees of Camp Guernsey are also allowed to hunt on Camp Guernsey. All hunters must follow WGFD laws. The hunting program is detailed in *Section 4.15*.

Wildlife on Camp Guernsey includes mammals, birds, reptiles, amphibians, fish and insects. Big and small game species inhabit the area. Information on wildlife on Camp Guernsey has been primarily limited to inventory driven data (Appendix B). While the creation of species lists is a necessary first step to resource management, species presence does little to inform management without information on habitat and species distribution. Not all of the acquisitions made since 2010 have had species inventories completed for all faunal groups, however, the habitats in these areas are similar to others across the Installation and the same species may be expected to be present.

The Planning Level Survey (PLS) Vegetation Communities Map will be used in conjunction with previous wildlife surveys to create maps that indicate what wildlife species may be expected to be found in the different habitat types. This combined data set, that ties vegetation type with wildlife species, will then be used to inform resource management across Camp Guernsey.

Mammals

Big Game—Big game species that use Camp Guernsey include elk (*Cervus canadensis),* pronghorn (*Antilocapra americana*), white-tailed deer (*Odocoileus virginianus*) and mule deer (*Odocoileus hemionus* [WYARNG 1995, 2005a, 2008a, 2009b, 2013a, 2013b]). WGFD collects data to model population trends of big game annually. Surveys for big game carried out by WYARNG are limited to presence/absence surveys, which has been collected through incidental observations only.

Elk use the North Training Area (NTA) area yearlong. Some portions of the NTA may also receive an influx of animals during the winter months. Elk in this herd unit are not managed using population objectives because of a scarcity of data; management is based on landowner/hunter satisfaction (WGFD 2011). The South Training Area (STA) is not considered elk habitat by WGFD. WGFD has not designated any crucial range for elk within the installation boundary (WGFD 2010a).

Pronghorn use portions of the NTA yearlong, while other portions are used either in the spring, summer, or winter. The STA is used yearlong with an influx of animals in the winter months. The STA contains a small portion of crucial winter range designated by WGFD (Appendix A, Figure A-15). Crucial winter range "…*describes that component which has been documented as the determining factor in a population's ability to maintain itself at a certain level (theoretically at or above the population objective) over the long term*" (WGFD 2010a).

Small Game - Small game that is known from Camp Guernsey is limited to cottontail. The three species of cottontail in the area are desert cottontail (*Sylvilagus audubonii*), eastern cottontail (*Sylvilagus floridanus*), and mountain cottontail (*Sylvilagus nuttallii)* [WYARNG 1995, 2005a, 2008a, 2009b, 2013a, 2013b].

Furbearers -There are four species of furbearers on Camp Guernsey: American badger (*Taxidea taxus*), beaver (*Castor canadensis*), bobcat (*Lynx rufus*), and common muskrat (*Ondatra zibethicus)* [WYARNG 1995, 2005a, 2013b].

Predatory Mammals - Eight mammal species found on Camp Guernsey are managed as predatory animals by WGFD: Coyote (*Canis latrans*), North American porcupine (*Hystricomorph hystricidae*), red fox (*Vulpes vulpes*), striped skunk (*Mephitis mephitis*), northern raccoon (*Procyon lotor*), black-tailed jackrabbit (*Lepus californicus*) and white-tailed jackrabbit (*Lepus townsendii)* [WYARNG 1995, 2005a, 2008a, 2009b, 2013a, 2013b].

Nongame Mammals - There are twenty-five species of nongame mammal species that have been identified on Camp Guernsey (Appendix B, Table B-1[WYARNG 1995, 2005a, 2008a, 2013a, 2013b]). Ten species are classified as Species of Greatest Conservation Need by WGFD in the *Statewide Wildlife Action Plan* (WGFD 2010b): Townsend's big eared bat (*Corynorhinus townsendii*), fringed myotis (*Myotis thysanodes*), long-eared myotis (*Myotis evotis*), pallid bat

(*Antrozous pallidus*), big brown bat (*Eptesicus fuscus*), little brown myotis (*Myotis lucifugus*), western small-footed myotis (*Myotis ciliolabrum*), hispid pocket mouse (*Chaetodipus hispidus*), plains pocket gopher (*Geomys bursarius*), and plains pocket mouse (*Perognathus flavescens*).

Birds

Game Birds - Thirteen waterfowl species and three upland game bird species have been observed at Camp Guernsey (Appendix B, Table B-2 [WYARNG 1995, 2001a, 2005b, 2006a, 2008b, 2009c, 2009d, 2013c, 2013d]). In addition, Sandhill Crane (*Grus canadensis*) and Sora (*Porzana carolina*) have also been observed. Waterfowl habitat accounts for a small percentage of Camp Guernsey and waterfowl hunting is not an important recreational activity on the Installation. Wild Turkey (*Meleagris gallopavo*) and Mourning Dove (*Zenaida macroura*), both upland game birds, are common on the Installation. All game birds, except the upland game birds, are also migratory birds protected under the Migratory Bird Treaty Act (MBTA).

Nongame Birds - There have been 168 bird species observed at Camp Guernsey (Appendix B, Table B-2 [WYARNG 1995, 2001a, 2005b, 2006a, 2008b, 2009c, 2009d, 2013c, 2013d]). A majority of these are protected under the Migratory Bird Treaty Act (MBTA) and are further discussed in *Section 2.6.2*.

Fish

The North Platte River and several streams provide habitat for fish species within Camp Guernsey. Since 2000, 29 species of fish have been caught in waterways on the Installation (WYARNG 2000a, 2004, 2010a). A majority of these species were caught in the North Platte River, although fish were also located in Cottonwood Creek, Little Cottonwood Creek, Patten Creek, and Deercorn springs (Appendix B, Table B-3).

The portion of the North Platte River between Glendo and Guernsey reservoirs is ranked as a yellow ribbon stream having 50 to 299 pounds of sport fish per mile by the WGFD. The portion of the North Platte River that flows through Cantonment and the South Training Area is ranked as an orange ribbon stream having both warm and cold water game fish present. Game species include brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), rainbow trout (*Oncorhynchus mykiss*), walleye (*Sander vitreus*), black bullhead (*Ameiurus melas*), black crappie (*Pomoxis nigromaculatus*), green sunfish (*Lepomis cyanellus*), and smallmouth bass (*Micropterus dolomieu*).

Reptiles and Amphibians

At least five amphibians: the tiger salamander (*Ambystoma tigrinum*), northern leopard frog (*Lithobates pipiens*), plains spadefoot (*Spea bombifrons*), woodhouse toad (*Anaxyrus woodhousii*), and the common bullfrog (*Lithobates catesbeianus*), occur in the North Training Area (Appendix B, Table B-4; WYARNG 2000b, 2005c; 2010b, 2012). Reptile species identified on Camp Guernsey include the short-horned lizard (*Phrynosoma hernandesi*), northern sagebrush lizard (*Sceloporus graciosus graciosus*), western hognose snake (*Heterodon nasicus*), eastern yellowbelly racer (*Coluber constrictor flaviventris*), bullsnake (*Pituophis catenifer sayi*), wandering (*Thamnophis elegans vagrans*) and common garter snakes (*Thamnophis sirtalis*), and the prairie rattlesnake (Crotalus viridis ;Appendix B, Table B-5; WYARNG 2005c, 2010b).

Insects
Several arthropod surveys have been conducted on Camp Guernsey (WYARNG 2001b; 2006b, 2008c, 2013e). A species list for the Camp is being developed.

2.6 RESOURCES OF SPECIAL INTEREST

2.6.1 Threatened, Endangered (T&E), and Candidate Species
The Endangered Species Act (ESA) (16 U.S.C. 1531-1544) directs all federal agencies to use their existing authorities to conserve threatened and endangered species and, in consultation with the USFWS, to ensure that their actions do not jeopardize listed species or destroy or adversely modify critical habitat. The ESA sets forth requirements for consultation to determine if a proposed action could potentially affect a federally endangered or threatened species. If the WYARNG determines that an action may affect a federally threatened or endangered species, Section 7(a)(2) of the ESA requires consultation with the USFWS to ensure that any action the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of any federally listed endangered, or threatened species or result in the destruction or adverse modification of Critical Habitat. Section 10 of the ESA allows the USFWS to issue permits for direct take (10(a)(1)(A)) and incidental take (10(a)(1)(B)). Anyone planning to conduct any activity that may take a threatened or endangered species must obtain approval to perform that activity. Under the ESA, "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

The state of Wyoming has no state equivalent threatened and endangered species list.

The U.S. Fish & Wildlife Service Wyoming Ecological Services Field Office's Information, Planning, and Conservation (IPaC) system website (http://ecos.fws.gov.ipac/) provides an up to date on-line listing of endangered, threatened, proposed, and candidate species and their designated critical habitat that occur in or may be affected by actions associated with proposed projects. This species list fulfills the requirements of the USFWS under section 7(c) of the Endangered Species Act (16 U.S.C. 1531 et seq.). Table 6 lists the endangered, threatened, proposed, and candidate species and their designated and proposed critical habitat that occurs in or may be affected by actions on Camp Guernsey per the IPaC system (dated September 2015). Appendix A, Figures A-16, A-17, A-18 present the Section 7 Range of each of these species around Camp Guernsey.

Platte River Species
The *Platte River Species* include three bird species (Least Tern [*Sterna antillarum*], Piping Plover [*Charadrius melodus*], and Whooping Crane [*Grus americana*], one fish species (pallid sturgeon [*Scaphirhynchus albus*]), and one plant species (western prairie fringed orchid [*Platanthera praeclara*]). While these species are not found on Camp Guernsey, the intent of the USFWS is to protect water resources upstream of habitats used by these species. The Platte River Recovery Implementation Program (http://www.fws.gov/platteriver/) details requirements and procedures for minimizing impacts from water-related activities in contributing watersheds. If a proposed action may lead to consumptive use of water or have the potential to affect water quality in the Platte River System, there may be impacts to threatened and endangered species inhabiting the downstream reaches of this river system. There is no designated critical habitat for the *Platte River Species* on Camp Guernsey.

Table 6. Threatened and Endangered Species List for Camp Guernsey.

Species/Critical Habitat	Scientific Name	Status	Habitat	Habitat Present
Platte River Species • Least Tern (Interior Population) • Pallid Sturgeon • Piping Plover • Western Prairie Fringed Orchid • Whooping Crane	 *Sterna antillarum* *Scaphirhynchus albus* *Charadrius melodus* *Platanthera praeclara* *Grus americana*	 Endangered Endangered Threatened Threatened Endangered	Riverine habitat downstream of Wyoming in the Platte River system.	**n/a**
Platte River Species Critical Habitat	Designated for whooping crane in Nebraska in riverine habitat of the Platte River system (see 50 CFR 17.95(b))			**No**
Preble's Meadow Jumping Mouse	*Zapus hudsonius preblei*	Threatened	Lush riparian vegetation or herbaceous understories of wooded areas near water	**Yes**
Ute Ladies'-tresses	*Spiranthes diluvialis*	Threatened	Seasonally moist soils and wet meadows of drainages below 7,000 ft. elevation	**Yes**

Preble's Meadow Jumping Mouse

Preble's meadow jumping mouse (*Zapus hudsonius preblei*) is a small rodent that has large back feet adapted to jumping (Figure 18). It is found in Wyoming and Colorado along the Front Range of the Rocky Mountains. It lives in well-developed riparian areas that contain tall dense vegetation that it uses as cover. Typical habitat for Preble's is comprised of well-developed riparian vegetation with adjacent, relatively undisturbed grassland communities and a nearby water source. Preble's meadow jumping mice regularly use upland grasslands adjacent to riparian habitat. The species hibernates near riparian zones from mid-September to early May. Preble's meadow jumping mouse populations have declined due to removal, degradation, and alteration of riparian areas that historically provided suitable habitat for this small mammal. Preble's meadow jumping mouse Section 7 Range only includes the South Training Area and the portion of the North Training Area around the North Platte River.

Figure 18. Preble's meadow jumping mouse captured near Laramie Peak. It has never been found on Camp Guernsey.

The WGFD conducted a Preble's meadow jumping mouse survey along the North Platte River in 2012, which is the northern limit of their predicted range. Trapping sites were along or immediately adjacent to the North Platte River from approximately Casper to Lingle. Despite conducting greater than 5,500 trap nights at eight sites along the North Platte River, the WGFD failed to detect any Preble's meadow jumping mice (WGFD 2013). The WGFD concluded that:

> *Although Preble's are known to occupy riparian habitat along large perennial rivers (USFWS 2003), they do not appear to be common along the North Platte. In fact, only one jumping mouse has been captured along the North Platte despite numerous surveys since 1980, including those conducted for this project. Given the low elevation combined with the lack of jumping mouse captures, it is likely the North Platte River does not represent substantial habitat for the Preble's in Wyoming*.

The Nongame Mammal Biologist for WGFD stated that it was unlikely that there are any Preble's meadow jumping mice on Camp Guernsey (Martin Grenier, personal communication 2013).

Preble's meadow jumping mouse is difficult to distinguish in the field from the closely related western jumping mouse and is typically identified using genetic methods. To date, the WYARNG has conducted five small mammal surveys on Camp Guernsey and no jumping mouse species (*Zapus* spp.) have been identified (WYARNG 2005a, 2008a, 2009b, 2013a, and 2013b). A Preble's jumping mouse survey was carried out in the summer of 2015 and the results will be incorporated into this INRMP when received by WYARNG.

Ute Ladies'-tresses

Ute ladies'-tresses (*Spiranthes diluvialis*) is a perennial orchid whose geographic range includes much of Wyoming, as well as parts of Montana, Idaho, Utah, Nebraska, Nevada, Washington, and Colorado. It has small white or ivory colored blooms that open in late July through August (Figure 19). This terrestrial orchid occurs in riparian areas between 4,200 ft to 7,000 ft.

Ute ladies'-tresses preferred habitat typically occurs in moist valley bottoms where perennial rivers and streams are fed by groundwater (Heidel et al. 2008). The species occurs primarily on low, flat floodplain terraces or abandoned oxbows within 2 to 150 ft of small perennial streams or rivers. These terraces are subirrigated, often seasonally flooded, and remain moist throughout most of the growing season. It typically occurs in stable wetland and seepy areas within historical floodplains of major rivers, as well as in wetlands and seeps near freshwater lakes or springs. Nearly all occupied sites have a high water table (usually within 5 to 18 in of the surface) augmented by seasonal flooding, snowmelt, runoff and irrigation (USFWS 2009). Ute ladies'-tresses seem to require "permanent sub-irrigation," indicating a close affinity with floodplain areas where the water table is near the surface throughout the growing season and into the late summer and early autumn (USFWS 1995). The species seems to prefer well drained, sandy to silty loam soils derived from alluvial deposits with a slightly basic pH (University of Wyoming 2008). It is not found in heavy or tight clay soils or in extremely saline or alkaline (pH > 8) soils (USFWS 2009). Surveys conducted since 1992 have expanded the number of vegetation and hydrology types occupied by Ute ladies'-tresses to include subirrigated or spring-fed abandoned stream channels and valleys, and lakeshores. Populations have also been discovered along irrigation canals, berms, irrigated

meadows, excavated gravel pits, roadside borrow pits, and other human-modified wetlands. The orchid is well adapted to disturbances from stream movement within floodplains over time and is tolerant of other disturbances such as grazing that are common to grassland riparian habitats (USFWS 1995). Populations are often dynamic and "move" within a watershed as disturbances create new habitat or succession eliminates old habitat (Fertig and Beauvais 1999). The orchid has been known to establish in heavily disturbed sites, such as revegetated gravel pits, heavily grazed riparian edges, and along well-traveled foot trails on old berms (USFWS 1995).

Figure 19. Ute ladies'-tresses at Bear Creek. It has never been found at Camp Guernsey.

The grassy vegetation of Ute ladies'-tresses habitat is relatively short (usually less than 18 inches) but dense, usually in full sun but sometimes partial shade. Vegetation cover is typically 75-90% and the Ute ladies'-tresses usually occur as small scattered groups and occupy relatively small areas within the riparian system (Fertig 2000). The orchid persists in those areas where the hydrology provides continual dampness in the rooting zone throughout the growing season, but is not tolerant of long term standing water, and does not compete with emergent plant species (e.g., cattails) or aggressive species that form dense monocultures such as Canada thistle (USFWS 1995).

Drainages with documented orchid populations include Antelope Creek and its tributaries in northern Converse County, Bear Creek in northern Laramie and southern Goshen counties, Horse Creek in Laramie County, and Niobrara River in Niobrara County. The nearest population to Camp Guernsey is Bear Creek in northern Laramie County approximately 30 miles from Camp Guernsey. There is no designated critical habitat for Ute ladies'-tresses within Camp Guernsey. Camp Guernsey has wet meadow and riparian habitat that Ute ladies'-tresses could potentially occupy.

To date, the WYARNG has conducted eight vegetation inventories/vegetation community surveys/land condition trend surveys/wetland delineations at Camp Guernsey and no Ute ladies'-

tresses have been identified (WYARNG 1995, 1997, 2008d, 2009a, 2010a, 2010b, 2013f, 2014a). A survey of Camp Guernsey property was conducted in 2010 specifically looking for plants protected under the Endangered Species Act (WYARNG 2010). This survey identified nine areas of potential habitat for Ute ladies'-tresses. All nine areas were searched and no plants were located. However, the flowering window for Ute ladies'-tresses is normally from mid-August to mid-September and these surveys missed that critical window. *Section 4.9* details plans for future surveys.

2.6.2 Migratory Birds

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703–712) prohibits the taking, killing, or possessing of any migratory bird, part, nest or egg without authorization. Such "authorization" typically includes waterfowl hunting licenses, falconry licenses, and permits for scientific research, education, and depredation control. The definition of "take" (50 CFR 10.12) under the MBTA is to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to hunt, shoot, wound, kill, trap, capture, or collect. However, as detailed in the next three paragraphs, the military has an "authorization" for the incidental take of migratory birds while conducting military readiness activities as long as the readiness activities do not pose a significant adverse effect on migratory bird populations. This authorization for incidental take does not authorize take for non-readiness activities such as natural resource management; or the maintenance, construction, operation, and demolition of facilities. The MBTA does not contain any prohibition that applies to the destruction of an unoccupied migratory bird nest (without birds or eggs), provided that no possession occurs during the destruction. However, unoccupied nests of threatened and endangered migratory bird species and Bald and Golden eagles are legally protected by other statutes.

Executive Order 13186 requires that federal agencies:

> "*evaluate the effects of proposed actions on migratory birds (including eagles) pursuant to NEPA or other established environmental review processes; to restore and enhance the habitat of migratory birds, as practicable; identify where unintentional take reasonably attributable to agency actions is having, or is likely to have, a measurable negative effect on migratory bird populations; and, with respect to those actions so identified, the agency shall develop and use principles, standards, and practices that will lessen the amount of unintentional take, developing any such conservation efforts in cooperation with the USFWS.*"

This Executive Order also requires federal agencies to develop and implement a Memorandum of Understanding (MOU) with the USFWS to promote the conservation of migratory bird populations.

The Department of Defense (DoD) and the USFWS first published a *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* in 2006 and updated this MOU in 2014. The MOU recognized that the DoD's mission is to provide for the Nation's defense and that realistic military training and testing would be compatible with the conservation of migratory birds and their habitats by implementing conservation measures in ways that do not conflict with or impede

military training. This MOU addressed specific categories of activities including natural resource management; and maintenance, construction, operation, and demolition of facilities. It includes an agreement to: (1) focus on bird populations; (2) focus on habitat restoration and enhancement where actions can benefit specific ecosystems and migratory birds dependent upon them; and (3) recognizes that actions taken to benefit some migratory bird populations may adversely affect other migratory bird populations. However, this MOU did not authorize incidental take of migratory birds during non-military readiness activities.

The 2003 National Defense Authorization Act directed the USFWS to prescribe regulations to exempt the Armed Forces (including the individual state's National Guard) for the incidental taking of migratory birds during military readiness activities. In passing the Authorization Act, Congress determined that allowing incidental take of migratory birds as a result of military readiness activities is consistent with the MBTA and the treaties. With this language, 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. ''Military readiness activity'' is defined in the Authorization Act to include all training and operations of the Armed Forces that relate to combat, and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. It includes activities carried out by contractors, when such contractors are performing a military readiness activity in association with the Armed Forces, including training troops on the operation of a new weapons system or testing the interoperability of new equipment with existing weapons systems. Military readiness does not include: (a) the routine operation of installation operating support functions, such as: administrative offices; military exchanges; commissaries; water treatment facilities; storage facilities; schools; housing; motor pools; laundries; morale, welfare, and recreation activities; shops; and mess halls, (b) the operation of industrial activities, or (c) the construction or demolition of facilities listed above. The Final Rule authorizing incidental take, with certain limitations, resulting from military readiness activities was promulgated in the Federal Register on February 28, 2007 (Volume 72, Number 39). This rule requires the evaluation of significant effects on populations of migratory bird species utilizing the NEPA process and if significant adverse effects are likely, the military must confer and cooperate with the USFWS to develop appropriate and reasonable conservation measures to minimize or mitigate the identified significant adverse effects. When military readiness activities do not have a significant adverse effect on migratory bird populations, incidental take is authorized without conferring with the USFWS. This rule does not authorize take under the Bald and Golden Eagle Protection Act or the Endangered Species Act.

Camp Guernsey Migratory Bird Inventory

There have been 164 bird species observed on Camp Guernsey that are protected under the Migratory Bird Act. Camp Guernsey lies within the federally-designated Central Flyway. Primary considerations with regard to migratory bird management are:

- Compliance with the Migratory Bird Treaty Act (MBTA)
- Implementation of migratory bird management actions in accordance with Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Bird*
- Management to satisfy the *Memorandum of Understanding (MOU) between the DoD and the USFWS to Promote the Conservation of Migratory Birds* (DoD 2014)

- Support, contribution and compatibility with the goals and efforts of numerous regional migratory and game bird conservation programs.

There are two Breeding Bird Survey routes in the vicinity of Camp Guernsey. Breeding Bird Surveys are designed to monitor long-term trends of bird populations in North America and are coordinated by the U.S. Geological Survey and the Canada Wildlife Service. The Meadowdale Route runs for 6 miles along the eastern boarder of the North Training Area. The Dwyer runs within 10 miles of the South Training area, going west along the south side of Grey Rocks Reservoir before turning north. The Meadowdale Route was surveyed for nine years between 1983 and 1995; the Dwyer Route was surveyed for 6 years between 1992 and 2008.

Past migratory bird studies at Camp Guernsey have been limited to presence/absence data. In 2013, Rocky Mountain Bird Observatory was contracted to develop an avian monitoring plan for Camp Guernsey and to also estimate occupancy by bird species of Camp Guernsey. This data set will allow migratory bird densities on Camp Guernsey to be compared to those across similar habitats across Wyoming. This type of information will help guide management of migratory birds on the Installation. The data collected in 2013 is available through the Avian Knowledge Network. In addition, the Rocky Mountain Bird Observatory has received a Legacy Grant to study breeding bird occupancy rates at several military installations in 2015 and will be using Camp Guernsey as a study site.

Comprehensive bird conservation plans for migratory birds have been developed for various types of migratory birds. These conservation plans identify species and habitat conservation priorities at both national and regional scales. Plans that encompass Wyoming and are applicable to Camp Guernsey include:

- *Partners in Flight, North American Land Bird Conservation Plan*
- *North American Waterfowl Management Plan*
- *North American Waterbird Conservation Plan*
- *North American Bird Conservation Initiative*
- *Wyoming State Wildlife Plan*
- *Wyoming Bird Conservation Plan*

These plans provide the framework, conservation priorities, goals, and objectives comparable to INRMP goals and objectives for various migratory bird species and their habitats.

The DoD and Partners in Flight maintain a list of priority bird species for the different Bird Conservation Regions in North America. Camp Guernsey is within *Bird Conservation Region 17* and 25 priority species for this region have been identified on the Installation. USFWS maintains a list of *Birds of Conservation Concern*; twelve species have been observed on Camp Guernsey (Appendix B; Table B-2).

Raptors — Raptors (birds of prey – hawks, eagles, and owls) are a specific subset of migratory birds, which carry a more specific USFWS management guidelines. Special protection is granted to eagles under the Bald and Golden Eagle Act.

Twenty species of raptors have been reported from Camp Guernsey. Both species of North American eagle are present: Bald Eagle (*Haliaeetus leucocephalus*) and Golden Eagle (*Aquila chrysaetos*). Raptor species found on Camp Guernsey include hawks, falcons, and owls (Appendix B; Table B-2).There are ten mapped raptor nests on Camp Guernsey (Appendix A, Figure A-14, A-15). The species that use five of these nests are unknown, two are Osprey nests, one nest is used by a Red-tailed Hawk, one nest is occupied by a Ferruginous Hawk, and there is one Burrowing Owl nest site. However, it is likely that there are more nests that have not been mapped. In addition, there are several Osprey nests and two Bald Eagle nests (discussed below) known from just outside of the Installation boundary. Several nests have been removed from the map since the last INRMP because surveyors in 2013 could not locate them. Historically, raptor nests were not monitored for annual activity; raptor nests have been monitored annually since 2014.

Bald and Golden Eagles

The Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668–668d) includes more restrictive provisions than the MBTA, such as the protection of unoccupied nests and a prohibition on "disturbing" eagles. The BGEPA prohibits knowingly, or with wanton disregard for the consequences to take Bald Eagles and Golden Eagles without authorization. The definition of "take" (50 CFR 22.3 and 72 FR 31132) under the BGEPA is to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb. "Disturb" is to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, injury to an eagle; or a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. The BGEPA allows for the limited take of Bald eagles, or their nests, when the take is associated with otherwise lawful activities and the take would be compatible with the preservation of the Bald Eagle (74 Federal Register 46835). Compatible with the preservation of the Bald Eagle means the actions would have to be consistent with the goal of stable or increasing populations. Under these regulations the USFWS may issue take permits, based on regional population thresholds, to allow take that results in mortality of eagles or an eagle nest under special circumstances. The final rule regarding take permits was published in the Federal Register on September 11, 2009. Information on the types of permits, permit application process, required monitoring, mitigations requirements, and the application review process are available on the **USFWS website**.

Bald Eagles are also a state *Species of Special Conservation Need*. WGFD considers the biggest threats to Bald Eagle populations to be habitat loss and human disturbance (WGFD 2010b). The biggest threat to Bald Eagle on the Installation is human disturbance to which they are very sensitive when nesting. Nesting habitats for Bald Eagle are located on rivers and lakes, which is commonly where they also forage. There are no known Bald Eagle nests on Camp Guernsey, although Bald Eagle is often seen foraging along the North Platte River. There is one known nest on private land adjacent to Camp Guernsey that is less than the USFWS buffer distance away (0.5 miles) from the Installation (Appendix A, Figure A-14). However, the portion of Camp Guernsey that is within 0.5 miles of the nest is not currently used for training. The Impact Area and associated ranges are more than two miles from the nest. There is an another Bald Eagle nest located along the North Platte River that is approximately one mile from the North Training Area.

Previously, there were two Bald Eagle winter roosts mapped to the west of the North Training Area on private land. One roost was mapped just within 0.5 miles of the Camp boundary while the other is a further away. Surveys during the winter of 2014 and 2015 did not find any roosts. The Casper BLM District does not have any winter roosts identified along this section of the North Platte River.

No Golden Eagle nests are known to occur on Camp Guernsey. Occasionally, Golden Eagles can be seen soaring over the installation.

2.6.3 Species of Greatest Conservation Need: Tier 1 Species

The WGFD has prioritized species they have classified as *Species of Greatest Conservation Need* using a three tier system with species on Tier I having the highest priority for conservation. The following are Tier I species that are or can be expected to be found on Camp Guernsey.

Townsends's Big-eared Bat

Townsends's big-eared bat (*Corynorhinus townsendii*) is a medium sized bat with very long ears that occurs in the western United States. In the summer months, the females form maternity colonies where they bear and raise their young. Unlike other bat species, these bats are fairly sedentary and do not undergo a long migration. It prefers to roost in open areas, not cracks and crevices, and therefore relies on the availability of caves and mines for roost sites.

There are two identified bat community roosts on Camp Guernsey in the North Training Area (Figure 20, Appendix A, Figure A-14): Bat's Balcony located in the new Osburn parcel and Youngite Mine Cave (aka Crystal Cave) located in the cliffs along the North Platte River. Bat's Balcony is one of the largest maternity colonies of Townsend's big-eared bat in Wyoming with greater than 200 females using the site. In addition, the site is used as a winter hibernation site by Townsend's big-eared bat, western small-footed myotis (*Myotis ciliolabrum*) and little brown bat (*Myotis lucifugus*). Youngite Mine Cave is used as a winter hibernation site by Townsend's big-eared bat and western small-footed myotis. All of the above species plus the big brown bat (*Eptesicus fuscus*) have historically used Youngite Mine Cave as a summer roost; however, this site has not been surveyed during the summer since 1997 (Grenier personal communication 2013).

Figure 20. (a)Bats Balcony Cave (b) Youngite Mine Cave

The biggest threats to Townsend's big-eared bat populations are a decline in available habitat and human activities (WGFD 2010b). Human disturbance during the breeding season can result in abandonment of young. Bat's Balcony is a shallow cave which makes the bats using this site particularly vulnerable to disturbance (Grenier personal communication 2013). Conservation actions in the *State Wildlife Action Plan* that that are relevant to Camp Guernsey include (WGFD 2010b):

- Conduct inventories for species in all suitable habitats.
- Delineate important habitats and work to maintain these habitats.

Bald Eagle

The current status of Bald Eagle on Camp Guernsey is discussed under the Section 2.6.2 above.

Burrowing Owl

Burrowing Owl (*Athene cunicularias*) known to nest in the South Training Area (WYARNG 2006a, 2013a). This small owl nests in burrows made by other mammals and can have a main burrow as well as many satellite burrows. It often choses to nest in areas with sparse vegetation cover so it can watch for predators approaching the nest. Prairie dog colonies are commonly used because they provide both burrows and sparse vegetation.

In the South Training Area, Burrowing Owl nest in a black-tailed prairie dog colony. Rozal Prairie Dog Bait (EPA Reg. No. 7173-286) has been used in the past to control prairie dog colonies. The practice of chemical prairie dog control poses a threat to populations of Burrowing Owl in Wyoming (WGFD 2010b). Efforts to better manage this important resource are incorporated into this revision of the INRMP under *Section 4.0 Program Elements*.

As well as being a Wyoming Species of Greatest Conservation Need, it is also a USFWS *Bird of Conservation Concern* and a Partners in Flight *Priority Species*. Conservation Actions outlined in the *State Wildlife Action Plan* that are relevant to Camp Guernsey include (WGFD 2010b):

- maintain prairie dog colonies used by Burrowing Owls, and
- minimize human disturbance within ¼ to ½ mile of nesting burrowing owls during the breeding season (April 1- September 15).

Ferruginous Hawk

Ferruginous Hawk (*Buteo regalis*) is a large hawk and is one of the few raptor species in Wyoming that is a year round resident. At Camp Guernsey, nesting sites are primarily rock outcrops and cliffs. Pairs often return to the same nest year after year to breed and can be very sensitive to human disturbance during nesting. A new disturbance, even short lived, can cause the bird to abandon its young and nest. There is one known occupied Ferruginous Hawk nest in the South Training Area.

Limiting factors for this species are habitat loss and disturbance by human activities (WGFD 2010b). In addition to being a Wyoming Species of Greatest Conservation Need, it is also a USFWS Bird of Conservation Concern and a Partners in Flight Priority Species. Conservation actions detailed in the *State Wildlife Action Plan* (2010) that are most relevant to Camp Guernsey include:

- collect information on occupancy and productivity,
- minimize human disturbance during the nesting season using a one mile buffer around Ferruginous Hawk nests during the breeding season (April 1 –July 31), and
- maintain prairie dog colonies.

Figure 21. Ferruginous Hawk nest in the South Training Area

Mountain Plover

Mountain Plover is a medium shorebird that breeds in grasslands of the Rocky Mountains. Suitable nesting habitat for Mountain Plover contains short vegetation and a high percentage of bare ground. Wyoming is an important breeding ground for this species and some areas on Camp Guernsey, especially those found in the South Training Area, can be expected to provide suitable habitat. While Mountain Plovers are known to breed in Platte County (WGFD 2012), surveys of Camp Guernsey have never identified a Mountain Plover. However, plover specific surveys have not been carried out.

The USFWS withdrew its proposal to list the Mountain Plover under the Endangered Species Act in 2011 (USFWS 2011). However, in addition to being a Wyoming *Species of Greatest Conservation Need*, it is also a USFWS *Bird of Conservation Concern* and a Partners in Flight *Priority Species*. Limiting factors to Mountain Plover populations are habitat and disturbance by human activities (WGFD 2010b). Conservation Actions for Mountain Plover that are applicable to Camp Guernsey include (WGFD 2010b):

- monitor suitable habitat,
- survey potential breeding sites, and
- maintain prairie dog colonies.

Northern Goshawk

Northern Goshawk (*Accipiter gentilis*) is a large grayish hawk that breeds in coniferous forests in boreal and temperate forests of North America. Like Ferruginous Hawk, it is a year-round resident

in Wyoming. A Northern Goshawk was observed flying over the South Training Area in 1995 (WYARNG 1995). In 2014, Wyoming State Forestry Division observed two goshawks in a forested area while marking trees for a thinning project.

Conservation actions for Northern Goshawk that are applicable to Camp Guernsey include (WGFD 2010b):

- conduct annual monitoring at known nesting areas, and
- minimize human disturbance during the breeding season.

2.6.4 Priority Habitats

The WGFD has prepared a *Strategic Habitat Plan* that recognizes sustainment of quality wildlife habitat is contingent upon working in partnership with private landowners, public land managers, conservation organizations, local, state, and federal governmental agencies and the public. The WGFD's *Strategic Habitat Plan* identifies priority areas for habitat conservation (WGFD 2009). These priority habitat areas include wildlife habitats that are "crucial" and those habitats that have been degraded and have potential for "enhancement". Camp Guernsey is located within the *Laramie Region Priority Area*.

The southern half of the South Training Area is identified as being crucial terrestrial and aquatic habitat as a part of the *Lower Laramie and North Laramie River Watershed Priority Area*. The WGFD *Strategic Habitat Plan* (WGFD 2009) identifies the *Eastern Plains Riparian Habitat Priority Area* which includes riparian areas along the North Platte River through the Cantonment Area and Wendover Canyon as a *Priority Terrestrial Habitat Enhancement Area*. The WGFD recommends actions to meet the conservation objectives of the plan. Actions that may be applied to Camp Guernsey within one or both priority areas are:

- manage riparian areas using infrastructure to exclude or limit livestock grazing in riparian areas,
- use mechanical and chemical methods to remove non-native plant species, including Russian olive,
- conserve prairie dog colonies,
- identify grassland focus areas,
- re-seeding meadow habitats with native seed, and
- re-establish native woody vegetation through plantings.

Although the priority areas delineated by WGFD do not encompass all of Camp Guernsey, WYANG will expand the actions suggested by WGFD to the whole installation where appropriate and applicable.

2.6.5 Rare Plants and Plants with Traditional Cultural Uses

The state of Wyoming has no state regulation that protects rare or sensitive plant species or plant communities.

The Wyoming Natural Diversity Database maintains a list of plant species of concern that occur in Wyoming. There are 24 vascular plant species of concern whose geographic range overlaps with the watershed that contains Camp Guernsey; nine species have been found on Camp Guernsey and are known either through WYARNG surveys or the Wyoming Natural Diversity Database (Table 7).

Of the nine species that are known from Camp Guernsey, six species are upland species and three species are found in wet areas. Of the 13 species that may occur on Camp Guernsey, but have never been found, three are upland species and ten are species found in wet areas. Wet areas (wetlands, riparian areas, seeps, springs, ponds) are limited or degraded on Camp Guernsey (WYARNG 2010a). It is likely that suitable habitat does not occur on Camp Guernsey for many of the species that have not been found on the Installation. Plant taxonomy can be complex and the same plant species may have different names from different authorities which add complexity when determining what species are present when compiling past survey data.

Table 7. Rare plants whose geographic range includes Camp Guernsey.

Common Name	Species	Upland (U) Wetland (W)	Present on Camp Guernsey
Andean prairie-clover	*Dalea cylindriceps*	U	Possible
Boreal spikerush	*Eleocharis tenuis* var. *borealis*	W	Unlikely
Chaffweed	*Centunculus minumus*	W	Possible
Common Hackberry	*Celtis occidentalis*	W	Possible
Dwarf bulrush	*Lipocarpha drummondii*	W	Yes
Emory's sedge	*Carex emoryi*	W	Yes
Engelmann flatsedge	*Cyperus engelmannii*	W	Possible
flat-top fragrant goldenrod	*Euthamia graminifolia* var. *major*	W	Yes
Great blue lobelia	*Lobelia siphilitica*	W	Possible
Holzinger Venus' looking-glass	*Triodanis holzingeri*	U	Yes
James' nailwort	*Paronychia jamesii*	U	Possible
Lemon scent	*Pectis angustifolia* var. *angustifolia*	U	Yes
Nebraska buckwheat	*Eriogonum pauciflorum* var. *nebraskense*	U	Yes
New Mexico needlegrass	*Hesperostipa neomexicana*	U	Yes
Pretty dodder	*Cuscuta indecora* var. *neuropetala*	W	Possible
Rabbit tobacco	*Filago prolifera*	U	Yes
Red-rooted flatsedge	*Cyperus erythrorhizos*	W	Possible
Shining flatsedge	*Cyperus bipartitus*	W	Possible
Short-point flatsedge	*Cyperus acuminatus*	W	Unlikely
Showy prairie-gentian	*Eustoma grandiflorum*	W	Possible
Six-angle spurge	*Euphorbia hexagona*	U	Yes
Square-seeded spurge	*Euphorbia exstipulata*	U	Possible
Teal love grass	*Eragrostis hypnoides*	W	Possible
Wild yellowcress	*Rorippa truncata*	W	Possible

In addition to the rare plants found on Camp Guernsey, there are a number of plants that have been identified as having traditional cultural uses to Native American Tribes (WYARNG 2005d). There

are approximately 200 plant species that have been identified as being used for food, medicine, and for ceremonial purposes.

2.6.6 Floodplains

Executive Order 11988, Floodplain Management, requires federal agencies to avoid, to the extent possible, adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development. The Platte County Zoning Rules and Regulations (Platte County 2012) require prior approval before development in an area of special flood hazard as mapped by FEMA.

A portion of the Camp Guernsey Cantonment Area is located on a river terrace (Clarkelen wet Anvil Loam soil map unit) of the North Platte River. The Federal Emergency Management Agency (FEMA) does not identify the stream terrace in the Cantonment Area as being at risk from flooding (FEMA 1978). There is a mapped floodplain along the North Platte River upstream of the Catonment Area and along a small section of Broom Creek in the North Training Area. The construction of six large upstream reservoirs on the North Platte River by the Bureau of Reclamation (BoR) has substantially reduced the risk of flooding in the Guernsey area.

2.6.7 Ground Water

In the North Training Area (NTA), the primary geologic formation that serves as an aquifer is the Paleozoic-aged Hartville Formation which is composed of limestone, dolomite, sandstone, and siltstone. Parts of this formation is covered by the much younger Tertiary-aged Arikaree Formation, which is composed of fine-grained sandstone, siltstone, limestones, and tuff. The Arikaree Formation serves as a minor aquifer in the NTA. In the South Training Area (STA), the Arikaree Formation serves as the primary aquifer. It is much thicker than in the North Training Area, and thus is a more effective aquifer. Deep wells may also draw water from the Hartville Formation. There are also significant Quaternary-aged aquifers present in parts of Camp Guernsey. The most significant deposits serving as aquifers are composed of unconsolidated deposits associated with current or ancient river systems.

The Town of Guernsey and the Cantonment Area are supplied by wells drawing water from alluvium associated with the North Platte River. These wells may also draw water from the underlying Arikaree Formation.

Seventy impoundments and dam embankments exist within the North Training Area (WYARNG 2011). Most of the facilities appear to have storage capacities less than 12 acre-feet, with many less than 2 acre-feet. Many of these impoundments do not contain water by late summer.

The now closed, unlined Guernsey Landfill is located due north of the Cantonment Area. This landfill has known groundwater contamination and requires active remediation with numerous constituents exceeding the Wyoming Department of Environmental Quality's (WDEQ) Maximum Contaminant Level under the Groundwater Protection Standard. Groundwater flow direction from this leaking landfill goes under the Cantonment Area. This leaking landfill is listed as a high priority for WDEQ.

2.6.8 Water Quality

There are over 100 identified wells on Camp Guernsey, eight of which are used for potable water and are routinely tested using the U.S. Environmental Protection Agency (EPA) Public Water Supply protocols. There are four potable water wells in the North Training Area located at: Ryan Springs, Deercorn Springs, the QTR Range, and the LAW Range. There are three potable water wells in the South Training Area located at: the KD Range, the MRF Range, and at the Guest House. There is one potable water well on Cantonment. Overall the water quality has been good at these wells. However, the water system at the QTR has tested positive for total coliform due to a poor system design. WYARNG is working with the EPA and Rural Water to address this issue. The WYARNG has received an EPA Region VIII Excellence Award for all of the North Training Area and Cantonment Area wells.

In 2011, inventories were conducted on 41 existing groundwater wells or springs in the North Training Area, and limited pump and flow tests were conducted on 12 wells (WYARNG 2011). Basic potable water quality sampling was done on 26 wells. All wells were below maximum contaminant levels for total dissolved solids and nitrate/nitrite. A few wells exceeded the secondary maximum contaminant levels for iron, but after operating the wells for a longer period, only one well exceeded the secondary maximum contaminant levels.

Secondary screening for radiochemicals, metals, volatile organic compounds and semi-volatile organic compounds was conducted on seven wells. All wells were non-detectable for both types of compounds. Gross alpha concentrations were elevated for a few wells, and further study is planned.

Phase I and Phase II Operational Range Assessment were conducted at Camp Guernsey in 2007 and 2012 to identify the presence or absence of munitions constituents of concern (MCOCs) that could be generated and released to surface water and/or groundwater due to training activities. The Phase II assessment concluded that no off-range MCOC migration is occurring at Camp Guernsey and all downrange MCOCs are well within acceptable levels with most being below detection limits.

2.6.9 Air Quality

Platte County and Camp Guernsey are in the *Metropolitan Cheyenne Intrastate Air Quality Control Region* (AQCR) (40 CFR 81.89). This AQCR is in full attainment of both the National Ambient Air Quality Standards (NAAQS) and Wyoming Ambient Air Quality Standards (WAAQS) for all criteria pollutants. No mandatory federal Prevention of Significant Deterioration Class I areas are located in Platte County or within 100 miles of Camp Guernsey. The closest Class I area is located 230 miles away (WDEQ 2003).

2.7 ENVIRONMENTAL CONCERNS

2.7.1 Drought

Wyoming has experienced periods of drought over the last 100 years and has been in a moderate to severe drought since 1999 (Wyoming State Climate Office 2014). During this period, most springs at Camp Guernsey had reduced flow, with some drying up completely. In 2012, low snowpack, an extremely dry spring and the third warmest spring in the past 118 years, brought

severe drought conditions to Camp Guernsey (Western Water Assessment and the National Integrated Drought Information System 2012). Along with the severe drought conditions, came a severe fire season with substantial fires occurring at Camp Guernsey and statewide.

2.7.2 Wildland Fire

Numerous small fires associated with training activities occur annually, but are quickly contained. In 2006, there were two large fires: the Tracer Fire and the Old Chicago Fire. The Tracer Fire, a result of a 5.56mm tracer round, burned 14,218 acres. The Old Chicago Fire was ignited by a lightning strike and burned 13,305 acres. In 2012, the Sawmill Canyon Fire was started by training activities and burned 14,140 acres (Appendix A, Figure A-19). Precipitation occurring after these fires resulted in significant erosion and sedimentation. Wildland fire caused by training or those started through lighting strikes on the Installation have the potential not only to reduce the quality of the environment available for training, but also have the potential to cross the Installation boundary onto private lands. An *Integrated Wildland Fire Management Plan* is currently being developed for Camp Guernsey to mitigate the risk of occurrence of large wildland fires on the Installation.

2.7.3 Bark Beetle

Currently, the Rocky Mountain region is concluding one of the worst bark beetle infestations in history. Approximately 20 miles distant, the Medicine-Bow National Forest has been severely impacted by the outbreak. Bark beetles are capable of killing whole stands of trees and, although, bark beetle infestations are a cyclic natural process across western North America, the scale of the current infestation is one of the greatest recorded. Stands of dead trees retain their needles which dry out once the tree is dead (the red needle phase). This poses a significant fire hazard. The potential for downfall of dead trees has forced the Forest Service to close roads and recreational areas. The ecological consequences can impact whole watersheds, as mountainous areas are no longer shaded by timber and are unable to retain winter snowpack in the spring leading to excessive run off in some areas. To date, the impact of bark beetle at Camp Guernsey has been modest, although evidence of infestation can be seen in most wooded areas on the Installation.

2.7.4 Livestock Grazing

The WYMD recognizes that properly managed livestock grazing is compatible with enhancing or maintaining military training lands. Livestock grazing is currently allowed on Camp Guernsey and is discussed in Section 2.4.5. The WYARNG does not currently have a *Livestock Grazing Management Plan* to integrate grazing with the military training mission while supporting our multiple use stewardship and sustainability goals. Boundaries of the current grazing leases are, in some cases, not fenced and boundaries of other interior surface landowners (BLM, WY School Trust, BoR, private) are often not fenced. In some areas of the Installation, distribution of livestock is poor because of insufficient fencing and uneven distribution of water sources. Some areas are over-utilized, while some are under-utilized. Implementation and enforcement of the terms of these leases has been marginal over the years.

Camp Guernsey has contracted out the completion of three *Land Condition Trend Analysis* surveys since 1997 (WYARNG 1995, WYARNG 1997, and WYARNG 2002). The 2002 report summarized one riparian survey plot as follows:

> *Even with the exclusion of cattle and military vehicles, natural revegetation of the floodplain could take years. Just upstream from this site are heavily grazed ranchlands. The creek and floodplain off the installation are devoid of woody vegetation (cottonwood and willow) and have only a very sparse herbaceous cover of unpalatable weeds. Overgrazing of this once productive riparian corridor has resulted in an almost complete loss of vegetative cover for miles upstream. During periods of high runoff, sediment movement is heavy from this area to downstream sites on the installation.*

The 2002 report summarized trends in forage species surveys over the years as follows:

> *However, the carrying capacity of the rangeland is finite, especially in drought years. During periods of drought the vegetative resource cannot withstand normal levels of grazing, and the more palatable forage species are depleted. A detailed analysis of canopy cover data was performed to identify trends in 34 palatable forage species for cattle. It was also shown that forage species comprised 64% of all aerial cover in 1997, 1998, and 1999, but only 50% of all aerial cover in 2002. Forage species of Poor palatability showed little change over the survey period, and non-forage species increased slightly, despite the drought of 2002. Trends in the data indicate that the drought of 2002 is probably not responsible for the decline in palatable forage species, but that grazing by cattle and wildlife is more likely the cause of the decline.*

Historical overgrazing by livestock in portions of Camp Guernsey have potentially changed some vegetation communities to a state that produces less forage and is not ideal for military training (WYARNG 2010b, WYARNG 2014). While a change in management can offer improved vegetative conditions, some sites may never recover to a more desirable vegetative state without extensive intervention. Data collected in 2013 suggest that the North Training Area is less impacted than the South Training Area by historical grazing. However, there are some areas where low vegetative cover, erosion, and undesirable plant species could be indicators of historical overgrazing. A *Rangeland Health Assessment* will be conducted in 2016 in the North and South Training Areas to better quantify the health of the rangelands.

2.7.5 Noxious Weeds

In Wyoming, noxious weeds are managed under the Wyoming Weed and Pest Control Act. Wyoming has a list of Designated Noxious Weeds (W.S. 11-5-102 (a)(xi)) and Prohibited Noxious Weeds W.S. (W.S. 11-12-104). There are currently 25 species on this State-Listed Noxious Weed list (Table 8, http://www.wyoweed.org/). The act also provides for Weed and Pest Control Districts associated with each county, covering all lands within a county including federal lands. Each County Weed and Pest District can declare additional species applicable only within the District. The Platte County Weed and Pest District has designated four additional plant species as Noxious Weeds in Platte County (Table 8).

Nineteen state designated noxious weeds have been identified on Camp Guernsey (WYARNG 2003). Non-native thistles are the most common and problematic State-Designated Noxious Weeds on the Installation. There is a large infestation of plumeless thistle (*Carduus acanthoides*)

on the Smith Ranch that originated prior to WYARNG ownership. Plumeless thistle is common along roadside drainages, riparian and wetland areas at Camp Guernsey. It is a biennial thistle, taking two years to complete its life cycle. It is avoided by livestock. High seed production and long seed viability make thistle hard to control once it becomes established. A combination of chemical and mechanical methods applied over multiple years provides the most effective control.

Table 8. State and Platte County listed Noxious Weeds.

Common Name	Species	Reported from Camp Guernsey	State or County Designated
Canada thistle	***Cirsium arvense***	**yes**	State
Cheatgrass	***Bromus tectorum***	**yes**	County
Chicory	***Cichorium intybus***	**yes**	County
Common burdock	***Arctium minus***	**yes**	State
Common St. Johnswort	*Hypericum perforatum*	no	State
Common tansy	*Tanacetum vulgare*	no	State
Dalmation toadflax	***Linaria dalmatica***	**yes**	State
Diffuse Knapweed	***Centaurea diffusa***	**yes**	State
Dyers woad	*Isatis tinctoria*	no	State
Field bindweed	***Convolvulus arvensis***	**yes**	State
Hoary cress, whitetop	*Cardaria draba*	no	State
Hoary cress, whitetop	***Cardaria pubescens***	**yes**	State
Houndstongue	***Cynoglossum officinale***	**yes**	State
Jointed goatgrass	*Aegilops cylindrical*	no	County
Leafy spurge	***Euphorbia esula***	**yes**	State
Musk thistle	***Carduus nutans***	**yes**	State
Oxeye daisy	*Leucanthemum vulgare*	no	State
Perennial pepperweed	*Lepidium latifolium*	no	State
Perennial sowthistle	*Sonchus arvensis*	no	State
Plumeless thistle	***Carduus acanthoides***	**yes**	State
Pucturevine	***Tribulus terrestris***	**yes**	County
Purple loosestrife	*Lythrum salicaria*	no	State
Quackgrass	***Elymus repens***	**yes**	State
Russian knapweed	***Acroptilon repens***	**yes**	State
Russian olive	***Elaeagnus angustifolia***	**yes**	State
Salt cedar	***Tamarix* spp.**	**yes**	State
Scotch thistle	***Onopordum acanthium***	**yes**	State
Skeletonleaf bursage	***Ambrosia tomentosa***	**yes**	State
Spotted Knapweed	***Centaurea stoebe* ssp. *micranthos***	**yes**	State
Yellow toadflax	*Linaria vulgaris*	no	State

The County-Designated Noxious Weed of greatest concern is cheatgrass (*Bromus tectorum*), an annual brome, which occurs across the Installation. Once established, cheatgrass is difficult to eliminate. In many areas annual bromes are so common that control may be impractical or not economically feasible with current control technologies. Many of these areas may have crossed a

threshold to represent a vegetation disclimax. Where active control is practical, live plants must be eliminated, seed set must be prevented, and new seedlings must be quickly controlled. Where such high input manipulation is not practical, the combined variables of time, livestock grazing management, protection from fire, and lack of other disturbance, may allow perennial native vegetation to regain dominance.

Russian olive (*Elaeagnus angustifolia*) is common along the portion of the North Platte River that runs through Cantonment. Once planted as an ornamental tree that was thought to provide habitat for wildlife, this tree is now classified as a State Noxious Weed. Russian olive has an abundant seed crop that is readily spread by wildlife. This tree can outcompete native willows and cottonwoods, leading to less diverse riparian habitats. It is difficult to remove as a combination of cutting and herbicide application over multiple years must be used for control to be effective.

3.0 NATURAL RESOURCES MANAGEMENT STRATEGY AND MISSION SUSTAINABILITY

3.1 INTEGRATING THE MILITARY MISSION AND SUSTAINABLE LAND USE

Camp Guernsey provides a variety of ecosystems and environmental conditions in which to train and prepare combat-ready troops for expeditionary deployment. This INRMP details management for natural resources that will sustain healthy ecosystems to support the Camp Guernsey Mission. By their nature, training activities have the potential to impact natural resources. The WYARNG recognizes air, land, and water resources as environmental assets for military training and is committed to responsible stewardship of these natural assets.

The WYARNG recognizes that it has a responsibility to manage natural resources in a way that complies with legal and regulatory requirements, promotes ecological sustainability, and facilitates mission accomplishment. However, WYARNG acknowledges that training activities can be detrimental to ecosystems. The WYARNG is committed to rehabilitating all damage that occurs through training. With proper natural resource management, the WYARNG strives to maintain its ability to train and complete our mission, while supporting a legacy of natural resources for current and future generations. Natural resource management at Camp Guernsey will be aimed at maintaining the ecosystems necessary to support the military mission and encouraging habitat conservation in other natural areas throughout the installation.

3.2 SUSTAINABILITY CHALLENGES

Mission emphasis is on field artillery training, but facilities are also available for infantry, engineer, aviation, maintenance, medical units, et cetera. Mission activities may have adverse impacts to soil and the surrounding watershed. Soil disturbances during training activities will increase soil erosion, reduce water quality, and eventually reduce habitat for local wildlife and plant communities. Degradation of these natural resources would have an adverse impact on training by reducing the realistic training landscape. Activities of concern that may impact the natural resources at Camp Guernsey include, but are not limited to:

- Degradation of water quality related to industrial storm water discharge from the Camp Guernsey Airport. Impacts are expected to be minimal as the industrial storm water discharge is regulated by the Wyoming Pollutant Discharge Elimination System (WYPDES) Program Storm Water Permit and Best Management Practices (BMPs) are employed;
- Road dust from mechanized infantry training may also impact air quality throughout the training areas. Active road dust suppression performed during training activities minimizes the amount of dust emitted to the atmosphere;
- Artillery and arms training, impermeable surfaces, soil disturbances, and vehicle use and maintenance activities contribute to existing water quality degradation in the watershed;
- Accidental spills of hazardous and non-hazardous constituents related to vehicle maintenance, routine fueling operations, and other mission activities may contribute to degradation to water quality in the watershed and groundwater beneath the facility. Impacts are expected to be minimal as spills, spill prevention, and emergency management are addressed in the *Camp Guernsey Spill Prevention, Control, and Countermeasure*

(SPCC) Plan (WYARNG 2014b). Accidental releases of hazardous waste are also expected to be minimal as all hazardous waste is handled in accordance with the *Camp Guernsey Hazardous Waste Management Plan* (WYARNG 2013g) and training in waste handling is provided to all personnel. In addition, secondary containment units and drip pans are used throughout the Installation

- Accidental releases related to fueling operations from permanent and mobile fuel tanks are potential sources of groundwater and surface water contamination. Impacts are believed to be minimal as the permanent fuel tanks are equipped with double-walled containment, alarm systems, and self-contained oil/water separators. The mobile fuel tankers are also equipped with secondary portable containers to minimize potential releases.
- Surface water impacts are possible when using herbicide during pest management activities. This impact is expected to be minimal, as these activities are conducted in accordance with the *Integrated Pest Management Plan* for WYARNG facilities (WYARNG 2013h).
- Wetlands and streams can be impacted through current operations if personnel are not aware of these sensitive areas and the requirements for protecting them.
- Habitat for special status species can be impacted through training activities and improper ecosystem management if personnel are not aware of management requirements. These impacts are reduced through management outlined in *Section 4.0* and include such things as seasonal buffers around raptor nests.
- There is a potential for noise from training activities to affect wildlife. The most notable noise impact is from field artillery training. Other lesser noise impact producing activities on Camp Guernsey include military vehicle use; aircraft, grounds maintenance; tree pruning and removal; construction activities; general troop training; and use of vehicles. The magnitude of the impact is reduced through seasonal buffers around raptor nests and restrictions when pronghorn are present in their crucial winter range during severe winters.
- Training activities can introduce and spread invasive plant species. WYARNG mitigates the spread of invasive plant species through training activities by closing areas that are heavily infested until they are treated and by integrating adaptive management techniques.

The impact of training activities on natural resources is further reduced by briefing all incoming troops on natural resource issues that are relevant to the training they will be taking part in. ITAM monitors and repairs damage to the vegetation and soils due to training. In addition, Environmental Management Division (EMD) Staff will clear an area before troops are allowed leave the site after completing their training.

3.2.1 Climate Change

WYARNG understands that there is a potential for climate change, on a local level, to impact the ability of the military to sustain the training of soldiers. Shifts in precipitation regimes and temperature ranges can result in changes to the vegetation which could impact the training areas, promote noxious weed infestations, or compromise wildlife habitat. WYARNG will support the development of a vulnerability assessment to better understand the potential impacts related to a changing climate. However, the abundance and distribution of species and habitats on WYARNG properties is too small in scale to address comprehensive climate change vulnerabilities. Therefore, WYARNG will look at existing regional plans, partnerships, or other reports that other agencies, universities, or non-profits are conducting in Wyoming on assessing, developing, and

implementing climate change adaptation strategies. In general, WYARNG will identify and implement sound natural resources strategies that provide benefits to the ecosystem, regardless of whether climate changes occur.

3.3 ENCROACHMENT & TRAINING CONSTRAINTS

Natural resources at Camp Guernsey that have the potential to limit activity are: wetlands, riparian areas, special status species, special habitats, and invasive species. These natural resource constraints are mapped and the resulting maps are used by the Environmental Management Division (EMD) Staff when accessing environmental impacts and determining the level of coordination needed with incoming units on environmental concerns (Appendix A, Figure 26). As opposed to making areas completely off limits, this INRMP acknowledges that different types of training activities have the potential to impact natural resources differently. It is the intent of the EMD Staff that by making these maps available to incoming units, they will be able to choose training areas that fulfill their needs that have the least limitations due to environmental concerns.

Each constraint map focuses on a different type of military training activity: bivouac, digging, flames, foot traffic, heavy maneuver, light maneuver, and smoke. Within each map, areas are colored green, amber, red, or black. No color indicates that there are no known resources present that have the potential to constrain military training activities. Green areas indicate that there is a resource present, but it is unlikely to impact military training activities. When an area is colored amber, there is a resource present that could constrain military activities and EMD Staff must be consulted. Red areas require detailed coordination with EMD Staff. Black areas indicate that military training is likely not permissible. Initial coordination should occur with the Camp Guernsey Natural Resource Specialist, who will then coordinate with the Cultural Resource Manager or the Natural Resource Manager, depending on which resource is present in the area. The environmental constraints maps are continually updated as new data becomes available.

When training is proposed to occur in an area colored amber or red, there are a number of questions that will be asked during the coordination process. First, it will be determined if the restriction is an active constraint at the time training is proposed. Also information will be needed about the number of people and equipment involved in the training activity. The timeframe of the activity will also be a consideration. There also must be a reason why the activity must occur in the amber or red area and cannot occur in adjacent areas where there are no or fewer environmental concerns.

Only one area within Camp Guernsey is classified as off limits to training due to natural resource constraints:

- a large infestation of plumeless thistle in the North Training Area near Smith Ranch.

3.4 NEPA ANALYSIS

Appendix G contains the Environmental Assessment and Appendix H the associated Finding of No Significant Impact (FNSI) that analyzed the environmental consequences of implementing this proposed INRMP.

3.5 OTHER PLANS

The *Integrated Wildland Fire Management Plan*, the *Grazing Management Plan* (future), the *Integrated Training Area Management (ITAM) Plan*, and the *Integrated Pest Management Plan* are all supporting plans to this INRMP. All supporting plans will integrate the management goals and objectives detailed in this INRMP.

3.6 STATE COMPREHENSIVE WILDLIFE PLAN

The Wyoming *State Wildlife Action Plan* (SWAP) was revised in 2010 (WGFD 2010b). The SWAP identifies *Species of Special Conservation Need* and ranks them by priority. The SWAP used the magnitude of threats to species' habitat and population in order to determine priority. This INRMP cycle will focus management on Tier I species identified in the SWAP. Tier I species are species that have been identified by WGFD as having the highest priority for conservation actions. The Tier I species are described in *Section 2.6.3*.

4.0 PROGRAM ELEMENTS

The following 18 INRMP Program Elements have specific goals, objectives and projects detailed in this section. In addition, numerous best management practices (BMPs) are identified that may be implemented to fulfill the stated goals and comply with applicable laws.

4.1 WETLANDS AND RIPARIAN MANAGEMENT

Military training and construction of infrastructure to support training can impact wetlands, but in most cases this is avoidable at Camp Guernsey. The following bulleted best management practices (BMPs) may be implemented to ensure the conservation of wetland and riparian habitats and maintain compliance with applicable laws:

- Training constraints for wetlands include (Appendix C):
  - Bivouac: Not allowed.
  - Digging: Not allowed.
  - Foot Traffic: Detailed coordination with Environmental Management Division (EMD). May be allowed if training quality would be reduced if re-located.
  - Light Maneuver: Detailed coordination with EMD. May be allowed if training quality would be reduced if re-located.
  - Heavy Maneuver: Detailed coordination with EMD. May be allowed if training quality would be reduced if re-located.
  - Flames/Pyrotechnics: Allowed without additional coordination
  - Smoke Obscurants: Allowed without additional coordination
- All mapped springs have a 200 foot buffer within which no training may occur.
- All supplements used for livestock must be placed ¼ mile from water sources.

Goal: Improve and maintain riparian and wetland conditions to provide realistic training, support native vegetation communities and riparian/wetland wildlife and fish, as well as prevent excessive erosion of stream banks and channelization in wetlands.

Objective: Within the next five years, improve riparian conditions in three riparian reaches.

Project: Identify riparian/wetland areas that are degraded or in need of additional protection and then prioritize riparian/wetland areas for restoration.

Project: Fence three reaches/springs to protect and/or prevent future damage.

Project: Initiate a plan to monitor recovery of riparian areas. This could be through photo points or more detailed vegetation measurements.

Objective: Within the next five years, inventory all springs/seeps.

Project: Map and record locations of all springs/seeps on Camp Guernsey.

Project: Establish monitoring plan for springs/seeps.

4.2 FORESTRY MANAGEMENT

Camp Guernsey has a limited amount of harvestable forest on the installation, especially after repeated wildland fires in the North Training Area. Forestry Management as related to wildland fire is discussed under *Wildland Fire Management* in *Section 4.7*. Timber sales are not conducted on Camp Guernsey at this time; however, timber sales, pole sales and tree thinning may be considered in the future. Firewood is available for public collection, but no standing live or dead trees may be cut due to public safety concerns. Christmas tree cutting is also available to the public from November 1 to December 25.

There are no current plans for timber harvesting at Camp Guernsey. However, plans may be developed over the next 5 years. If harvesting is proposed, the action will be analyzed in a stand-alone NEPA document. The INRMP will be updated to address forestry changes and logging operations as needed on an annual basis.

Goal: Manage forests and woodlands to provide a diverse sustainable realistic military training landscape while providing quality wildlife habitat.

> **Objective:** Reduce the potential for catastrophic wildland fire that would remove forests and woodlands.
>
> > **Project:** Approve and implement an *Integrated Wildland Fire Management Plan* (IWFMP).

4.3 VEGETATIVE MANAGEMENT

Vegetation is managed largely through the wildland fire program, invasive species program, livestock grazing program, and the ITAM program. The following bulleted best management practices (BMPs) will be implemented to ensure the conservation of vegetation and maintain compliance with applicable laws:

- Native seed mixes will be used to revegetate disturbed areas as required (see Appendix D for reclamation procedures). If seeding an all native seed mix is not practicable, ecological bridge species may be used as described in Palazzo et al. (2009). However, native seed must be an important component in all seed mixes.
- Species that are "invasive" will not be planted (DoA 2007)
- When possible, plant species that have be identified as having traditional cultural uses may be included in the native seed mix (WYARNG 2005d; Table 9).
- Non-native annual species (typically grains) may be used as a cover crop or nurse crop to provide immediate cover and aid in the establishment of permanent native vegetation.
- Each installation shall, to the extent practicable, use locally-adapted native plants and minimize the use of pesticides and herbicides. (DoDI 4715.03).
- Seed must be certified weed free.
- Seeding is recommended to occur between March 15- May 15 or September 1- October 15.
- All seeding will be conducted in compliance with W.S. 11-12-101…125, Chapter 51 - *Regulations Pertaining to Seed Law*.

Table 9. Plant species with traditional cultural uses that may be included in native seed mixes.

Species	Common Name
Artemisia cana ssp. *cana*	Silver sagebrush
Artemisia frigida	Fringed sagewort
Bouteloua gracilis	Blue grama
Dalea candida	White prairie clover
Koeleria macrantha	Prairie junegrass
Liatris punctata	Dotted gayfeather
Lupinus sericeus	Silky lupine
Pascopyrum smithii	Western wheatgrass
Ratibida columnifera	Prairie coneflower
Schizachyrium scoparium	Little bluestem
Sphaeralcea coccinea	Globemallow

Goal: Manage vegetation on Camp Guernsey to provide a diverse sustainable realistic military training landscape composed of native plant communities.

Objective: Maintain rare plant populations on Camp Guernsey.

Project: Map locations of rare plants found during previous surveys of Camp Guernsey.

Objective: Manage ecosystems to maintain or obtain resilient and resistant vegetation communities.

Project: Develop goals and objectives for each vegetation community. Incorporate these goals and objectives into the INRMP with associated projects.

Project: Implement permanent vegetation monitoring.

Project: Map areas where juniper is encroaching into shrubland and riparian communities.

Project: Remove junipers from areas where they have encroached on riparian areas.

Project: Monitor reclaimed areas to determine the success of native seedings.

4.4 INTEGRATED TRAINING AREA MANAGEMENT (ITAM)

The ITAM program is part of the Army's *Sustainable Range Program* and is responsible for maintaining maneuver training land to improve training efficiency, Soldier and unit readiness and survivability by sustaining realistic training and testing lands through integration of land use requirements with land capability. The purpose of this program is to:

- Ensure no net loss in the capability of military installation land to support the military mission of the installation.
- Ensure sustained accessibility, capability and capacity of maneuver training land.
- Quantify training land capabilities and capacity to support maneuver training.
- Monitor training land conditions to identify land maintenance and repair requirements.
- Improve existing training land capabilities by conducting land reconfiguration projects to support validated mission requirements.
- Improve existing training land capacity by conducting land maintenance and repair projects to support existing and future mission needs.
- Provide geospatial capability to support range operations, range modernization, and the ITAM program, and long term planning in the range complex.
- Promote awareness of mission land capabilities and management issues to avoid unnecessary maneuver damage and environmental impacts.
- Acquire and assess data and information about the impacts from land management activities, mission activities, and land conditions to support range and training land management and scheduling decisions, and range modernization planning.
- Ensure mission needs are considered in environmental (e.g., INRMP, ICRMP, agricultural leases, annual burn plan, timber harvest plan) and facilities planning, and training land capabilities constraints are considered in mission planning.

Because the ITAM program is a reactionary program, many of the projects to support objectives are as needed and as funding allows.

Goal: Maximize the capability of training lands in order support mission readiness.

Objective: Manage the ITAM program and its components through the development and maintenance of an annual *Plan* and *Workplan* in coordination with the *Range Complex Master Plan*, administration of schedules, preparing required reports, acquiring office and computer supplies, and conducting required travel and training.

Project: Create annual ITAM *Plan* and *Workplan*.

Project: Prepare a NEPA document analyzing the environmental effects of these federal actions.

Objective: Repair maneuver damage and maintain maneuver lands over the next five years.

Project: Repair and maintain heavy and light maneuver lands annually.

Objective: Provide maximum accessibility to maneuver training areas through trail maintenance activities.

Project: Prioritize and execute trail maintenance activities on an annual and as needed basis (repair, semi-hardening, low water crossings, hazard tree removal, etc.) on trail providing access to maneuver lands.

Project: Continue assessment and monitoring maneuver trails on installation. GPS enabled equipment will be used to map problem areas and features. Those features that inhibit training will be prioritized for correction.

Project: Maintain earthen check dams for sediment containment when training is inhibited.

Objective: To create an off road heavy maneuver corridor through the North Training Area. This corridor will vary in width and will require significant vegetation removal, soil stabilization, and historic maneuver damage repair.

Project: Expand or maintain the movement corridor annually or as needed.

4.5 INVASIVE SPECIES MANAGEMENT, INCLUDING STATE- AND COUNTY-DESIGNATED NOXIOUS WEEDS

Note: "invasive species" are a general category of plants and animals which include, but are not limited to, state or county desiginated "noxious weeds" (see section 2.7.5). Invasive species that occur in areas because of repetitive training are managed through the ITAM program. However, ITAM funding cannot be used to manage invasive species that do not have a direct link to training. Invasive species enter areas when native vegetation cover has been reduced. At Camp Guernsey, native vegetation is disturbed through maneuver damage, livestock grazing, wildland fire, construction activities, creation of fire breaks, and roads. When native vegetation is disturbed, a site can become vulnerable to invasive plants. Furthermore, wind, vehicles, livestock, recreation, troops and wildlife can carry invasive species to new areas. Invasive weeds are usually inferior to native vegetation in preventing erosion and as forage for livestock and wildlife. Cheatgrass is a common invasive species on Camp Guernsey which is especially problematic because high densities of cheatgrass may alter the fire regime by increasing the likelihood of fire. At Camp Guernsey, high densities of invasive weeds are found around historical ranching infrastructure and are often associated with riparian areas.

By their nature, invasive weeds are notoriously difficult to successfully treat. Proper landscape management is the best option to reduce the density of these invasive species. In other cases, like non-native thistles and Russian olive, a combination of mechanical, biological and chemical control provides the desired results. While invasive weeds, and especially those designated as noxious weeds, are detrimental to ecosystems and wildlife, they can provide quality habitat to some wildlife species. The timing of treatment may become important in these instances.

Aquatic invasive mussel species are also a concern on Camp Guernsey. Although, no invasive mussels have been reported from waterways within the state, units coming from other states may bring invasive mussel species in on watercraft, amphibious vehicles, bridging and other equipment previously used in waters infested with these species.
The following bulleted best management practices (BMPs) may be implemented to ensure the management of invasive species and maintain compliance with applicable laws:

- Environmental Management Division (EMD) Staff will record any invasive weed infestations that they encounter when in the field. Locations will be provided to the Natural Resource Manager who will update the appropriate geodatabase.
- Each installation shall, to the extent practicable, use locally-adapted native plants and minimize the use of pesticides and herbicides. (DoDI 4715.03)
- Integrated invasive species management that uses two or more of the following control methods are preferred: biological, cultural, chemical, and mechanical.
- The timing of chemical or mechanical treatment of invasive weeds must correspond to times that will have the lowest impact on natural resources and still maintain effectiveness. For example, the treatment of invasive thistle should occur outside of the nesting season because finches nest within thistle stands.
- Treatment of invasive species must comply with the *Integrated Pest Management Plan* (WYARNG 2013h).
- All training activity is restricted in areas with large noxious weed infestations to prevent the spread to other areas of Camp. Once areas are treated and EMD Staff determine that the risk of spreading noxious weeds from the site has been lowered to an acceptable level, the area will be re-opened to training.
- The location of training activities will be rotated to allow maneuver and bivouac areas to recover.
- Damage due to training activities will be immediately repaired to discourage invasive weeds from establishing.
- Prescribed fire will be used in a manner that does not encourage cheatgrass invasion.
- All seeding will be conducted in compliance with W.S. 11-12-101…125, Chapter 51 - *Regulations Pertaining to Seed Law*.
- Aquatic Invasive Species (AIS):
    - All watercraft, amphibious vehicles, and any equipment that has the potential to transport invasive mussels must practice *Clean, Drain, Dry* before launching.
    - All watercraft, amphibious vehicles, and any equipment that has the potential to transport invasive mussels coming from out-of-state from March 1 – November 30 must undergo a mandatory inspection by an authorized inspector prior to launching. Several members of the EMD Staff are authorized inspectors.
    - All watercraft, amphibious vehicles, and any equipment that has the potential to transport invasive mussels that have been operated in waters that are known to be infested with zebra or quagga mussels must undergo inspection during all times of the year before launching.
    - All watercraft, amphibious vehicles, and any equipment that has the potential to transport invasive mussels that are coming from other locations in Wyoming are not required to be inspected, but should still practice *Clean, Drain, Dry*.
    - All watercraft that have a watercraft registration requirement must have a valid Wyoming AIS decal before launching. Military watercraft are exempt from watercraft registration and the AIS decal requirement.

Goal: Manage noxious weeds and invasive species so they do not impact military training or native plant and animal communities.

Objective: Treat approximately 50 acres of noxious weeds annually.

Project: Eradicate non-native thistles from 41 acres on the Smith Parcel. This will require multiple pesticide applications over several years. Currently training is inhibited in this area because of the dense nature of the thistle and because of concerns that training activities will spread this noxious weed throughout the training area.

Project: Eradicate non-native thistle at Deercorn Springs (approximately 1 acre).

Project: Eradicate the Russian olive trees along the North Platte River in the Cantonment Area.

Project: Start a management program to treat areas where cheatgrass is dominant.

4.6 LIVESTOCK GRAZING

Camp Guernsey is a State-owned National Guard installation and the issuance of livestock grazing leases on this state land is a state action. Livestock grazing of adjoining federal lands (BLM and BoR) will be managed by the respective federal agencies. The WYARNG's state military mission includes adding value to our local communities and the citizens of the state of Wyoming by continuing to solidify our relationship with the local community. Our livestock grazing program will also assess installation lands for grazing suitability and monitor grazing to insure sustainability. All grazing shall support the military mission and be addressed in the INRMP, and shall be consistent with long-term ecosystem-based management goals that place ecological sustainability objectives above revenue optimization goals. Each grazing lease must require Lessee adherence to a conservation plan that details the best management practices to sustain natural resources and protect Government interests under the lease.

Camp Guernsey has issued eleven grazing leases (*Forage Utilization Contracts*) in the North Training Area (NTA), two grazing leases in the South Training Area (STA), and two grazing leases in outlining parcels. The Impact Area, lands surrounding the Impact Area, and other live-fire ranges are not leased for grazing. However, the WYARNG may coordinate with Lessees to move livestock into some of these areas to reduce fuel loads; grazing is never allowed in the Impact Area.

In some areas of the Installation, distribution of livestock is poor because of insufficient fencing and uneven distribution of water sources. Development of water sources, new fence installation, and regular maintenance of fencing would greatly improve livestock distribution throughout the leased lands.

Some of the current grazing leases originated as part of the sale agreement when the WY Military Department (WYMD) purchased the land. All subsequent grazing leases have been issued utilizing an open competitive bid process with no preferential rights. The *Forage Utilization Contracts* expressly state the purpose of the contract is to:

> *…support the primary objective of the Wyoming Military Department, which is military training. Military training shall take precedence over any other activity, including the Forage Utilization Program…Supporting objectives include improvements in wildlife, livestock, forage, and hydrologic production; improvement of landscape condition; and protection and improved access to socio-cultural resources.*

The *Forage Utilization Contracts* are issued for a seven- year term with the ability to renew for an additional seven-year term at the discretion of the WYMD. They are not assignable (e.g., they cannot be subleased). A majority of the current grazing leases expire in December 2016.

The following best management practices (BMPs) may be included in all new grazing lease agreements (2017 onward) to ensure that the management of livestock grazing is compatible with the military mission while supporting our multiple use stewardship and sustainability goals and that the program maintains compliance with applicable laws:

- Livestock operators will move livestock within 10 days of written notice by the WYMD
- 50% of the current year's growth will be left standing following grazing.
- Supplement locations (mineral and salt blocks, etc.) will be pre-approved and be located at least ¼ mile from water sources.
- Livestock carcasses or parts of carcasses will be moved at least 100 yards from springs, seeps, wetlands, streams, riparian zones, or water sources.
- The Lessee will work in cooperation with the WYMD to make every reasonable effort to control noxious and invasive weeds. The Lessee may work in conjunction with the County Weed & Pest Control District to develop projects to be submitted to the Lessor for reimbursement of costs for eradication and control of noxious weeds. The Lessee must follow the WYARNG *Integrated Pest Management Plan*.
- The Lessee and/or their employees will not use any eradication, management tools, or devices (for example: poison, M-44's, anti-coagulant rodenticides, snares or traps) for prairie dog or predator control on leased lands without prior written approval from the WYMD.
- The Lessee and/or their employees shall not remove, disturb, or cause or permit to be removed or disturbed, any paleontological (fossil), historical, archeological, architectural, or other cultural artifacts, relics, remains or objects of antiquity
- The Lessee shall dispose of all waste in an appropriate manner and not allow debris, garbage, waste, or other refuse to accumulate on the leased land. The Lessee further agrees to document and report, as soon as possible, to the WYMD any unauthorized dumping of debris, garbage, or trash on the leased land by other parties.
- The Lessee shall comply with all applicable federal, state, and local livestock health and sanitary laws and regulations.
- New fences will be built to wildlife friendly specifications: 4-strand wire fence with the bottom wire being smooth and 16 inches from the ground, the second wire barbed and 23 inches from the ground, the third wire barbed and 30 inches from the ground and the fourth wire barbed and 42 inches from the ground. The exception to this will be fences along a

state highway right-of-way which must follow the Wyoming Department of Transportation fencing policy. These fences will be Type E: first wire is smooth and 16 inches from the ground, the other three wires are barbed and are 25, 33, and 45 inches from the ground respectively.

- All improvements (fences, corrals, stock tanks, etc.) must be approved in writing by the WYMD prior to implementation. Once installed, improvements become the property of the WYMD and maintenance is the responsibility of the Lessee for the duration of the lease.
- Maintenance of existing fences, wells, stock tanks and other agricultural range improvements is the responsibility of the Lessee for the duration of the lease. Failure to maintain existing agricultural range improvements may result in the suspension or cancellation of the grazing lease.
- Existing infrastructure may be removed from the leased land by the WYMD.
- The Lessee shall not lock or remove gates, or block or change established roads on the leased land unless specifically authorized in writing by the WYMD.
- All livestock watering facilities must be designed to be wildlife friendly. There will be no structures over the tank to ensure that the water is available to a wide variety of wildlife including those that drink on the wing. Wildlife escape ramps must be installed and maintained by the Lessee. Designs must be approved by the WYARNG Environmental Management Division (EMD).
- The Lessor may require the Lessee to construct fences around springs, seeps, wetland and riparian areas to prevent trampling by livestock and protect water quality. Costs will be reimbursed by the WYMD.
- Rangelands that have been burned or undergone other vegetation treatments may be closed to grazing for one or two growing season. The Animal Unit Months (AUMs) and grazing fee will be adjusted accordingly or livestock may be relocated to set-aside areas as determined by the WYMD.
- As part of the lease agreement, the Lessee and the WYMD will develop a *Forage Utilization Plan* annually. The *Forage Utilization Plan* will outline grazing management for the upcoming grazing season and will include the stocking rate and define the grazing season. It will also identify any agricultural range improvements to be constructed in the upcoming year. Failure to adhere to the stocking rate and season of use detailed in the annual *Forage Utilization Plan* may result in the lease being suspended or canceled.
- The WYMD will be given notice in writing at least 10 days prior to livestock turn-in and turn-out.
- Type of livestock will be determined in the *Forage Utilization Plan*. Conversions to other types of livestock require written permission from the WYMD.
- The Lessee and their employees must always check in with the Camp Guernsey Fire Desk (307-836-7810) before entering the North and South Training Areas.
- All lease conditions must be adhered to or the lease may be suspended or cancelled.

Goal: Allow livestock grazing on Camp Guernsey when and where it is compatible with the military mission and supports our multiple use stewardship and sustainability goals. Our goal is not to maximize the number of livestock or maximize revenue from grazing leases.

Objective: Issue new livestock grazing leases in 2017 that integrate military mission requirements and support our multiple use stewardship and sustainability goals.

Project: Complete a *Rangeland Health Assessment* and the current grazing lessees for all lands at Camp Guernsey by the fall of 2016. This assessment will provide credible 3rd party data to evaluate ecological sites, plant communities, forage production, grazing infrastructure, current grazing management, baseline photo points, and range condition.

Project: Complete a 5-year *Livestock Grazing Management Plan* for Camp Guernsey by the fall of 2016. This plan will programmatically address goals, objectives, and projects for managing the grazing program at Camp Guernsey based on results from the *Rangeland Health Assessment*. This *Livestock Grazing Management Plan* will be developed in 2016 using the data from the *Rangeland Health Assessment*. The long-term carrying capacity or the annual stocking rate and the stocking density will be determined by taking into account the primary mission of Camp Guernsey, which is to provide realistic military training lands. Multiple-use objectives for wildlife habitat, wildland fire, invasive plants, and sensitive ecosystems will also inform the final stocking rate. This plan will also identify a long-term rangeland monitoring program which builds on the baseline monitoring conducted in the *Rangeland Health Assessment*. When complete the *Livestock Grazing Management Plan* will be included as an appendix to this INRMP.

Preliminary Draft versions of the *Livestock Grazing Management Plan* envision dividing the Installation into thirteen separate leases. The WYARNG will not include 3,745 acres of BLM land or 919 acres of BoR land encompassed by the Installation boundary in these grazing leases. The Impact Area, live-fire ranges, and areas surrounding these high use sites will not be leased for livestock grazing. Two pastures, one in the North Training Area (NTA) and one in the South Training Area (STA) will likely be set-aside for backup grazing to be used during training conflicts, prescribed burns, wildland fire, drought, et cetera. These backup areas also contain infrastructure, such as corrals, for livestock loading and sorting that will be made available to all lessees. The establishment of these vacant pastures would increase the flexibility afforded to livestock grazing systems and would allow for sensitive fish and wildlife habitats in other areas to receive rest if needed to accomplish habitat objectives. Other areas may be excluded from livestock grazing due to the presence of sensitive natural resources. The plan will include requirements for rotational and seasonal grazing. Management of some leases may include winter grazing only due to training conflicts, access issues, or ecological reasons. Other grazing management tools detailed in the plan will include development of new water sources, additional fencing, or removal of fencing.

Project: Prepare lease-specific *Annual Grazing Management Work Plans* for each lease by the December 2016. These plans will provided detailed site specific goals, objectives, and projects for each lease based on the programmatic strategies from the *Livestock Grazing Management Plan.* These plans will determine lease-specific

carrying capacities, stocking rates and densities; seasons of use; and lease specific infrastructure projects.

Project: Issue new grazing leases in January 2017 based on the lease-specific *Annual Grazing Management Work Plans.* These new grazing leases will be issued utilizing an open competitive bid process with no preferential rights. Grazing fees will be deposited in the state of Wyoming General Fund.

4.7 WILDLAND FIRE MANAGEMENT

All Department of Defense Components shall manage fuel loads and provide adequate planning for prescribed burn programs, and respond to wildfire in a manner to preserve health, safety, and air quality; protect facilities; and facilitate the health and maintenance of natural systems. This management shall reduce the potential for wildfires; function as an ecosystem-based management tool; integrate applicable state and local permit and reporting requirements; and be consistent with Department of Defense Instruction 6055.06 and the current Environmental Protection Agency Air Quality Policy on Wildland and Prescribed Fires (EPA 1998).

Currently, Camp Guernsey does not operate under an *Integrated Wildland Fire Management Plan.* A draft plan along with a draft Environmental Assessment (EA) has been prepared and is undergoing review. The draft plan includes suppression activities, training requirements for firefighting personnel, current wildland fire management practices, and it identifies and prioritizes fire management treatments on Camp Guernsey. The following bulleted best management practices (BMPs) may be implemented to ensure the management of wildland fire and maintain compliance with applicable laws:

- Fire Decision Matrixes will be used in conjunction with a remote automated weather station (RAWS) to advise Camp Guernsey Range Operations Command when certain types of training should be restricted.
- Ensure that the Camp Guernsey Fire Department is in the vicinity when artillery is firing and that air assets are available to reach Camp Guernsey within one hour.
- Coordinate with other federal, state, and local agencies during all fire suppression efforts.
- Incorporate public health and environmental quality considerations into fire management planning and execution.
- The Natural Resource Manager will be consulted prior to any non-emergency fire management activity that disturbs vegetation or wildlife.
- Rehabilitate burned areas with certified weed-free native seed mixes to stabilize soil and prevent invasion by non-native weed species.
- Avoid wetland and riparian areas during fire pre-suppression activities and, if possible, during suppression activities.
- The Cultural Resource Manager will initiate consultation under Section 106 of the National Historic Preservation Act upon receiving the required activity description of any pre-suppression fire management undertakings.

- The Cultural Resource Manager and the Natural Resource Manager, or representative, will be available to advise the designated Fire Incident Commander on the protection of cultural and natural resources during all wildland fire events as needed.
- In the event of a non-life threatening wildland fire the designated Fire Incident Commander will coordinate with other WYARNG department personnel (Environmental Program Manager [EPM] and Cultural Resource Manager) to protect cultural resources.
- The Cultural Resource Manager will mitigate any adverse effects on cultural resources after a wildland fire through consultation with the State Historic Preservation Office (SHPO) and interested parties.
- All fire management activities will be based on the best available science.

Goals, objectives, and projects are detailed in the draft *Integrated Wildland Fire Management Plan*. In summary they include:

Goal: Assist the Camp Guernsey Training Center in its mission to:

> "…*provide relevant, ready responsive air and ground training space, ranges, support facilities and services in order to enable operational elements to train to standard for Federal and State Mission requirements and enable generating elements to support operational requirements*".

And to comply with the Army Wildland Fire Management Guidance Memo date 4 Sept 2002 and the 2001 updated Federal Fire Policy.

> **Objective:** In 2016, implement a proactive fire management policy which emphasizes reducing negative effects from unplanned wildfire through fire mitigation techniques and direct suppression tactics.
>
> > **Project:** Approve and implement the *Integrated Wildland Fire Management Plan* (IWFMP).
> >
> > **Project:** Annually update the *Integrated Wildland Fire Management Plan*.
> >
> > **Project:** Formalize standard operating procedures.
> >
> > **Project:** Participate in the *Platte County Annual Operating Plan* (AOP) or establish mutual aid agreements with individual fire departments.
> >
> > **Project:** An internal working group will meet quarterly to plan fire mitigation activities and manage progress on mitigation activities.
> >
> > **Project:** An *Annual Fire Mitigation Plan* will be written that will plan and prioritize activities for the upcoming fiscal year. This will be the result of the quarterly meetings of the internal working group. Adequate funding will be requested from CFMO.

Objective: Maintain or improve the quality of training lands represented within Camp Guernsey by reducing the potential of wildfire through activities resulting in decreased fuel loads. Decrease the fuel load on a minimum of 1-2% of potentially treatable acres annually.

Project: Coordinate with Camp Guernsey Range Operations staff to use livestock grazing to help reduce fuel loads.

Project: Thin trees on approximately fifty acres in Fire Management Unit (FMU) C.

Project: Improve access for firefighters and fuel mitigation crews in FMU C.

Project: Use prescribed fire to reduce fine fuels every three to five years as needed at OPS Areas (areas where field artillery fire from).

Project: Expand the existing firewood gathering program to remove dead trees on Camp Guernsey.

Project: Explore the possibility of timber and pole sales as a means to reduce fuel loads in forested portions of Camp Guernsey.

Goal: Prevent wildfire from leaving the Installation boundary.

Objective: Through strategic wildland fire mitigation actions, prevent wildland fires from spreading onto adjacent ownerships.

Project: Annually maintain existing firebreaks and fuelbreaks
.

Project: Implement North Training Area (NTA) and South Training Area (STA) firebreaks and fuelbreak projects outlined in the *Camp Guernsey Annual Fire Mitigation Plan*.

Goal: Provide for public and firefighter safety.

Objective: Camp Guernsey will work towards adopting the training standards established by the National Wildfire Coordinating Group (NWCG), Interagency Incident Management Systems for Wildland Fire Qualification under PMS 310-1, Wildland Fire Qualifications Subsystem Guide - October 2013). All personnel engaged in suppression and prescribed fire activities will continuously work toward meeting these standards.

Project: Provide courses of instruction developed by the NWCG for each position in the wildfire Incident Command System (ICS) at Camp Guernsey or, if impractical to hold course instruction at Camp Guernsey for some positions, send personnel to training off site.

Objective: Examine and identify resource requirements and availability at each organizational level to provide needed suppression and support.

Project: Establish and maintain a centralized cache of firefighting equipment as funding allows.

Project: Annually inventory and inspect equipment to ensure readiness for fire suppression.

Project: Equip firefighting personnel with proper personal protective equipment (PPE) that meet or exceed National Fire Protection Association 1977 Standard on Protective Clothing and Equipment for Firefighters. Funding for PPE is dependent on the status of the firefighting personnel. If equipment is for state employees, funding would be provided through the CFMO.

Project: Annually review standard operating procedures for safety considerations.

Goal: Conserve natural and cultural resources.

Objective: Maintain ecosystem integrity by using practices that encourage native plants, discourage noxious weeds, reducing erosion, and encouraging a variety of successional stages across Camp Guernsey.

Project: Implement a monitoring program to document the effects of the prescribed burn program on ecosystem properties and fire behavior during wildfire pending the availability of funds and personnel. This will be implemented by the Environmental Management Division (EMD).

Project: Implement a monitoring program to assess non-native weed species invasion pending the availability of funds and personnel. This will be implemented by the EMD.

Project: Enter habitats at Camp Guernsey into a prescribed burn rotation that is appropriate for the current vegetation, while considering habitat diversity and desired vegetation community.

4.8 FLOODPLAIN MANAGEMENT

FEMA's Flood Hazard Mapping Program does not identify the stream terrace in the Camp Guernsey Cantonment Area as being at risk from flooding (FEMA 1978). FEMA does map the Platte River upstream of the Cantonment Area and a small section of Broom Creek in the North Training Area.

Goal: To sustain no flood damage to man-made structures.

Objective: Construct new structures outside areas that are at risk for flooding.

Project: Map flood hazard areas at Camp Guernsey.

4.9 THREATENED AND ENDANGERED SPECIES, CRITICAL HABITAT, AND OTHER SPECIAL STATUS SPECIES.

Camp Guernsey has potential habitat for two species protected under the Endangered Species Act (ESA): Ute ladies'-tresses and Preble's meadow jumping mouse. ESA Section 7 consultation will be conducted with the USFWS for all WYARNG-authorized federal actions conducted at Camp Guernsey when the WYARNG determines the action "may effect" a listed species.

The most immediate need at Camp Guernsey pertaining to federally listed species is to identify "potential habitat" and "suitable habitat" so on-going surveys using the USFWS recommended methodology can be completed on a regular basis. There is no USFWS designated "Critical Habitat" on Camp Guernsey.

In addition to federally listed species, WYARNG will manage for *Species of Greatest Conservation Need* that are identified by the WGFD in the *State Wildlife Action Plan* (2010). We will focus on Tier I species and federally listed species as presented in Table 10. Other species that will be included on the focal list are Bald and Golden eagles. All raptor buffers follow USFWS recommendations unless otherwise indicated.

Table 10. Focal species list for Camp Guernsey. Management will focus on these species for this INRMP cycle.

Common Name	Species	Federal Status	WGFD status
Bald Eagle	*Haliaeetus leucocephalus*	MBTA[a] BGEPA[b]	Tier I
Burrowing Owl	*Athene cunicularia*	MBTA	Tier I
Ferruginous Hawk	*Buteo regalis*	MBTA	Tier I
Golden Eagle	*Aquila chrysaetos*	MBTA BGEPA	
Mountain Plover	*Charadrius montanus*	MBTA	Tier I
Northern Goshawk	*Accipiter gentilis*	MBTA	Tier I
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	ESA[c] Threatened	Tier II
Townsend's big-eared bat	*Corynorhinus townsendii*	none	Tier I
Ute ladies'-tresses	*Spiranthes diluvialis*	ESA Threatened	

[a] Migratory Bird Treaty Act
[b] Bald and Golden Eagle Protection Act
[c] Endangered Species Act

The following best management practices (BMPs) will be implemented to ensure the management of special status species and maintain compliance with applicable laws:

- Aerial flight paths will avoid Bald Eagle and Ferruginous Hawk nest sites by at least 1,000 feet January 1 – August 15 and March 15 – July 31, respectively. Flight paths will avoid Northern Goshawk nest sites by at least 500 feet from April 1- August 15.

- The prairie dog colony in the South Training Area (STA) is an important raptor area as burrowing owls have been documented to nest there. Individual nests are not buffered within the important raptor area. Aerial flight paths will avoid this area by 250 feet during April 1 – September 15.
- Anti-coagulant rodenticides will not be used for prairie dog control.
- Explosives will not be used within 1 mile of Bald Eagle (January 1 – August 15) and Ferruginous Hawk (March 15 – July 31) nest sites.
- No construction projects will occur within ½ mile of Bald Eagle nests and 1 mile of Ferruginous Hawk nests.
- New live-fire training ranges will not be constructed within 1 mile of Bald Eagle and Ferruginous Hawk nests.
- Overstory trees will not be cut down within 330 feet of Bald Eagle nests.
- All prescribed burning within ½ mile of a Bald Eagle nest tree will be conducted outside of the breeding season (January 1 – August 15).
- The 1-mile buffer around the Ferruginous Hawk nest has a highway and a heavily used access road that bisects it (Appendix A, Figure A-14, A-15). Traffic is not managed on either road; both roads are excluded from the buffer.
- Detailed coordination with the Environmental Management Division (EMD) is required for all types of training within a ½ mile of Bald Eagle nests from January 1 to August 15. (Appendix C). The use of smoke obscurants is not allowed within the buffer if the nest is active.
- Detailed coordination with the EMD is required for all types of training within 1 mile of Ferruginous Hawk nests from March 15 to July 31 (Appendix C). No type of training will be allowed if adults are incubating eggs. The use of smoke obscurants is not allowed within 1 mile of an active nest.
- Detailed coordination with the EMD is required for all types of training within ½ mile of Northern Goshawk nests from April 1 to August 15 (Appendix C). The use of smoke obscurants is not allowed within ½ mile if the nest is active.
- Detailed coordination with the EMD is required for all types of training within the Important Raptor Area containing Burrowing Owl nests from April 1 to September 15 (Appendix C). The use of smoke obscurants is not allowed if there is an active nest.
- The Natural Resources Manager and Integrated Pest Management Coordinator will coordinate with ITAM annually to ensure that prairie dogs are only being controlled in areas where their presence has the potential to impact training. If a negative impact on training is occurring or colony expansion is making it likely that training will be impacted, the Natural Resources Manager will work with ITAM to develop a plan to remove prairie dogs using methods that will have the least effect on other species that are dependent on prairie dog towns. Anti-coagulant rodenticides will not be used due to comments received from USFWS during coordination of this INRMP.
- There is a ¼-mile modified buffer around the Townsend's big-eared bat roost and maternity colony site (Bat's Balcony). The buffer has been modified to exclude the existing road (Appendix A, Figure A-14). Detailed coordination with the EMD is required for all training activities occurring within this buffer.
- No vegetation removal shall occur below the canyon rim within ¼ mile of the Townsend's big eared bat roost.

- The Townsend's big-eared bat roost (Bat's Balcony) and maternity site has been gated.

Goal: Comply with the Endangered Species Act.

Objective: Routinely survey Camp Guernsey for the presence of listed species. If any listed species are identified, management of these species will be integrated into the INRMP within one year.

Project: Train Environmental staff to recognize and survey Ute ladies'-tresses and Preble's meadow jumping mouse using USFWS recommended procedures.

Project: Identify "potential habitat" for Ute ladies'-tresses and Preble's meadow jumping mouse on Camp Guernsey.

Project: Conduct a field inventory to determine if the potential habitat is "suitable habitat" using USFWS descriptions.

Project: Conduct field surveys for Ute ladies'-tresses and Preble's meadow jumping mouse in suitable habitat using USFWS survey procedures every five years. In order to survey the whole installation, it is likely that surveys will occur every year at different locations. NOTE: USFWS procedures recommend Ute ladies'-tresses surveys 2 to 3 years in a row in same suitable habitat as the plant does not bloom every year.

Objective: Conduct Section 7 consultation with the USFWS for all federal actions that the WYARNG determines "may effect" a listed species.

Project: Continually update the list of species and critical habitat that may be present on Camp Guernsey.

Project: Make an effects determination for all project-specific federal actions.

Project: If our determination is that the action "may affect*"* a listed species or critical habitat, conduct informal consultation with the USFWS to reach a "not likely to adversely affect*"* determination.

Project: If our determination is that the proposed action is "likely to adversely affect" a listed species, conduct formal consultation with the USFWS.

Goal: Manage Camp Guernsey Focal Species as defined in the INRMP (Table 9).

Objective: Determine use of prairie dog colonies by Burrowing Owl, Golden Eagle, Bald Eagle, Mountain Plover, and Ferruginous Hawk.

Project: Map prairie dog colonies every five years.

Project: Determine whether prairie dog colonies are active annually.

Project: Record use of prairie dog colonies by other species annually; especially use by Burrowing Owl, Golden Eagle, Mountain Plover, and Ferruginous Hawk.

Objective: Determine the status of the two previously identified Bald Eagle winter roosts adjacent to the installation over the next five years.

Project: Monitor the two previously identified Bald Eagle roosts.

Objective: Survey for Mountain Plover on Camp Guernsey over the next five years.

Project: Map potential Mountain Plover habitat

Project: Survey for Mountain Plover following USFWS protocols.

Objective: Establish a monitoring program, in conjunction with WGFD, for the Townsend's big eared bat colony at Bat's Balcony.

Project: Conduct annual or biennial hibernaculum surveys of Bat's Balcony.

Project: Perform annual roost exit counts at the Townsend's big eared bat colony at Bat's Balcony.

Project: Monitor bat use across Camp Guernsey.

Project: Annually monitor bat roosts for signs of white nose syndrome.

Project: Monitor temperature and humidity at bat roosts.

Project: Search for unidentified bat roosts.

4.10 MIGRATORY BIRD, INCLUDING RAPTOR, MANAGEMENT

There are 164 species of birds that are protected under the Migratory Bird Treaty Act that have been documented on Camp Guernsey (Appendix B, Table B-2). The Migratory Bird Treaty Act focuses prohibits the take of migratory birds either intentionally or incidental to implementation of a lawful action. Readiness activities are exempt from incidental take under the Migratory Bird Treaty Act through the DOD/MBTA Rule 72 FR 8931 (2006). When WYARNG proposes a non-readiness activity that has the potential to impact migratory birds, measures will be taken to reduce the potential for take of migratory birds.

The following best management practices (BMPs) may be implemented to ensure the management of migratory bird species and maintain compliance with applicable laws:

- Any readiness activity or non-readiness activity that has the potential to have significant adverse impacts on migratory bird populations will be addressed in a NEPA analysis and coordinated with the USFWS.
- If the Camp Guernsey Base Operations Manager determines that prairie dog colonies have reached an unacceptable size, treatment options will be explored in consultation with the USFWS and WGFD. To address concerns arising during coordination of this INRMP with USFWS (see Appendix G Environmental Assesment), anti-coagulant rodenticide will not be used because of the risk to raptors and other wildlife.
- When feasible, "non-readiness activities" (construction and other land disturbing maintenance activities) will take place outside of the migratory bird nesting season (February 1 - August 31) to avoid the incidental take of nesting birds. If this is not possible, then when feasible, the vegetation over the construction site will be mowed outside the nesting season to reduce nesting habitat. When feasible, migratory bird surveys will be conducted during the nesting season in the project area and buffer, immediately before and during construction so nests can be identified and avoided.
- All new or reconstructed power lines will be constructed with raptor-safe construction.
- Seasonal buffers have been established around raptor nests and they will be adhered too when the nest is active (Table 11; Appendix C). Training may be allowed depending on nest status and type of training.
- The Osprey nest located at the Town of Guernsey wastewater treatment facility does not have a buffer around it because it would severely impact air operations and it is located in a highly disturbed area.

Goal: Comply with the Migratory Bird Treaty Act and the *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* (Executive Order 13186, MOU final 30 Aug 2006)

Objective: Identify potential threats to migratory bird populations on the installation occurring within the next five years in order to minimize future potential impacts to training.

Project: Determine occupancy rates for different avian species on Camp Guernsey.

Project: Develop an avian monitoring plan.

Project: Create a map that illustrates habitats that are likely to be occupied by USFWS *Birds of Conservation Concern*, Partners in *Flight Priority Species*, and *Wyoming Species of Greatest Conservation Need*. This map will then be used in the planning process.

Objective: Conduct annual raptors nest surveys.

Project: Survey for new raptor nests annually with priority given to areas used for military training and future construction projects.

Project: Monitor known raptor nests for activity, including production, annually.

Objective: Raise awareness of migratory birds on Camp Guernsey.

Project: Create bird checklist to distribute to interested personnel and troops.

Table 11. Seasonal nest buffers at Camp Guernsey. An asterix (*) denotes raptor nests currently known from or adjacent to Camp.

Common Name	Horizontal Buffer[1] (miles)	Aviation Buffer[2] (feet)	Seasonal Buffer
American Kestrel	0.125	--	April 1 - August 15
Bald Eagle*	0.5	1,000	January 1 - August 15
Burrowing Owl*	0.25	250	April 1 – September 15
Common Barn Owl	0.125	--	February 1 - September 15
Cooper's Hawk	0.25	--	March 15 - August 31
Eastern Screech Owl	0.125	--	March 1 -August 15
Ferruginous Hawk*	1	1,000	March 15 - July 31
Golden Eagle	0.5	--	January 15 - July 31
Great Horned Owl	0.125	--	December 1 - September 31
Long-eared Owl	0.25	--	February 1 - August 15
Merlin	0.5	--	April 1 - August 15
Northern Goshawk*	0.5	500	April 1 - August 15
Northern Harrier	0.25	--	April 1 - August 15
Northern Saw-whet Owl	0.25	--	March 1 - August 31
Osprey*	0.25	--	April 1 - August 31
Peregrine Falcon	0.5	--	March 1 - August 15
Prairie Falcon	0.5	--	March 1 - August 15
Red-tailed Hawk	0.25	--	February 1 -August 15
Sharp-shinned Hawk	0.25	--	March 15 - August 31
Short-eared Owl	0.25	--	March 15- August 1
Swainson's Hawk	0.25	--	April 1 - August 31

[1] Seasonal buffers as recommend by USFWS. The Ferruginous Hawk buffer and the Northern Goshawk buffers have been modified due to previously existing disturbance. The nests in the Burrowing Owl nest in the prairie dog colony in the STA area do not have individual buffers, as these have been designated Special Raptor Areas.
[2] Aviation buffers are spheres around the nests

4.11 FISH AND WILDLIFE MANAGEMENT

There have been numerous wildlife surveys to document species presence on Camp Guernsey. There are some species that are conspicuously absent from the observed species list, most likely due to survey techniques designed to survey for the widest variety of species rather than designed to detect specific species. There are also some groups of species that warrant additional monitoring. This INRMP cycle will focus on establishing monitoring programs for these species. In addition, this INRMP cycle will focus more on evaluating habitats rather than species. Important habitats will be identified and mapped as opposed to mapping point locations of individuals.

Public hunting on Camp Guernsey is part of the WGFD *Hunter Management Area* program and law enforcement is provided by state Game Wardens. All wildlife violations should be reported

to 1-877-WGFD TIP (1-877-943-3847) or text message to 847411. For more information on the program see *Section 4.15*.

The following bulleted best management practices (BMPs) may be implemented to ensure fish and wildlife management and maintain compliance with applicable laws:

- When training is proposed to occur on pronghorn crucial winter range during the winter period (November 15 through April 30; Appendix A, Figure A-15), Environmental Management Division (EMD) staff will make a determination whether the winter is "severe" and whether pronghorn are using the area. If the winter is determined to be severe and pronghorn are present, EMD staff will provide guidelines to limit the impact on pronghorn.
- Management of game species and public access for hunting on Camp Guernsey will be coordinated with the WGFD.
- Management of the *Livestock Grazing Program* will be compatible with fish and wildlife habitat requirements.
- New fences will be built to wildlife friendly specifications: 4-strand wire fence with the bottom wire being smooth and 16 inches from the ground, the second wire barbed and 23 inches from the ground, the third wire barbed and 30 inches from the ground and the fourth wire barbed and 42 inches from the ground. The exception to this will be fences along a state highway right-of-way which must follow the Wyoming Department of Transportation fencing policy. These fences will be Type E: first wire is smooth and 16 inches from the ground, the other three wires are barbed and are 25, 33, and 45 inches from the ground respectively.
- Mule deer in the Cantonment Area create a hazard on the airfield. In 2014, Camp Guernsey acquired a special permit from WGFD to lethally remove these deer because of concerns about aircraft strikes. This management tool may be employed again if numbers increase.
- Anti-coagulant rodenticide will not be used to control prairie dogs.

Goal: Continually update the species list for Camp Guernsey to better understand what species are using the Installation and where their important habitats occur.

Objective: Fill in suspected data gaps that occur in the species list for Camp Guernsey over the next five years.

Project: Use the vegetation communities map to create a map that delineates important habitats on Camp Guernsey.

Project: Use camera traps to determine the status of swift fox on the installation.

Objective: Initiate a long term monitoring program of amphibians on Camp Guernsey by 2016.

Project: Conduct annual amphibian monitoring program using breeding survey call protocols from Partners in Amphibian and Reptile Conservation (PARC).

Objective: Ensure that new infrastructure contains design elements that are wildlife friendly.

Project: Review fence specifications to ensure that they are wildlife friendly.

Project: Map all fences on Camp Guernsey.

Project: Remove all unnecessary fences from Camp Guernsey with the priority to remove woven wire sheep fence.

Project: Install wildlife escape ramps on all stock tanks.

Goal: Manage hunting on Camp Guernsey based on collected data.

Objective: Annually collect herd data on elk, mule deer, and pronghorn.

Project: Conduct annual aerial surveys of elk, mule deer, and pronghorn. If an aerial survey is not possible, ground surveys will be conducted.

Project: Collect annual data on harvested elk, mule deer, and pronghorn using check stations and hunter surveys.

Project: Collect data on elk migration in cooperation with WGFD using GPS radio collars.

Goal: Improve wildlife habitat on Camp Guernsey.

Objective: Implement habitat improvement projects.

Project: Develop a *Wildlife Habitat Improvement Plan* that outlines and prioritizes projects.

4.12 PEST MANAGEMENT

An *Integrated Pest Management Plan* for all WYARNG facilities and lands was approved in 2013. Additional information on management of invasive plants and aquatic invasive species is detailed in *Section 4.5 Invasive Species Management*. The following bulleted best management practices (BMPs) will be implemented in the pest management program:

- Anti-coagulant rodenticides will not be used to control prairie dogs because of the risk to raptors and other wildlife.

Goal: Use integrated pest management techniques to manage insect and plant pest species.

Objective: Implement the approved *Integrated Pest Management Plan*.

Project: Update the *Integrated Pest Management Plan* by September 30 each year.

Project: Update all pest management records by September 30 each year.

4.13 SOIL MANAGEMENT

Erosion is a naturally occurring process that continually shapes the landscape. However, certain practices and conditions may cause accelerated erosion that may have detrimental impacts on natural resources, as well as infrastructure necessary to fulfill the mission of the WYARNG. Erosion that is directly caused by training is monitored and managed through the ITAM program.

Goal: Conserve the soil resource at Camp Guernsey.

Objective: Minimize wind and water erosion of soil due to man-made activities.

Project: Comply with WDEQ requirements for WYPDES permits for construction sites.

Project: Seed disturbed sites in accordance with procedures in Appendix D.

4.14 WILDLIFE AIRCRAFT STRIKE HAZARD

The Guernsey Army Airfield and the Guernsey Municipal Airport Joint Use Airfield have a *Bird/Wildlife Aircraft Strike Hazard Plan* (WYARNG 2012) that is reviewed annually. The plan details responsibilities and procedures. Low bird activity (Phase I) is identified as November through February and high bird activity (Phase II) is from March through October. The Camp Guernsey Base Operations Manager considers and may implement the following three BMPs during times of high bird activity:

- Avoid takeoffs/landings one hour from dawn/dusk when operationally feasible,
- Limit or prohibit formation takeoffs and landings, and
- Make full stop landings.

Other BMPs specified in the *Bird/Wildlife Aircraft Strike Hazard Plan* include:

- Bird hazard information will be displayed in the Airfield Operations building.
- All strikes will be documented in the Air Force Safety Automated System and the Bird Strike Quick Reaction Checklist will be completed.
- Bird hazards and migratory information will be published in the appropriate FLIP document.
- Bird avoidance information will be provided during air crew preflight briefings.
- Bird watch advisories will be issued as needed.
- Airfield structures will be managed to discourage perching by birds.
- Pyrotechnic devices will be used to disperse birds when necessary.
- Vegetation will be managed around the airfield to discourage bird and wildlife use.

Goal: Reduce the risk of bird/wildlife aircraft strikes.

Objective: Implement the *Bird/Wildlife Aircraft Strike Hazard Plan*.

Project: Review and update the *Bird/Wildlife Aircraft Strike Hazard Plan* annually.

Project: Mule deer in the Cantonment Area create a hazard on the airfield. In 2014, Camp Guernsey acquired a special permit from WGFD to lethally remove these deer because of concerns about aircraft strikes. This management tool may need to be employed again if numbers increase.

4.15 OUTDOOR RECREATION AND PUBLIC ACCESS

Department of Defense lands, waters, and coastal resources shall be made available to the public for the educational or recreational use of natural resources when such access is compatible with military mission activities, ecosystem sustainability, and with other considerations such as security, safety, and fiscal soundness (DoDI1105 4715.03).

The WYARNG allows multiple uses of Wyoming Military Department lands, including grazing, hunting, fishing, firewood gathering, and other recreational activities. Many of the facilities in the Cantonment Area are open to the public on week nights and others can be rented. Camp Guernsey also participates in the WGFD's Hunter Management (HMA) program. The *Broom Creek Hunter Management Area* (**https://wgfoapps.wyo.gov/plpwhmprogram**) traverses most of Camp Guernsey and is open to public hunting). Public fishing access is managed through the WGFD Walk-in Fishing Program (WIFA#14). Access to the North Platte is at Wendover Bend where there is a public parking lot.

The hunting program at Camp Guernsey is managed cooperatively by the Environmental Management Division (EMD), Camp Guernsey, and the WGFD. All members of the public who wish to hunt must get a permission slip online from the WGFD prior to hunting on Camp Guernsey. All hunters must sign in with the Fire Desk before hunting. Professional outfitting and guiding is not allowed on Camp Guernsey. Camp Guernsey also offers a youth hunter program that allows deer hunting from two blinds located in an undeveloped portion of the Cantonment Area when deer are present. Additionally, two areas, one in the South Training Area and one in the North Training Area are set aside for use by handicap hunters involved the Chairbound Hunter Program (**http://chairboundhunters.com**) out of Wheatland, WY.

The Camp Guernsey Policy for Public Access and Hunting **(http://wyomilitary.wyo.gov/camp-guernsey/training-areas/hunting)**, updated annually, is as follows:

1. The following hunting and fishing policies apply to all hunters and fisherman on Camp Guernsey property.
2. Outfitting and guiding are NOT allowed on Camp Guernsey.
3. Hunting at Camp Guernsey is managed through the *Broom Creek Hunter Management Area*. All hunters are required to follow the *Ranch Rules* and all Wyoming Game and Fish Commission Regulations. Failure to do so may result in revocation of hunting privileges on Camp Guernsey.

4. The *Broom Creek Hunter Management Area* is open to hunt turkeys, sharp-tailed grouse, doves, waterfowl, rabbits, squirrels, predators during daylight hours, antelope, deer, elk, and mountain lions during the specific species seasons as published in the current Game & Fish Commission Regulations with the following limitations:
   a. Each individual must check-in with Camp Guernsey Operations the day PRIOR to EACH hunting trip to see what areas will be open for hunting. Persons must check-in by phoning 307-836-7810 between 12:00 noon and 1:00 PM the day prior to each hunting trip. General information is available through the same phone number.
   b. Hunting Access (August 15, 2015-May 20, 2016): Permission slips are issued online except for predator hunters.
      (1) There is no public access to areas A, B, and M because of safety concerns. Training Area C is used by the Chairbound Hunter Program and access is restricted until their hunts are completed. There is also a Chairbound Hunter Area with restricted access in the south-east portion of the South Training Area. Additional daily restrictions may be in place due to ongoing military operations.
      (2) The two areas that are reserved for chairbound hunters require special permission for access. For more information, contact Al McCarty at 1-800-770-8688.
      (3) Regular Season Deer and Antelope Hunting permission slips are issued online, via a random drawing. Apply July 13 – August 17. Results will be available August 19. Thirty (30) permission slips are issued for each of the following periods: October 1– 2, October 3 – 5, October 6 – 8, October 9 – 11 and October 12 – 14.
      (4) Regular Season Elk hunting permission slips are issued online, via a random drawing. Fifty (50) permission slips are issued for September 15 – October 14.
      (5) Permission slips for all other species, except predators, and hunt periods are issued online and are unlimited in number.
      (6) Predator hunters must report to the fire desk at Camp Guernsey to receive a permission slip. After they receive the permission slip, they may check in over the phone (307-836-7810) for the rest of the season.
      (7) Twenty-five (25) hunters, fifteen (15) in the North Training Area and ten (10) in the South Training Area, are allowed on the HMA daily during the big game seasons. Access will be granted on a *first-call, first-serve* basis.
      (8) Outside of the general big game seasons, small game and upland bird hunters solely engaged in the hunting of small game or upland birds or in combination shall be limited to ten (10) parties per day in each the North and South Training Areas.
      (9) There is no limit on the number of migratory bird hunters if they are solely pursuing migratory birds.
   c. Each hunter must have a permission slip and a confirmation code (received from check-in call). Anyone without proper permission shall be subject to trespass charges.
   d. Individual migratory bird hunters will ensure they are dispersed across migratory bird hunting areas, and will stay at least 100 yards away from other hunting parties.
   e. Hunters who harvest a big game animal must provide harvest information by calling 307-836-7614 or e-mailing **amanda.c.thimmayya.nfg@mail.mil**. The following information must be provided: date of harvest, species, sex, age (calf/fawn or adult), and training area (A, B, C, D…) where the animal was harvested. All harvests must

be reported by February 2, 2016. Failure to do so may result revocation of hunting privileges on Camp Guernsey.

f. Predator hunters must submit a monthly harvest report if any animals were harvested that month. The harvest report may be submitted by calling 307-836-7614 or e-mailing **amanda.c.thimmayya.nfg@mail.mil**
g. All big game hunters are requested to respond to a hunter survey by February 2, 2016.
h. Non-hunting/non-permitted persons may assist as spotters and in game retrieval on the HMA as long as they are accompanying a permitted hunter and do not possess a firearm. They must also sign in with Camp Guernsey Operations.
i. Motorized travel is allowed on designated roads ONLY. Designated roads are posted with a white arrow.
j. Speed limit on the Broom Creek HMA is 30 mph unless posted otherwise
k. Possession or use of off road vehicles (ORVs) is prohibited on the Broom Creek HMA.
l. Leave all gates as found. Abide by all signs and posted areas.
m. Do not touch unexploded ordinances (UXO); if encountered, report immediately to base personnel.
n. Do not litter. No camping allowed.
o. Do not shoot in the direction of livestock, buildings, roads, windmills, stock tanks, or any object other than the animal you are hunting. Do not damage fences, range improvements, or harass livestock. Livestock has the right of way.

5. Fishing at Camp Guernsey is managed through the Wyoming Game & Fish Walk-In Fishing Area Program **(**North Platte River Area #14). Fishing is allowed in the North Platte River along Wendover Bend.
   a. Vehicle parking in the designated parking area only.
   b. Fisherman do not need to check in with the fire desk or obtain permission.
   c. Stay off of railroad tracks & railroad right-of-way.
6. Report any wildlife violations by calling 1-877-WGFD-TIP (1-877-943-3847).

Camp Guernsey personnel do not need a permission slip to hunt; the number of personnel is not limited. They are required to check in with Camp Guernsey Operations and must report any animals harvested to the Natural Resource Manager as detailed above. They are also asked to participate in the Hunter Survey.

Goal: Continue to provide the public with access to Camp Guernsey for outdoor recreation.

Objective: Maintain and enhance public hunting opportunities on Camp Guernsey.

Project: Continue to meet with WGFD annually to coordinate the Hunter Management Program at Camp Guernsey.

Project: Conduct quarterly Sportsman Program Meetings.

Project: Release 500 chucker's for recreational bird hunting. Three hundred chucker's were released in the fall of 2014. If this release is successful, an additional 200 chucker's will be released.

4.16 GEOGRAPHICAL INFORMATION SYSTEMS (GIS) MANAGEMENT, DATA INTEGRATION, ACCESS, AND REPORTING

Currently the WYARNG Geographical Information Systems (GIS) manager is building a GIS database that will be the repository for the most up to date natural resource geospatial data. The natural resource data will be updated on a regular basis. Natural Resource GIS data is used to create the constraint maps used to plan and evaluate military training Camp Guernsey. The following BMPs will be followed:

- All Contractors/consultants that carry out natural resource surveys on Camp Guernsey are required to provide spatial data with their final report.

Goal: Maintain up-to-date comprehensive spatial data for natural resources at Camp Guernsey.

Objective: To have a system in place by 2018 that will ensure that all natural resource data is updated annually on the WYARNG GIS database.

Project: Download the Natural Wetlands Inventory (NWI) and the Natural Hydrography Dataset (NHD) every five years to fulfill the Planning Level Survey (PLS) requirement to correspond with the five year INRMP review for operation and effect.

Project: Create a single spatial data layer that will contain all fauna observations across Camp Guernsey.

Project: Create a single spatial data layer that will contain all flora observations of invasive species and rare plants.

4.17 PRIVATE AND PUBLIC LEASES, EASEMENTS, AND RIGHT-OF WAYS

Various private and public leases, right-of-ways (ROWs), and easements exist on Wyoming Military Department lands at Camp Guernsey. The following BMPs will be followed when reviewing and issuing new leases, ROWs, and easements on Wyoming Military Department (WYMD) lands:

- The WYARNG-CFMO will coordinate with the adjoining surface management agency (BLM, WY School Trust, or BoR) involving any private and public leases, right-of-ways (ROWs), and easements proposed to cross WYMD lands.
- A reclamation plan will be included with the project plans provided to WYARNG-CFMO. Environmental Management Division (EMD) staff will review and approve the plan prior to project approval.
- Native species will be used to re-vegetate all areas that undergo vegetation removal in accordance with Appendix D.
- The project proponent is responsible for following all applicable environmental laws and regulations.

Goal: Continue to provide private and public leases, right-of-ways (ROWs), and easements that are compatible with the military mission and land stewardship responsibilities.

Objective: Ensure that all new eases, right-of-ways (ROWs), and easements crossing WYMD lands are compatible with our military mission and land stewardship responsibilities.

Project: EMD will be part of the WYARNG team that reviews and approves all new leases, right-of-ways (ROWs), and easements crossing WYMD Department lands.

4.18 TRAINING OF NATURAL RESOURCE PERSONNEL

Training of Natural Resource Personnel may change due to different needs that may arise during this INRMP cycle. Some training is required, while other training would bolster the ability of WYARNG staff to manage natural resources at Camp Guernsey. An appropriately trained staff will reduce the need to hire contractors to carry out natural resource surveys and projects at Camp Guernsey which should result in more money available for implementation projects.

Goal: Have a fully trained staff capable of supporting the Natural Resource Program at Camp Guernsey.

Objective: Fulfill all mandatory training by 2018

Project: Train the Pest Management Coordinator and the Pest Management Quality Assurance Evaluators.

Objective: Have appropriate environmental staff red card certified to provide natural resource and cultural resource guidance on wildland fires by 2016.

Project: Provide the Natural Resource Manager, Cultural Resource Manager, and Environmental Program Manager training so they receive their red cards to be on hand to provide resource protection guidance during wildland fires. Train other Environmental Staff as deemed necessary.

Objective: Reduce the number of natural resource surveys that need to be contracted to outside companies.

Project: Coordinate with USFWS, BLM, and the WGFD to obtain training for to survey for Ute Ladies'-tresses and Preble's meadow jumping mouse.

Project: Train Natural Resource Staff in wetland delineation.

Objective: Conduct Aquatic Invasive Species checks on units coming to train at Camp Guernsey as needed.

Project: Train Camp Guernsey EMD staff and the Natural Resource Manager so they may become certified through WGFD to conduct Aquatic Invasive Species checks on watercraft and other equipment. This certification must be maintained annually.

Objective: To continually train Natural Resource Staff to ensure that the most recent relevant science is driving natural resource management at Camp Guernsey and to ensure their continuing education.

Project: Annually attend the *DoD Natural Resources Annual Training Workshops* as practical.

Project: Annually attend the *Wyoming Chapter Wildlife Society Meeting* as practical.

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5.0 IMPLEMENTATION AND FUNDING

This INRMP will be implemented through the various policies and programs described throughout the document and accomplishment of specific projects identified in *Section 4.0*. Appendix E contains a project table that outlines all projects and indicates the responsible entity for each project for tracking purposes. This project table will be continuously updated as projects are completed.

Formal adoption of this INRMP by the WYARNG constitutes a commitment to seek funding and execute projects, subject to the availability of funding, resources, and command priorities. All actions in this INRMP are subject to the availability of funds properly authorized and appropriated under federal and state law. Nothing in this INRMP is intended to be nor shall be construed to be a violation of the Anti-Deficiency Act, 31 USC § 1341.

The availability of funds will affect the ability to effectively implement the INRMP. Funding for environmental projects, including natural resources, comes primarily from the federal government (National Guard Bureau) via the WYARNG Operation and Maintenance (O&M) Master Cooperative Agreement. The use of WYARNG staff is a primary method to implement many INRMP projects (primarily annual monitoring and reporting). Projects that are larger in scope, or require substantial material and equipment are typically contracted out. Projects are prepared and submitted annually by the WYARNG Natural Resource Program Manager utilizing the NGB *Status Tool for the Environmental Program* (STEP) to request federal funding for these projects.

Some natural resource management projects may be federally funded through Integrated Training Area Management (ITAM) program if the project is training related. The Department of Defense (DoD) *Legacy Resource Management Program* also provides funding for projects that improve natural and cultural resources management on military lands. Projects may also receive state funds. Some projects may be funded by coordinating with the grazing Lessee in-lieu of paying grazing fees.

In addition, there are alternative, non-DoD sources of funds and grants that may be available to support projects identified in INRMPs. Obtaining these funds usually involves writing a grant proposal or a funding request. Various cost-share programs exist from federal, state, and private non-profit organizations. Cost-share funds are typically available on a 50:50 or matching funds basis. Cooperative projects with other agencies (WGFD, NRCS, USFWS, etc.), Universities, or volunteers can be used to implement INRMP projects. The WGFD *Habitat Grant Program* provides funds on a cost-share basis for projects such as water source development, food plots, riparian habitat improvement projects such as fencing, and prescribed burning for habitat improvement. Applications for these grants are available from the WGFD and must be submitted 1 January of the year the project is scheduled to take place. A second type of grant available is the *Game and Fish Grant*. This grant works similarly to a cooperative agreement between a landowner and the WGFD. Agreements are typically for a 15-year period and only require that the landowner conducts any required maintenance of improvements and guarantees a certain level of hunter access. The Wyoming Department of Agriculture operates a *Wyoming Rangeland Health Assessment Program* which provides grants to federal land managing agencies, permittees, and landowners to obtain monitoring information and to assist this partnership in adaptive management strategies based on the cooperatively obtained data. Weed and Pest Control Districts provide cost-

sharing assistance to landowners to eradicate or slow the spread of invasive species. The Wyoming Office of State Lands and Investments pays for weed control on state lands.

The largest challenge to INRMP implementation is funding specific projects. For the most part, compliance-related projects, which for natural resources are almost always related to the Endangered Species Act, are the only projects consistently programmed, approved, and funded through the federal government (NGB).

An INRMP is considered to be implemented if an installation (DoDM 4715.03):

- Actively requests and uses funds for natural resources management projects, activities and other requirements in support of goals, and objectives identified in the INRMP;
- Ensures that sufficient numbers of professionally trained natural resources management personnel are available to perform the tasks required by the INRMP;
- Invites annual feedback from the appropriate USFWS and state fish and wildlife agency offices on the effectiveness of its INRMP;
- Documents specific INRMP action accomplishments undertaken each year; and
- Evaluates the effectiveness of past and current management activities and adapting those activities as needed to implement future actions.

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APPENDIX A: MAPS

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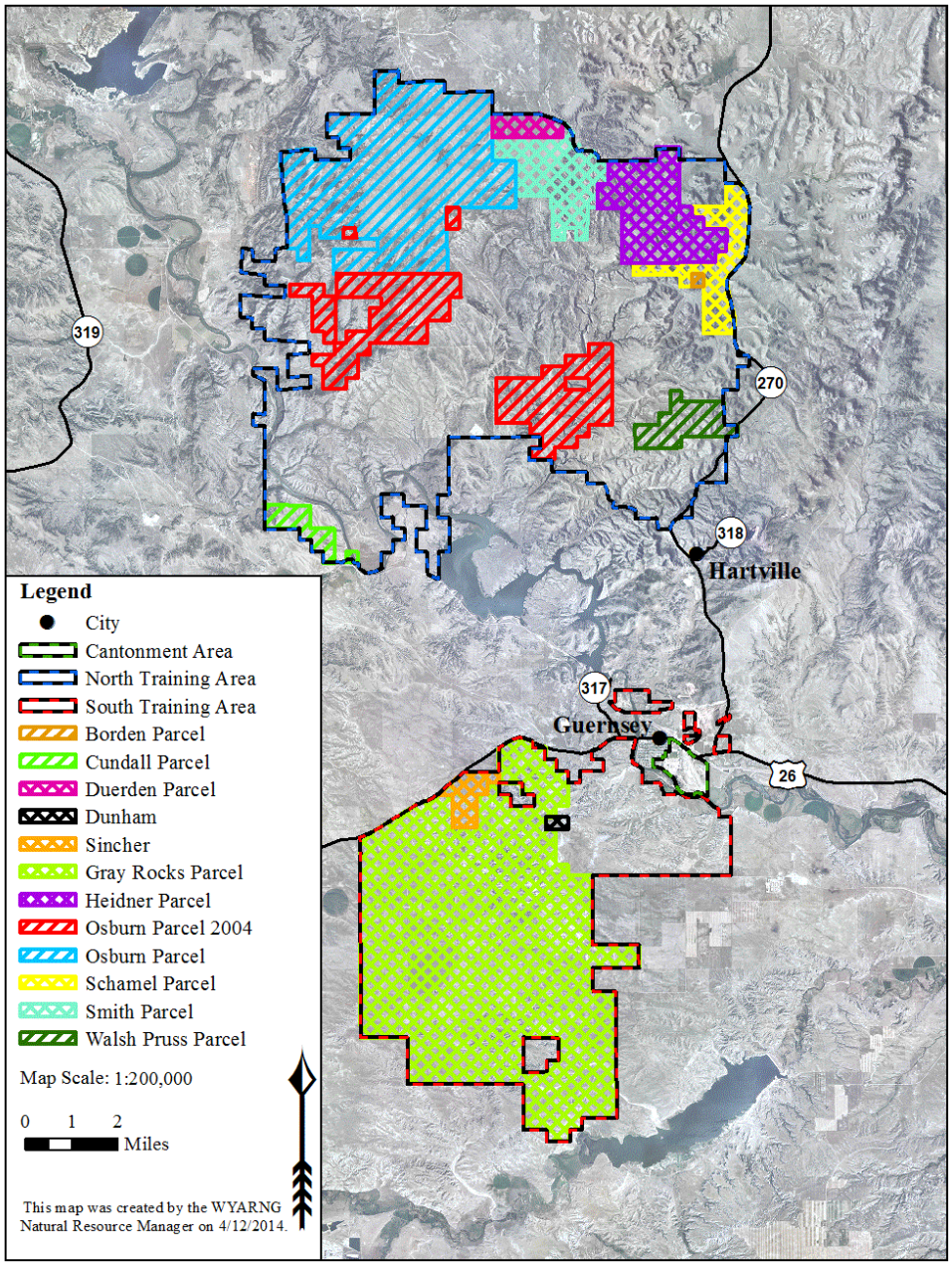

Figure A-1. Land acquisitions by the Wyoming Military Department since 2002.

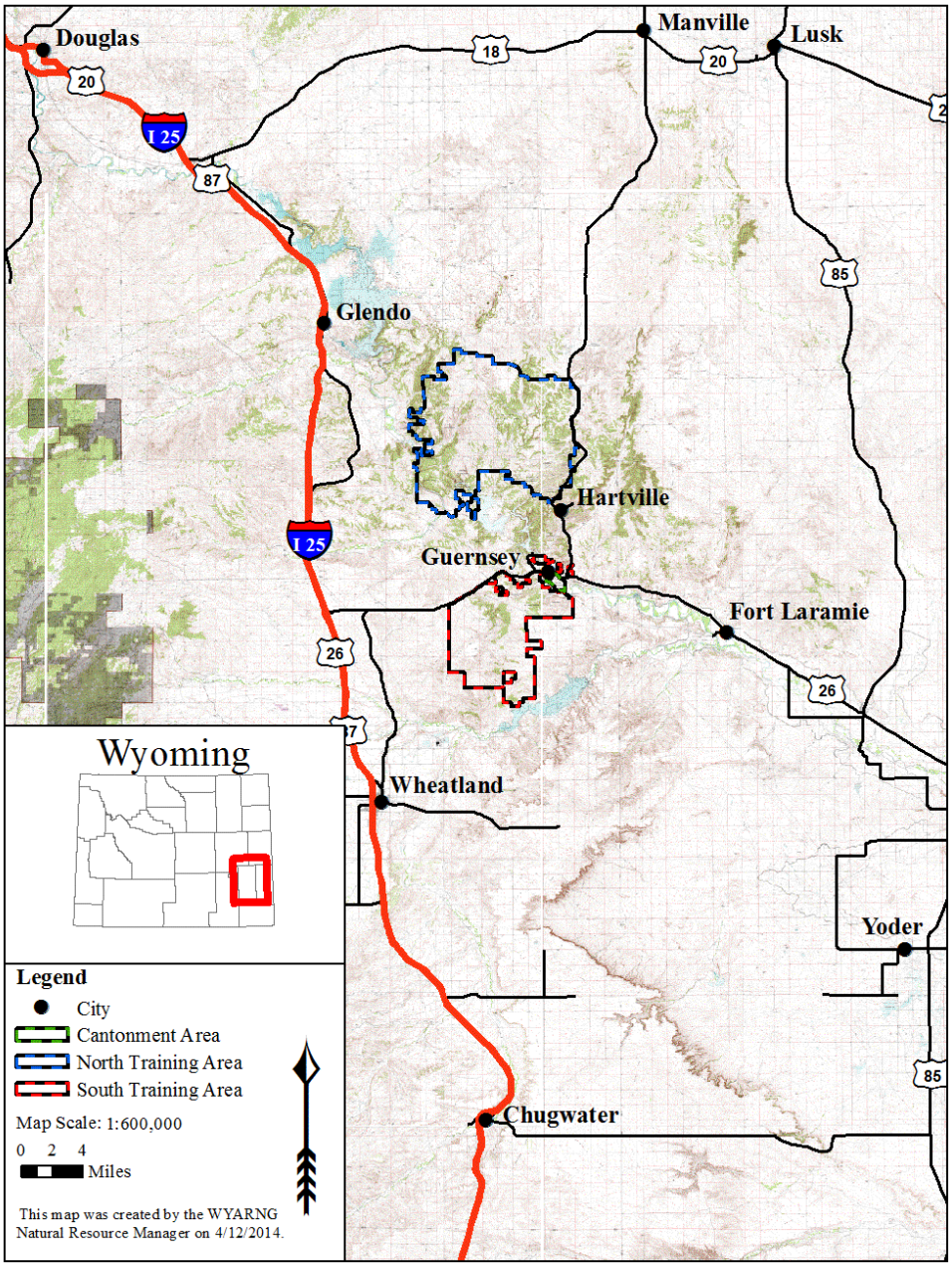

Figure A-2. Camp Guernsey and surrounding area.

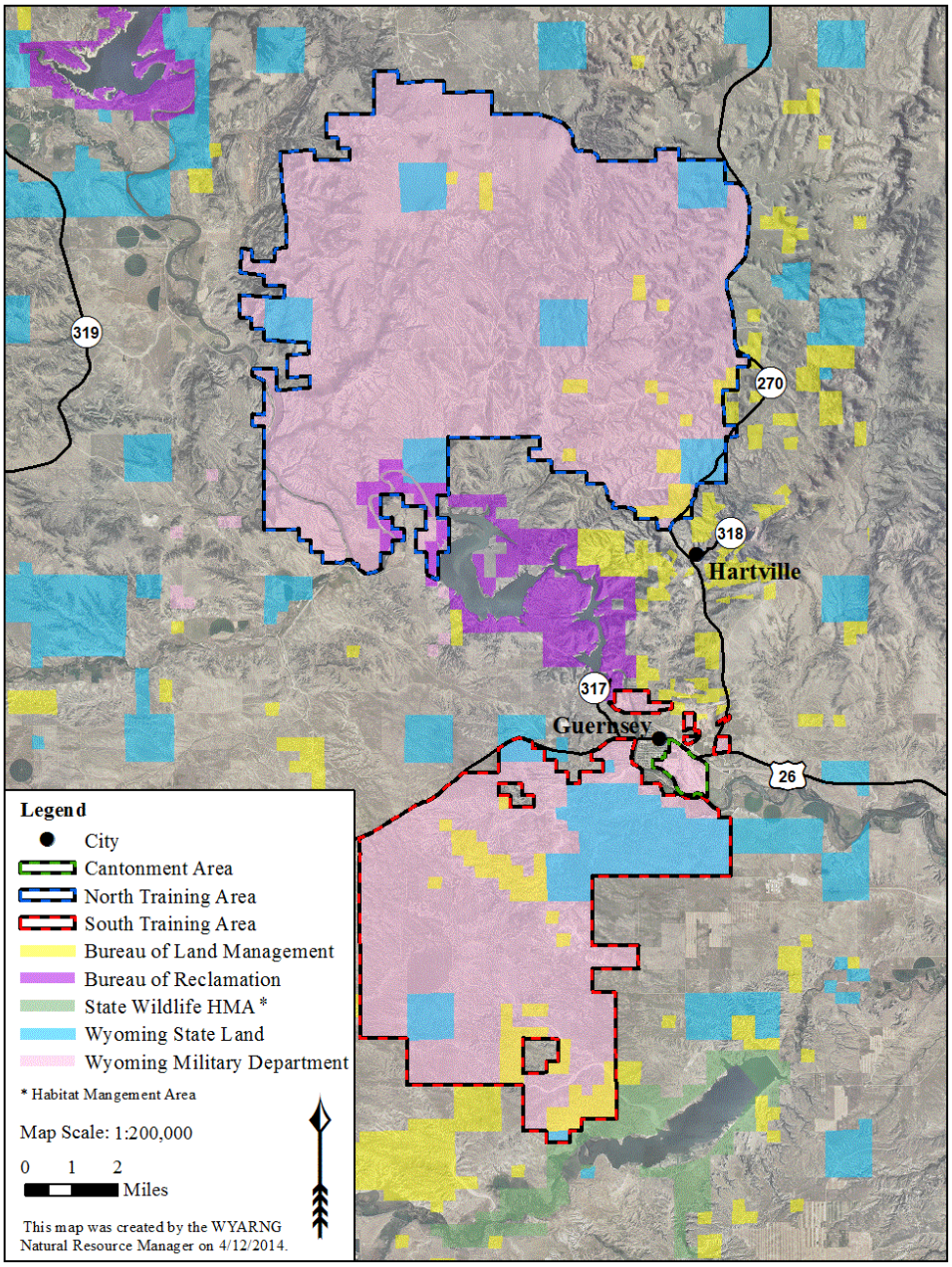

Figure A-3. State and Federal landownership within and around Camp Guernsey. Unshaded areas are privately owned.

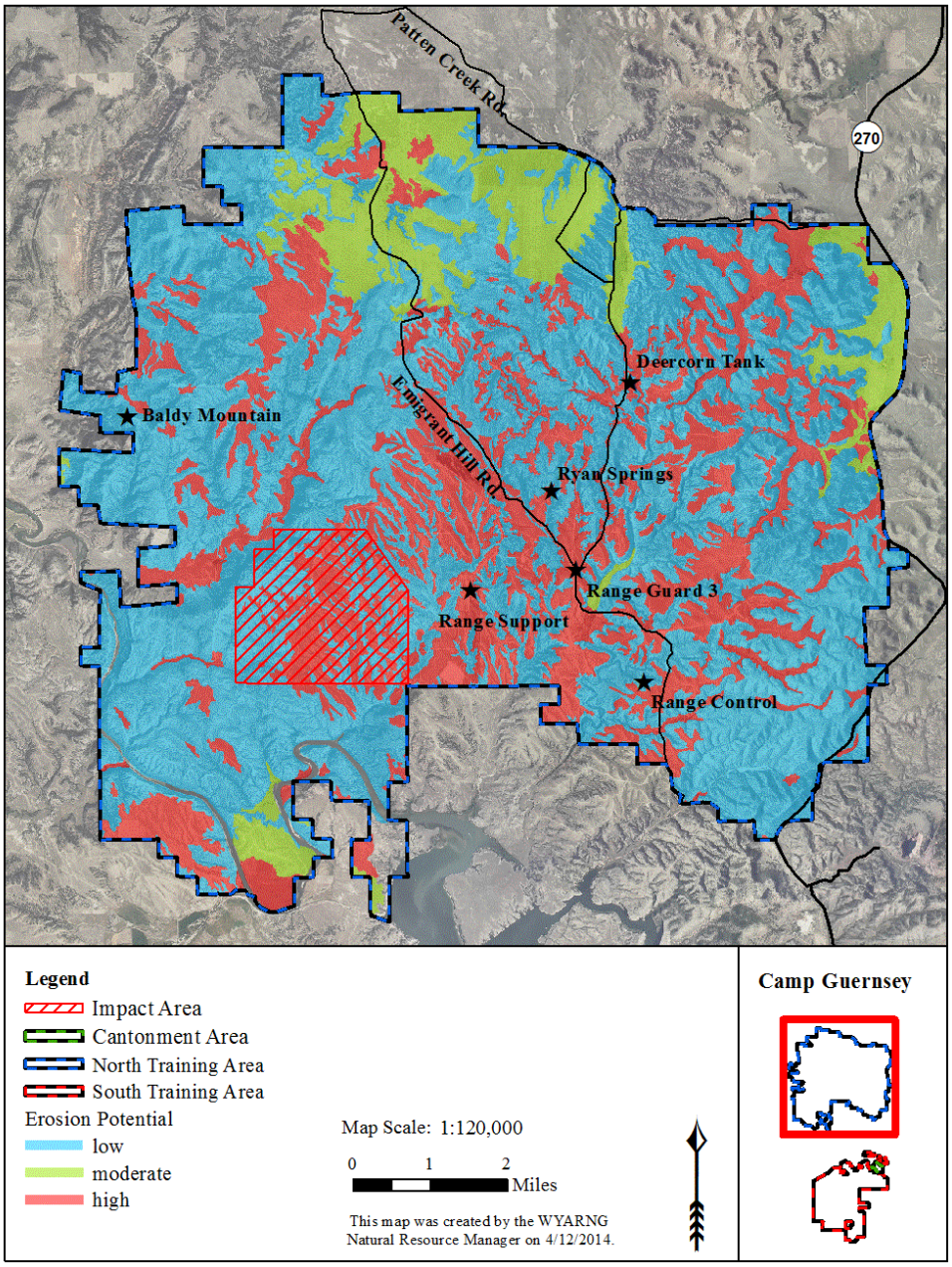

Figure A-4. Soil erosion potential in the North Training Area (NRCS 2011).

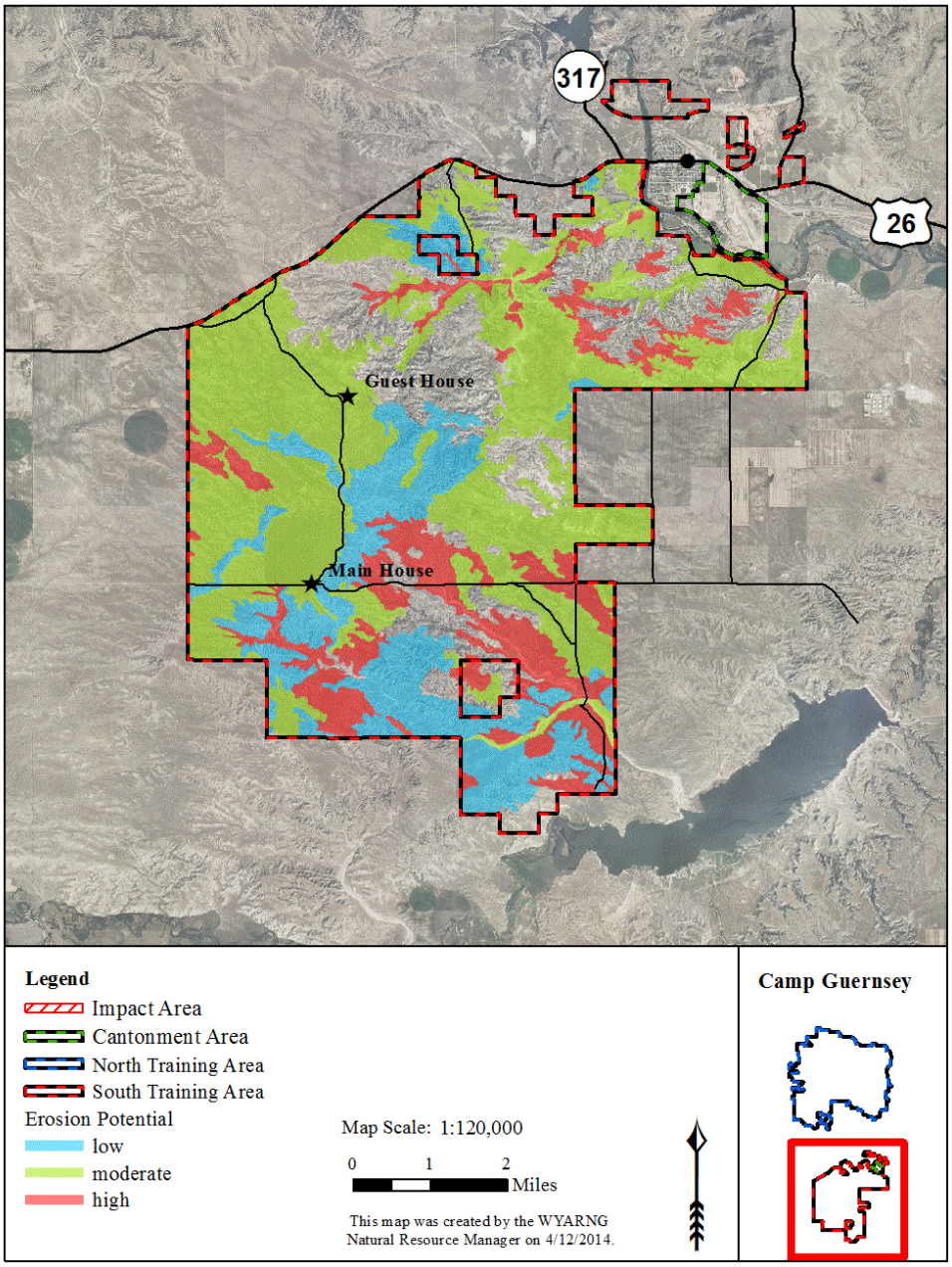

Figure A-5. Soil erosion potential in the South Training Area (NRCS 2011).

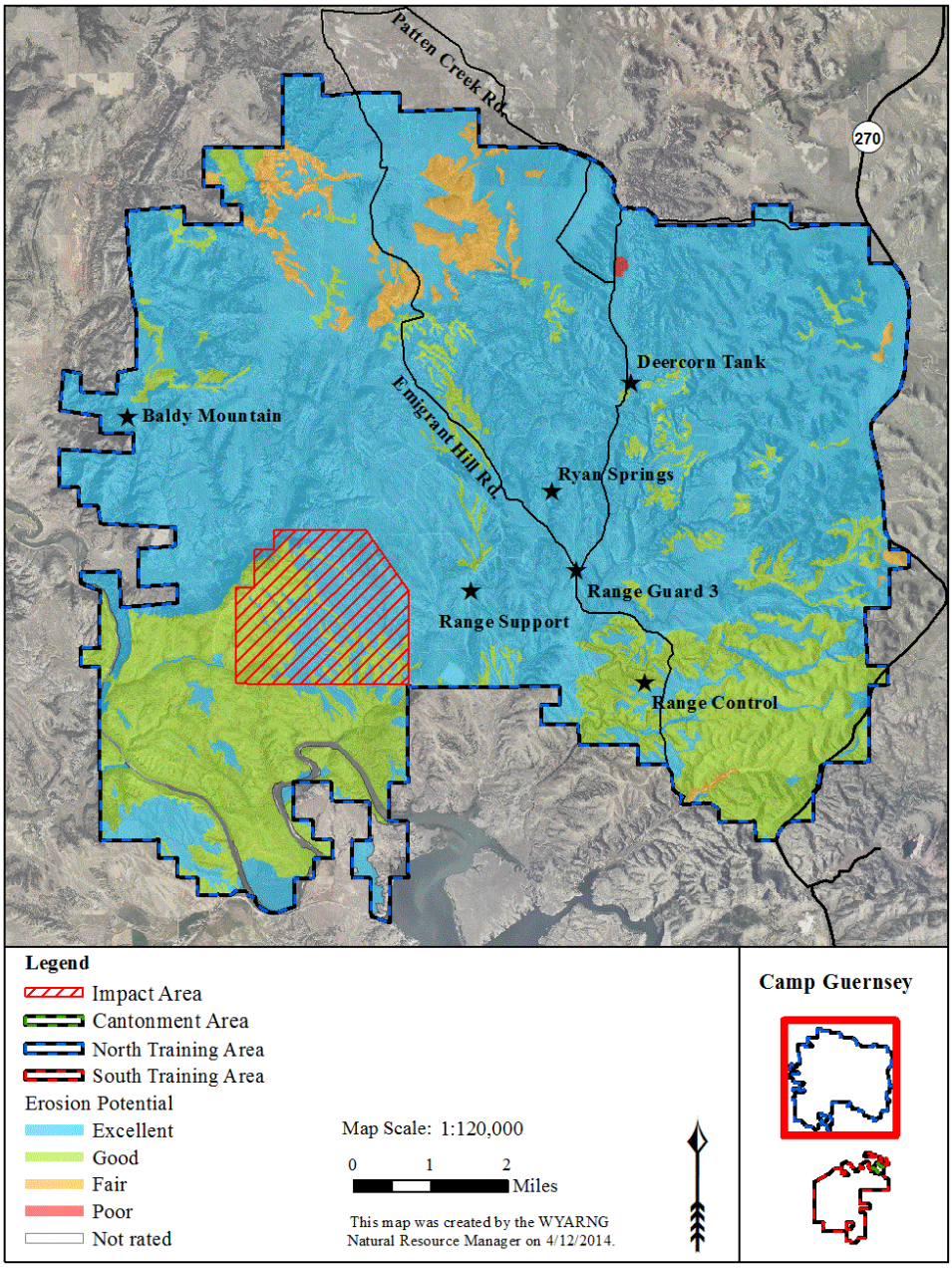

Figure A-6. Type 3 vehicle trafficability in the dry season in the North Training Area based on soils (NRCS 2011).

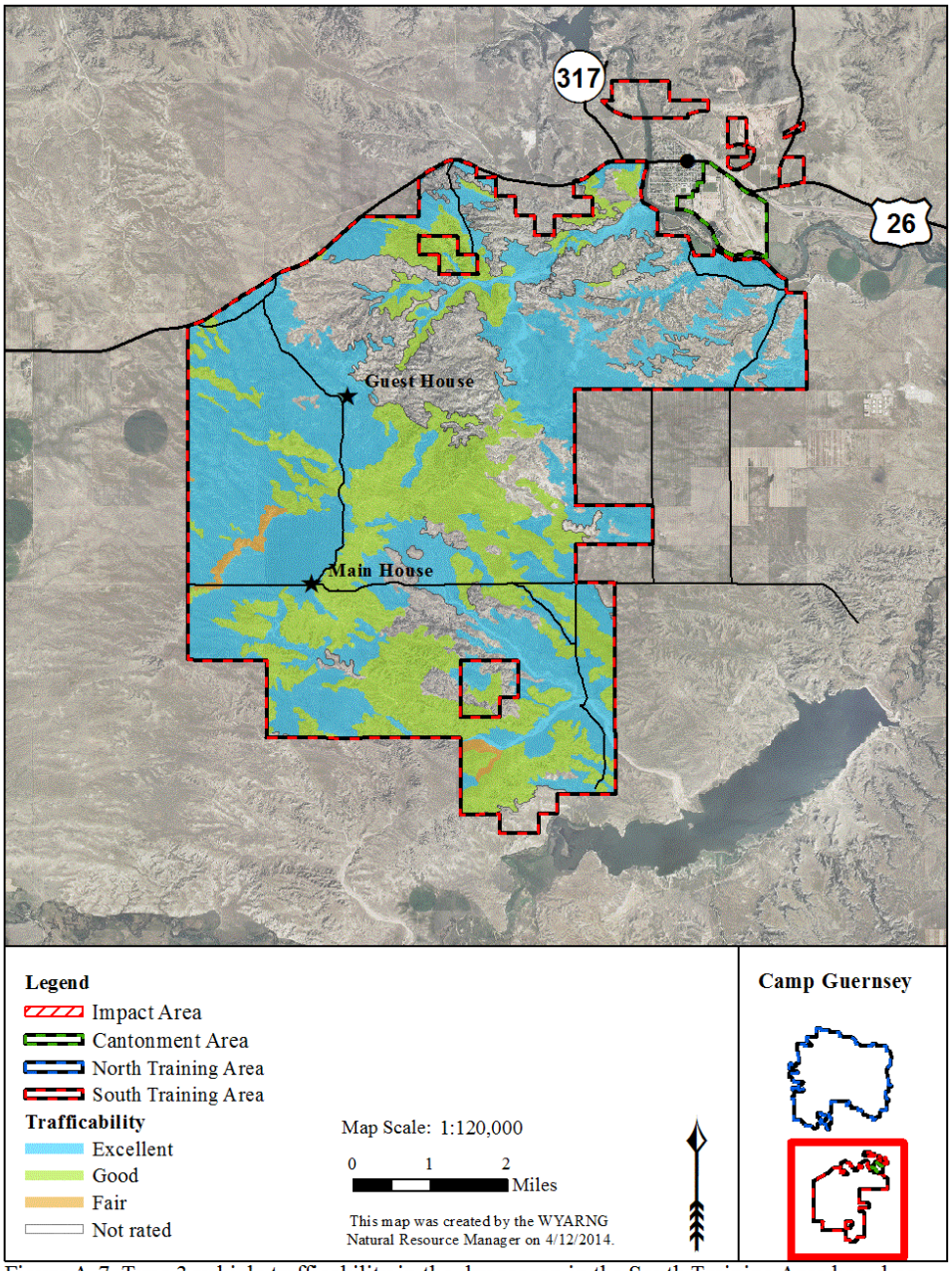

Figure A-7. Type 3 vehicle trafficability in the dry season in the South Training Area based on soils (NRCS 2011).

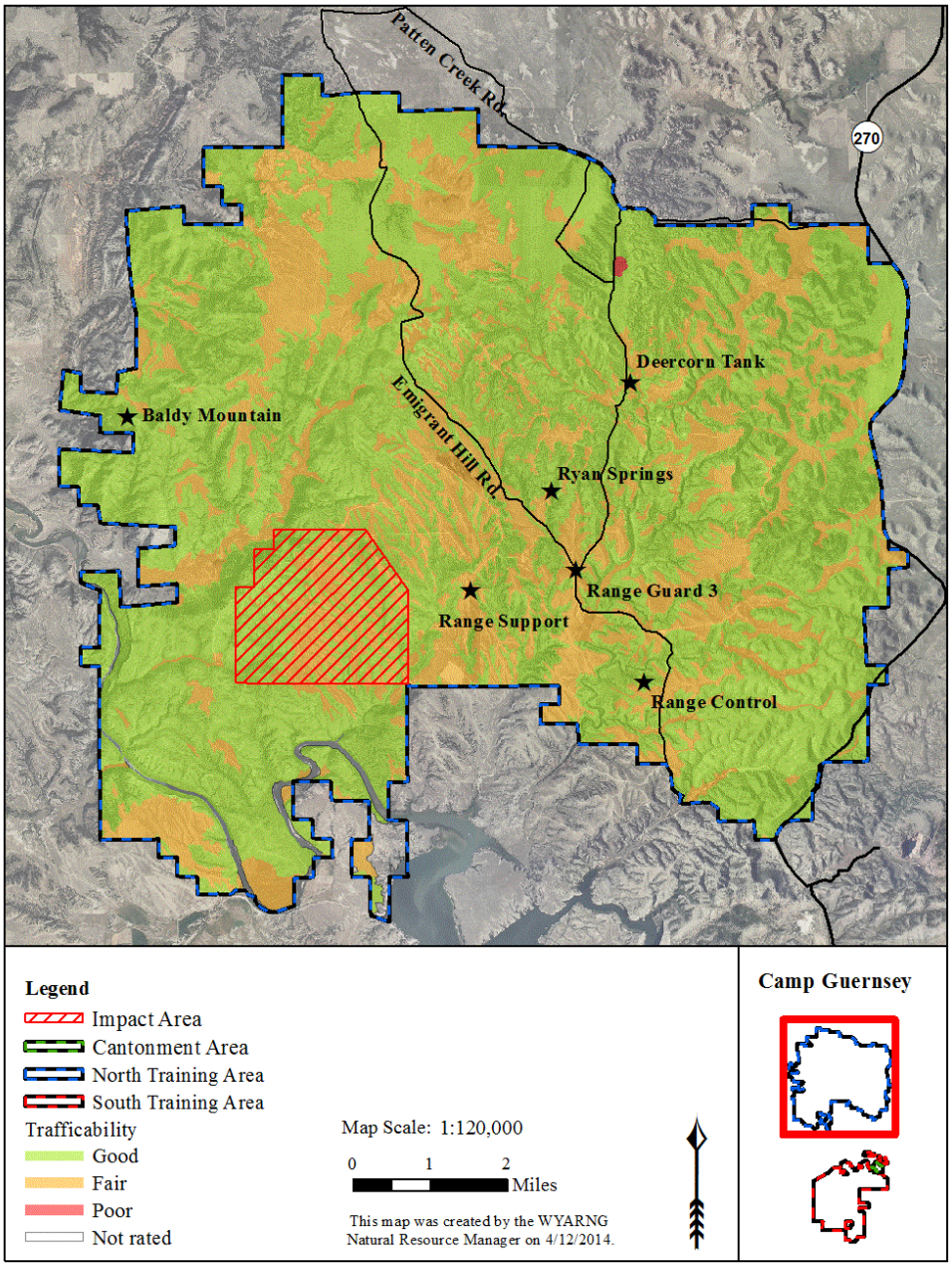

Figure A-8. Type 3 vehicle trafficability in the wet season for 50 passes in the North Training Area based on soils (NRCS 2011).

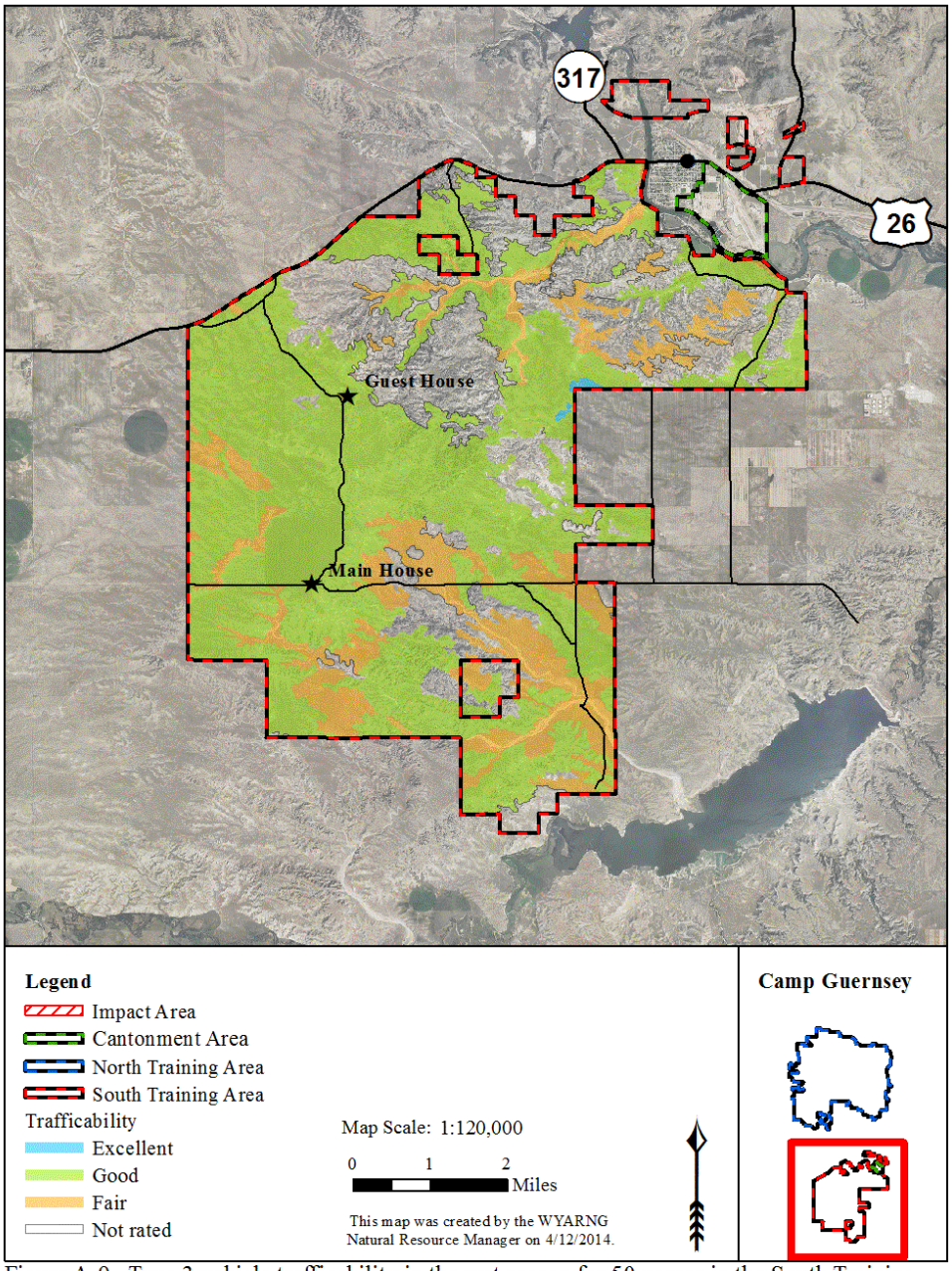

Figure A-9. Type 3 vehicle trafficability in the wet season for 50 passes in the South Training Area based on soils (NRCS 2011).

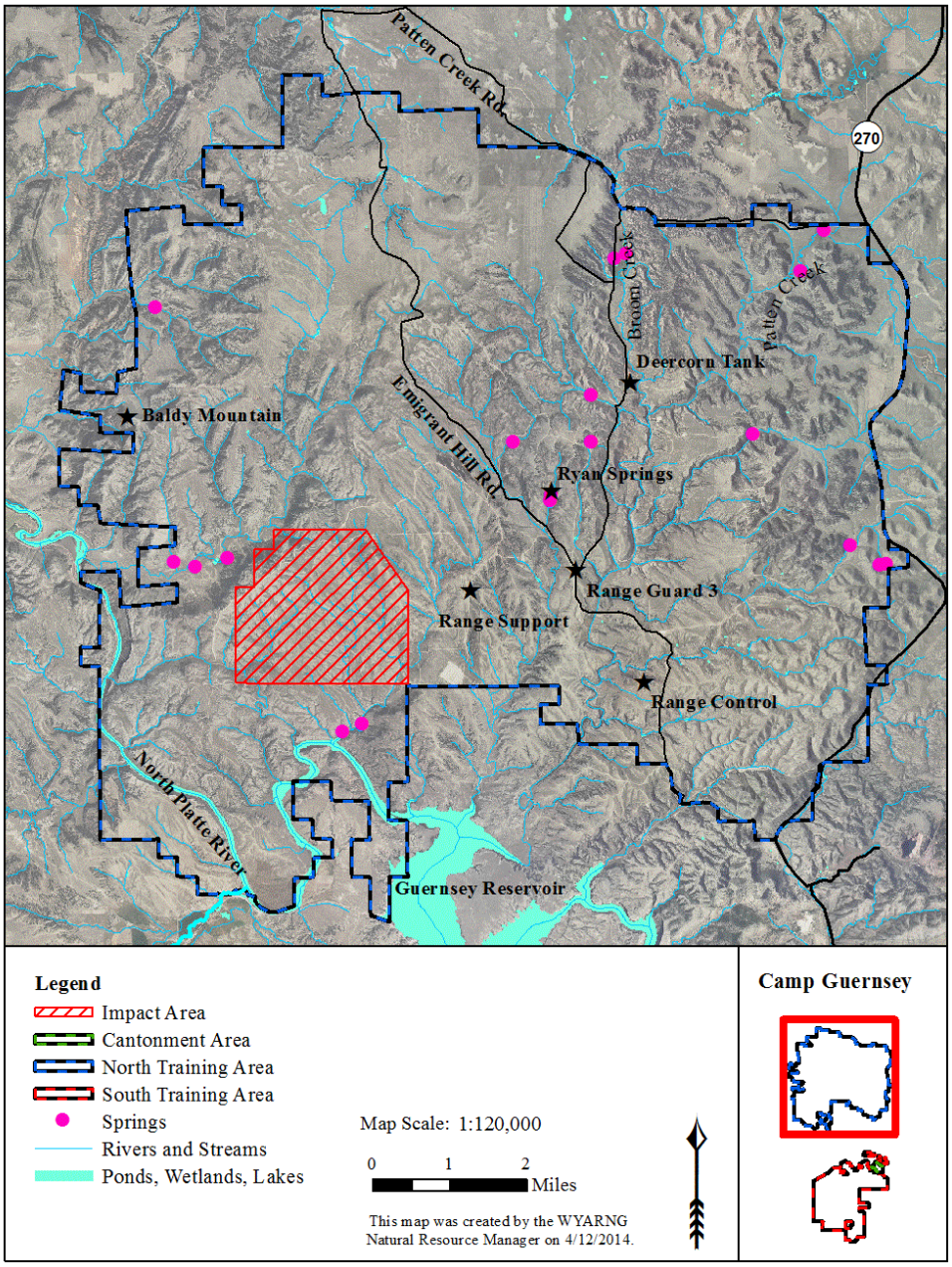

Figure A-10. Aquatic resources on the North Training Area. Rivers, streams (USDA-NRCS et al. 2012), wetlands (USFWS 2010), and springs (CIR NAIP 2009, WYARNG 2011, WYARNG 2012, USDS-NRCS et al. 2012) are shown.

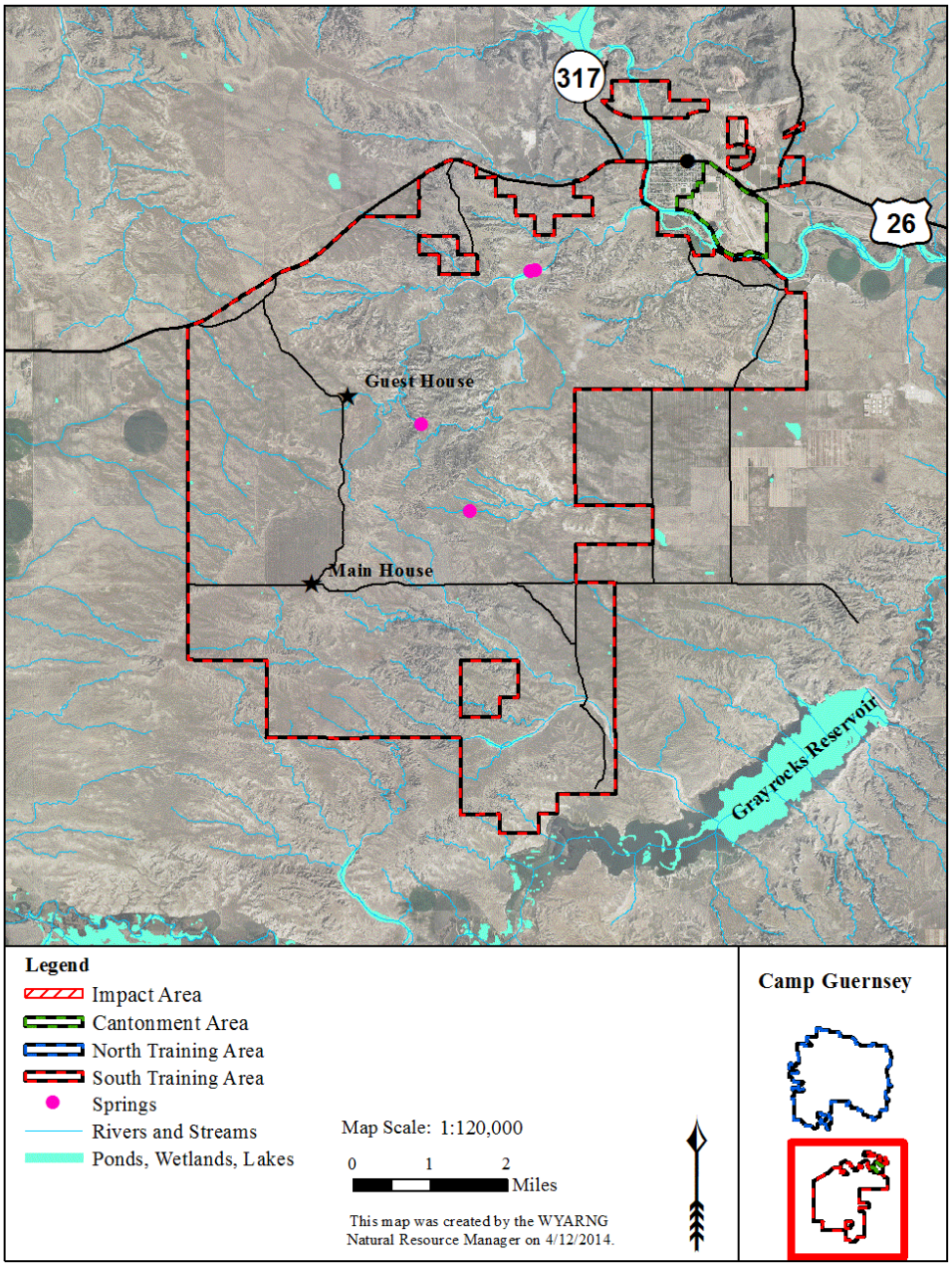

Figure A-11. Water resources on the South Training Area. Pond, Wetlands, Lakes (U.S. FIsh and Wildlife Service, 2010); rivers and streams (EPA 2012; and springs (CIR NAIP Imagery 2009, HDR 2011, URS Group, Inc and ARCADIS/Malcolm Pirnie 2012, USDS-NRCS and EPA 2012) are shown.

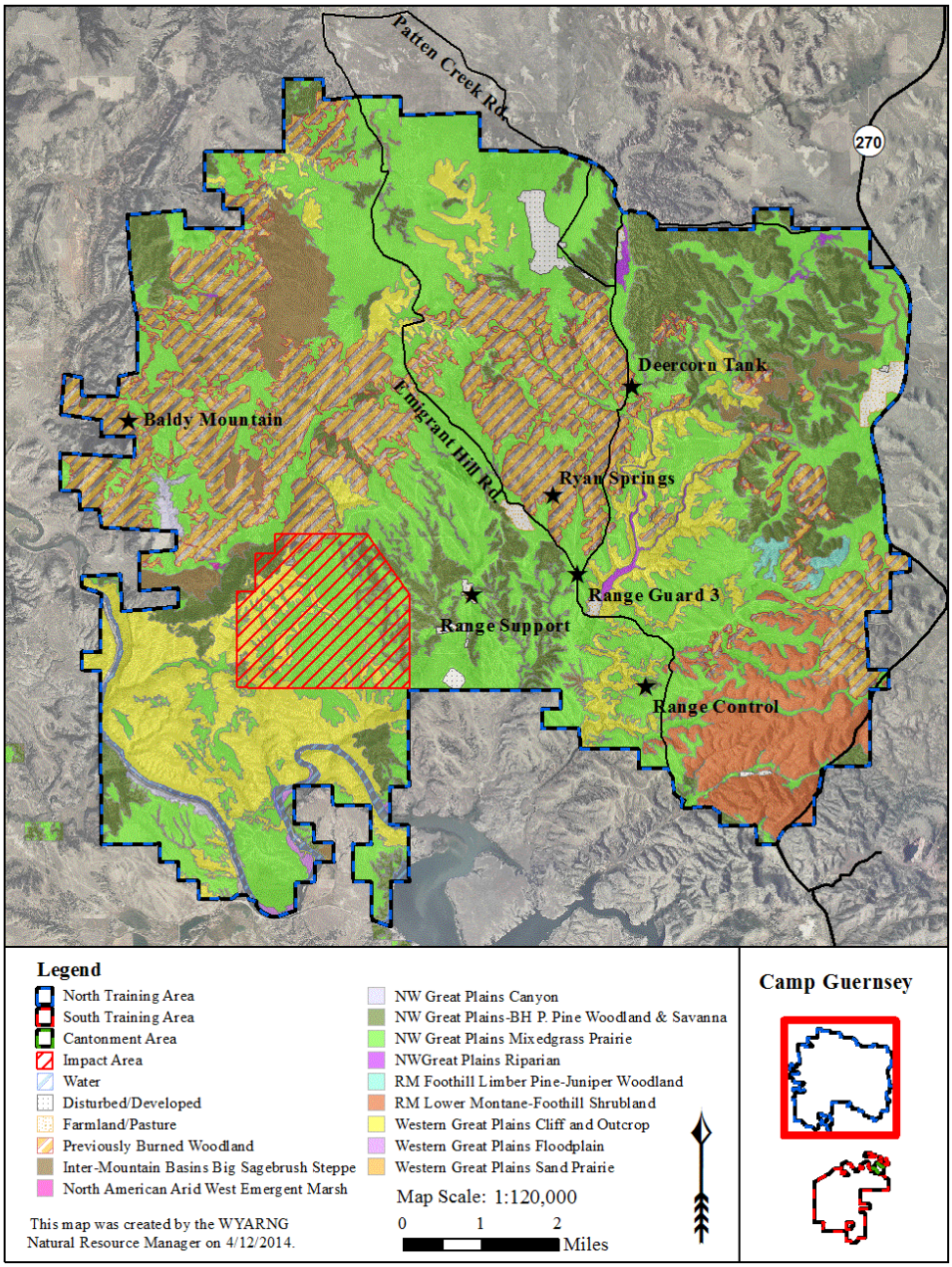

Figure A-12. Ecological Communites of the North Training Area (NatureServe 2009; WYARNG 2014). NW = North Western, BH = Black Hills, P. Pine = Pondorosa Pine, RM = Rocky Mountain.

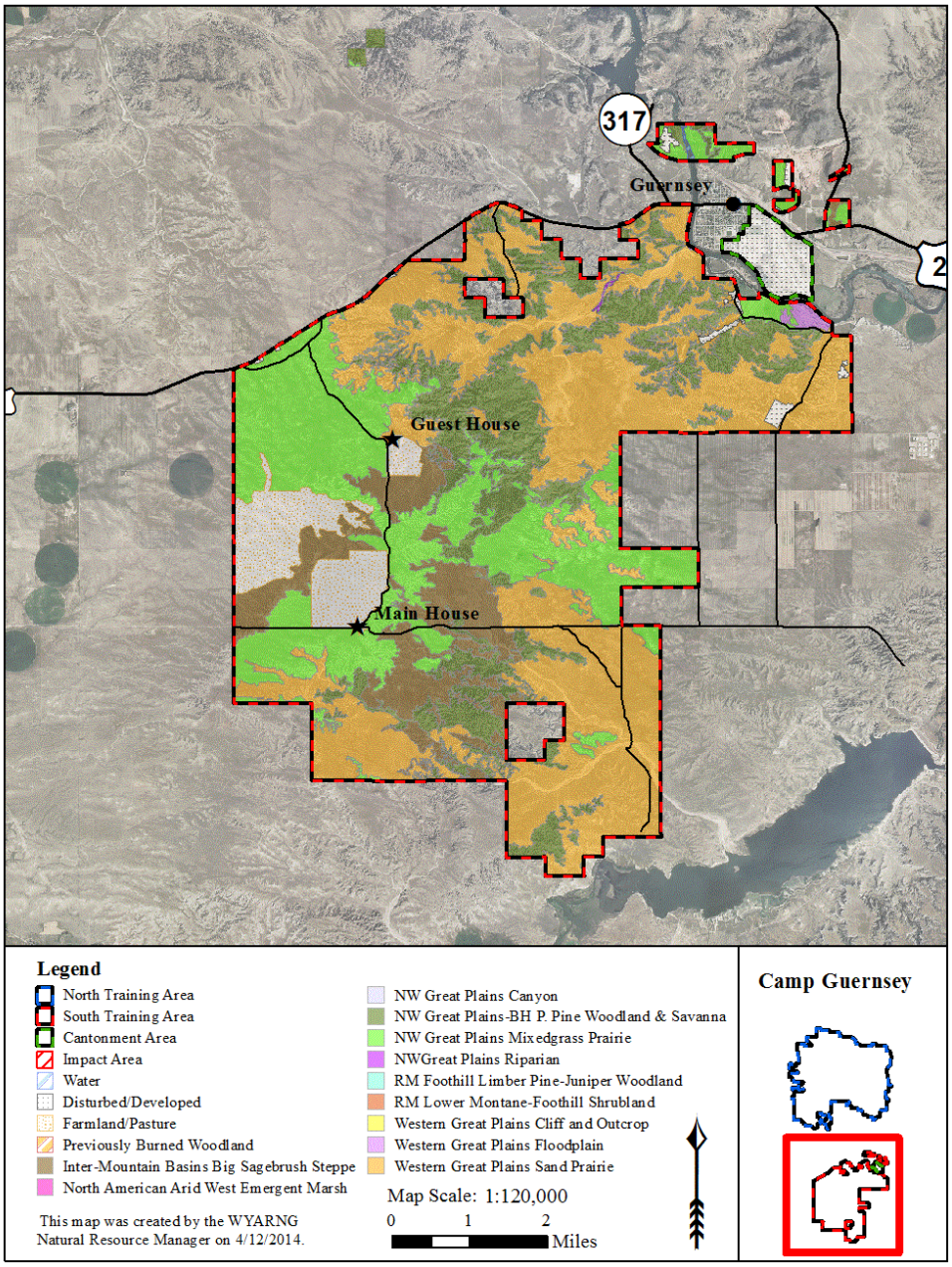

Figure A-13. Ecological Communites of the South Training Area (NatureServe 2009; WYARNG 2014). NW = North Western, BH = Black Hills, P. Pine = Pondorosa Pine, RM = Rocky Mountain.

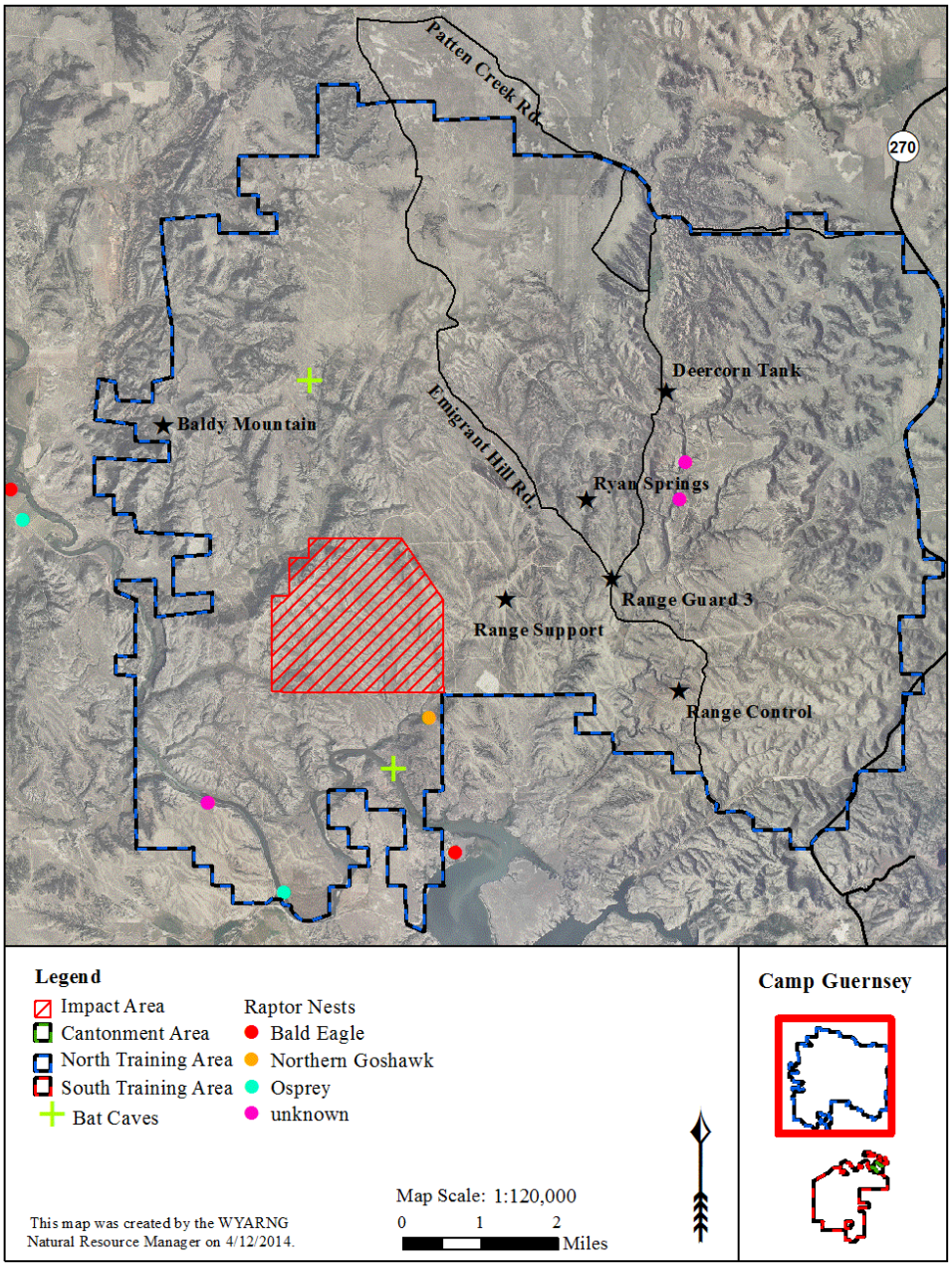

Figure A-14. Wildlife resources of special interest in the North Training Area.

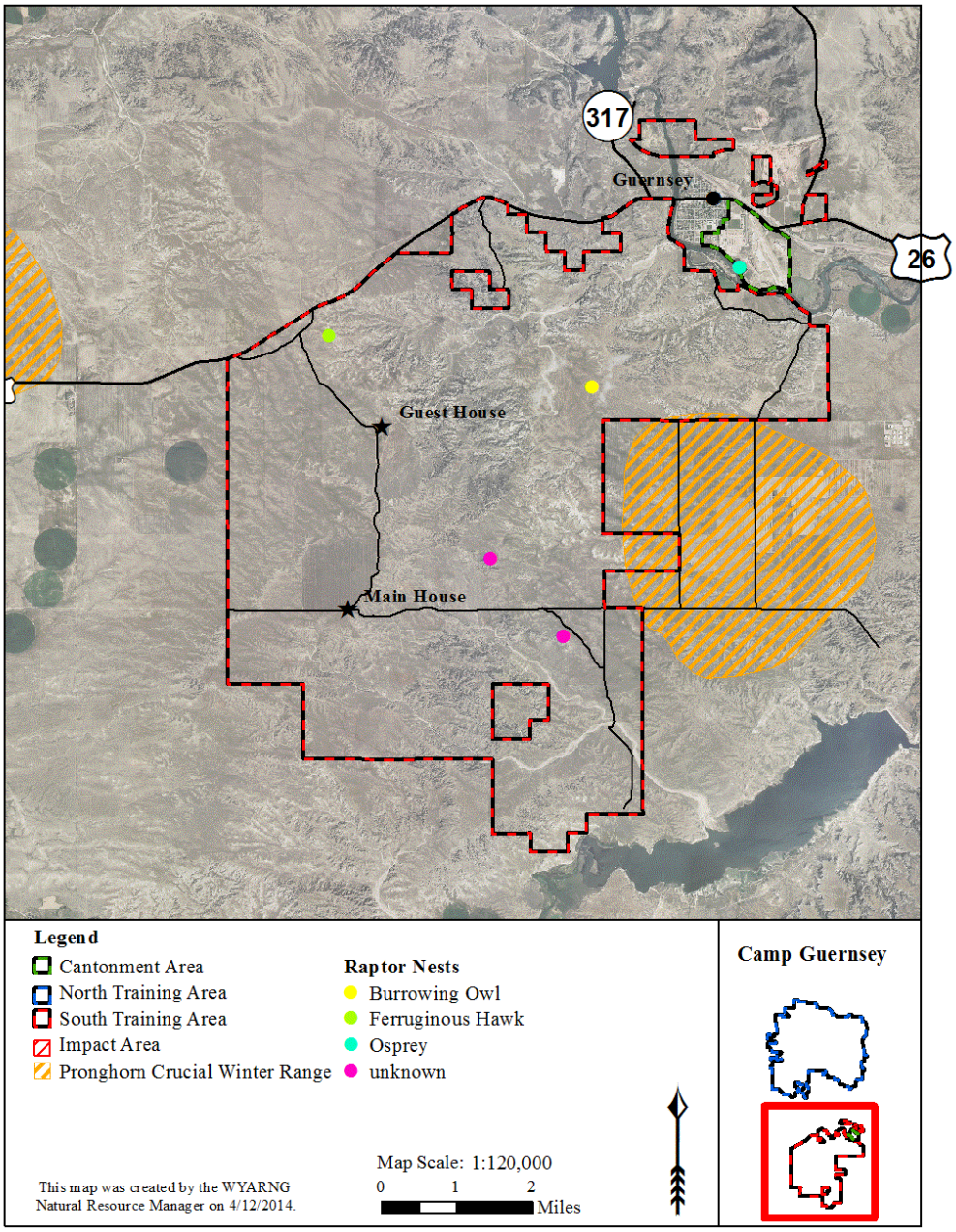

Figure A-15. Wildlife resources of special interest in the South Training Area.

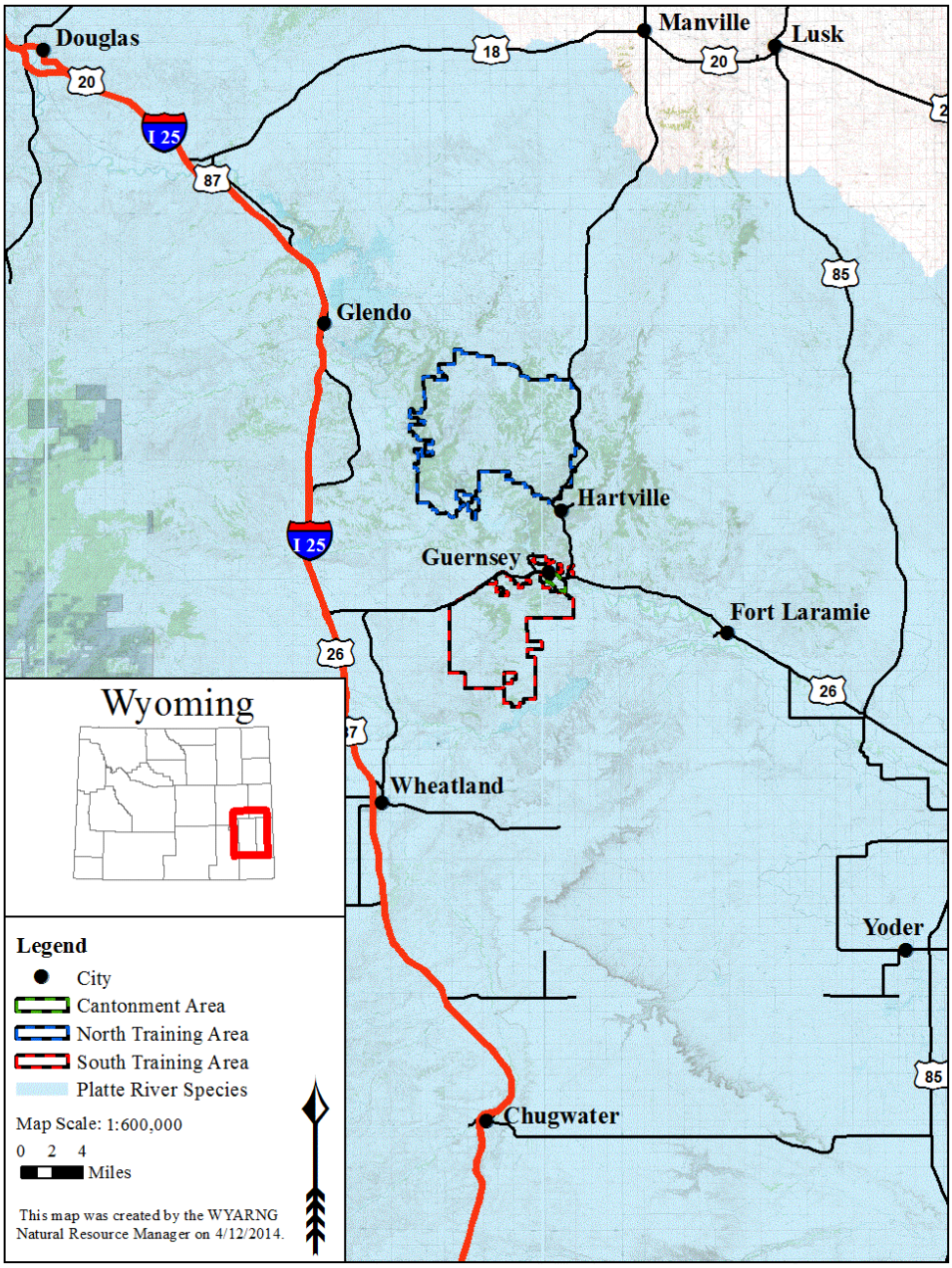

Figure A-16. Section 7 Range of the Platte River Species around Camp Guernsey.

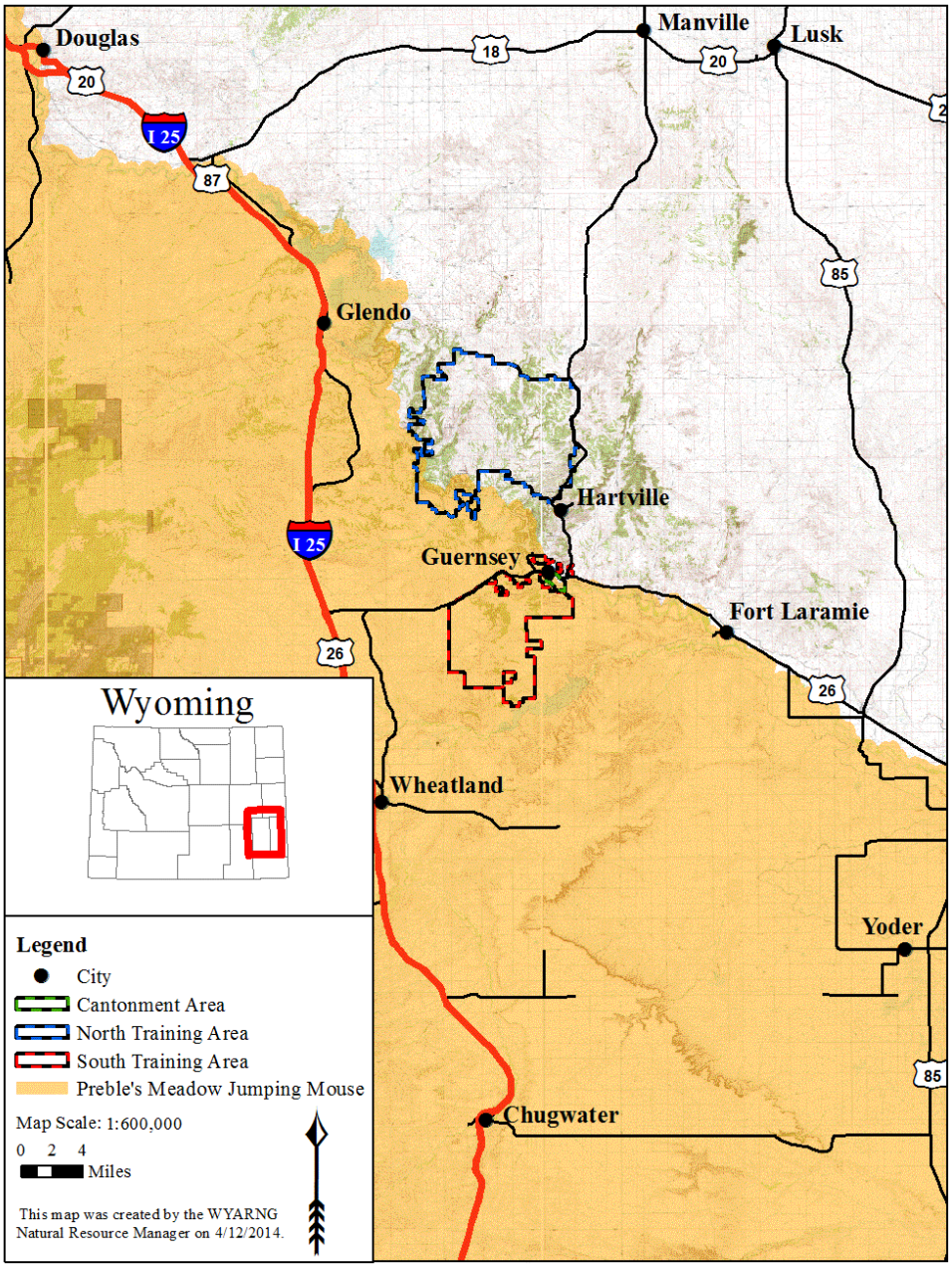

Figure A-17. Section 7 Range of Preble's meadow jumping mouse around Camp Guernsey.

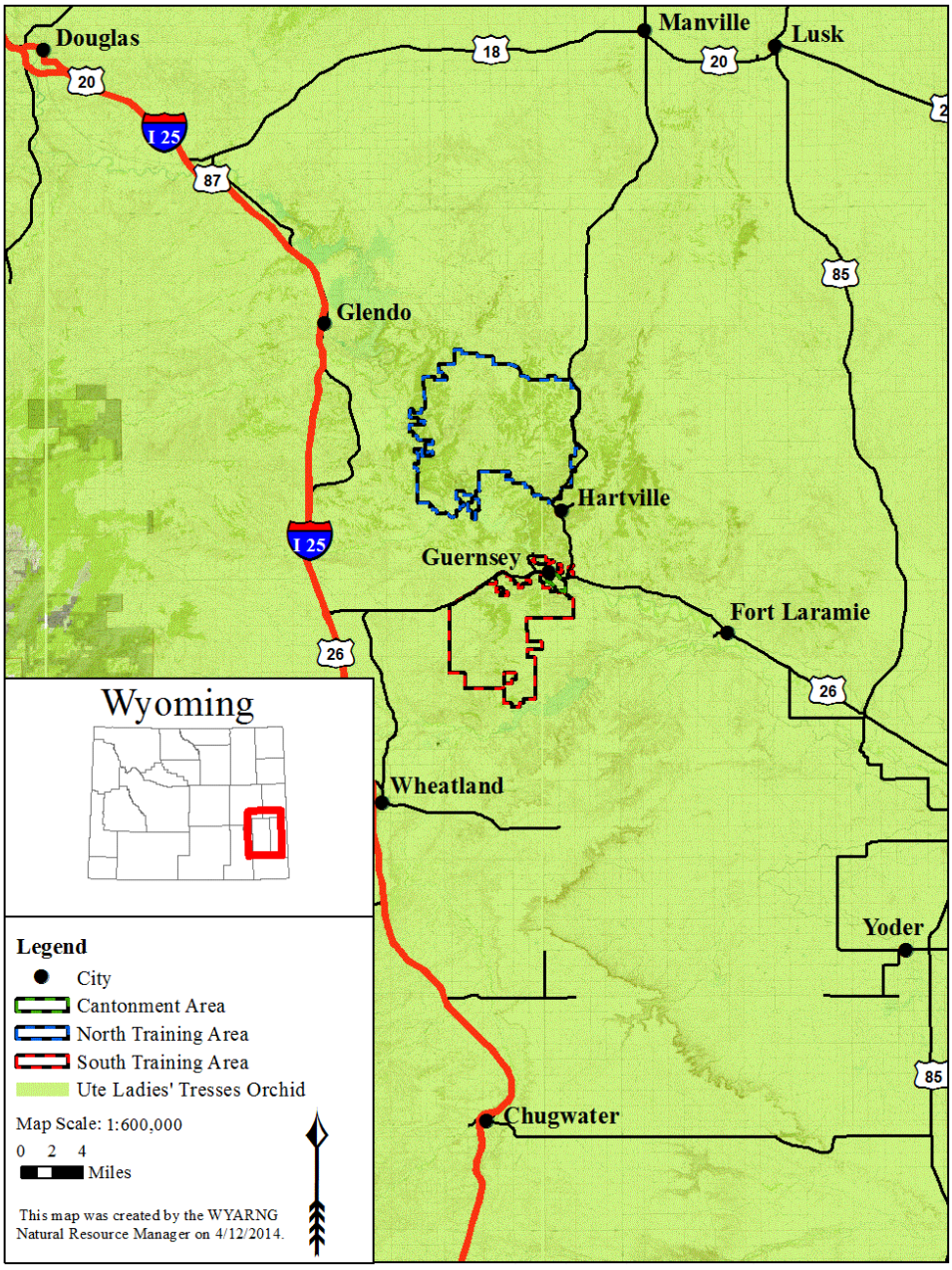

Figure A-18. Section 7 Range of Ute ladies'-tresses around Camp Guernsey.

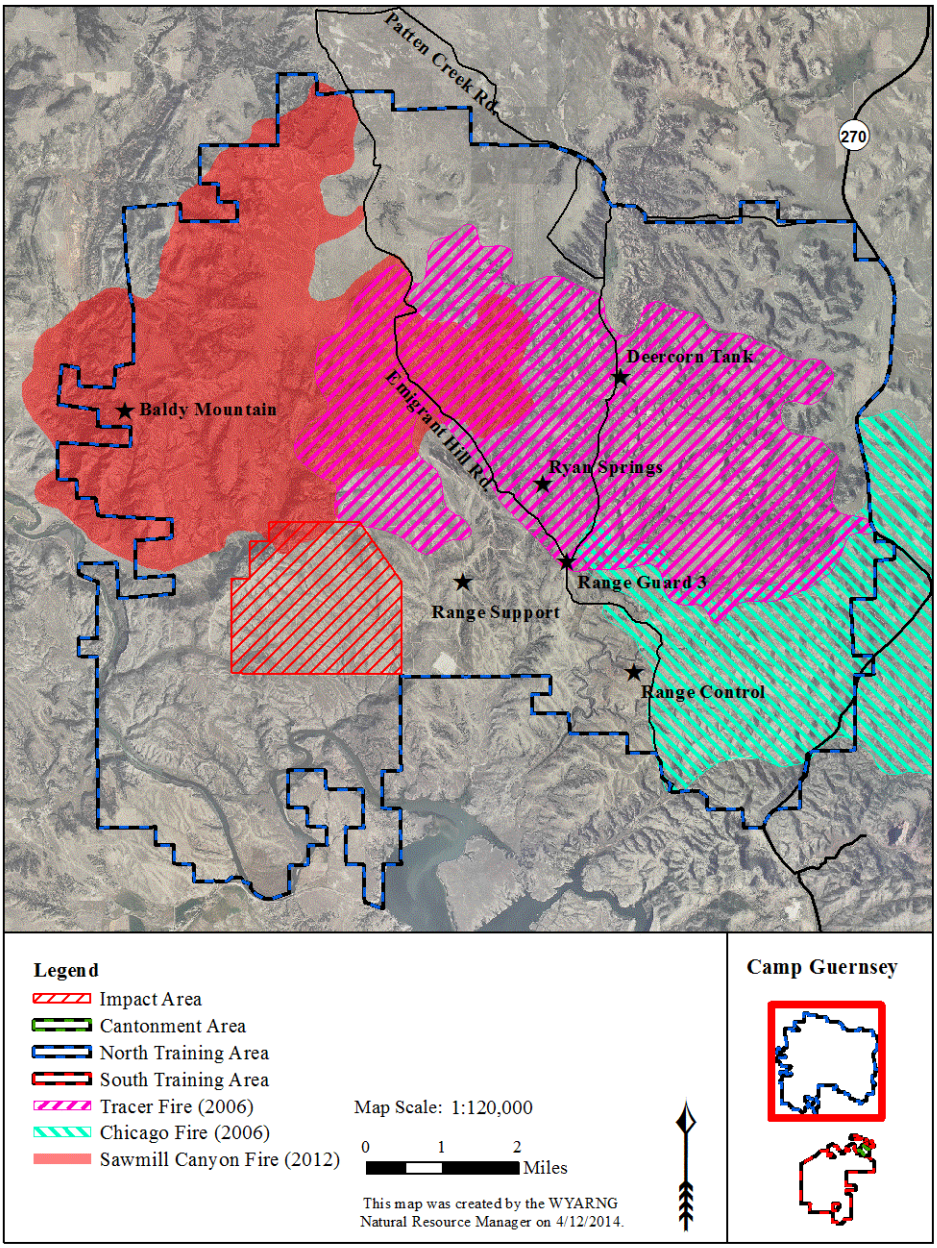

Figure A-19. Fire perimeters of major wildland fires that have impacted the North Training Area of the past decade.

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APPENDIX B: SPECIES LIST

Table B-1. Mammals known from Camp Guernsey (WYARNG 1995, 2005a, 2008a, 2008b, 2009b, 2013a, 2013b).

Common Name	Species	MGMT[1]	SGCN Tier[2]
American badger	*Taxidea taxus*	FB	
Beaver	*Castor canadensis*	FB	
Big brown bat	*Eptesicus fuscus*	NG	II
Black-tailed jackrabbit	*Lepus californicus*	PD	
Black-tailed prairie dog	*Cynomys ludovicianus*	NG	
Bobcat	*Lynx rufus*	FB	
Bushy-tailed woodrat	*Neotoma cinerea*	NG	
Common muskrat	*Ondatra zibethicus*	FB	
Coyote	*Canis latrans*	PD	
Deer mouse	*Peromyscus maniculatus*	NG	
Desert cottontail	*Sylvilagus audubonii*	SG	
Eastern cottontail	*Sylvilagus floridanus*	SG	
Elk	*Cervus canadensis*	BG	
Fringed myotis	*Myotis thysanodes*	NG	II
Hispid pocket mouse	*Chaetodipus hispidus*	NG	II
Hoary bat	*Lasiurus cinereus*	NG	
Least chipmunk	*Neotamias minimus*	NG	
Little brown myotis	*Myotis lucifugus*	NG	II
Long-eared myotis	*Myotis evotis*	NG	II
Long-tailed vole	*Microtus longicaudus*	NG	
Meadow vole	*Microtus pennsylvanicus*	NG	
Mountain cottontail	*Sylvilagus nuttallii*	SG	
Mule deer	*Odocoileus hemionus*	BG	
North American porcupine	*Hystricomorph hystricidae*	PD	
Ord's kangaroo rat	*Dipodomys ordii*	NG	
Pallid bat	*Antrozous pallidus*	NG	III
Plains pocket gopher	*Geomys bursarius*	NG	II
Plains pocket mouse	*Perognathus flavescens*	NG	III
Prairie vole	*Microtus ochrogaster*	NG	
Pronghorn	*Antilocapra americana*	BG	
Raccoon	*Procyon lotor*	PD	
Red fox	*Vulpes vulpes*	PD	
Silver-haired bat	*Lasionycteris noctivagans*	NG	
Striped skunk	*Mephitis mephitis*	PD	
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*	NG	
Townsend's big-eared bat	*Corynorhinus townsendii*	NG	I
Virginia opossum	*Didelphis virginiana*	NG	
Western harvest mouse	*Reithrodontomys megalotis*	NG	
Western small-footed myotis	*Myotis ciliolabrum*	NG	II
White-footed mouse	*Peromyscus leucopus*	NG	

Common Name	Species	MGMT[1]	SGCN Tier[2]
White-tailed deer	*Odocoileus virginianus*	BG	
White-tailed jack rabbit	*Lepus townsendii*	PD	
Wyoming ground squirrel	*Urocitellus elegans*	NG	

[1] WGFD management status; BG = big game; FB = furbearer; NG = nongame; PD = predatory animal; SG = small game; TG = trophy game

[2] Species of Greatest Conservation Tier; I = highest priority; II = moderate priority; III = lowest priority.

Table B-2. Bird species known from Camp Guernsey (WYARNG 1995, 2001, 2005b, 2006a, 2008, 2009c, 2009d, 2013c, 2013d, WYNDD 2012). An asterisk denotes species that are raptors.

Common Name	Species	Species of Concern[1]	SGCN Tier[2]
American Avocet	*Recurvirostra americana*		
American Coot	*Fulica americana*		
American Crow	*Corvus brachyrhynchos*		
American Goldfinch	*Spinus tristis*		
American Kestrel*	*Falco sparverius*		
American Robin	*Turdus migratorius*		
American White Pelican	*Pelecanus erythrorhynchos*		
American Wigeon	*Anas americana*	BCC	
Ash-throated Flycatcher	*Myiarchus cinerascens*	SGCN	II
Bald Eagle*	*Haliaeetus leucocephalus*		I
Baltimore Oriole	*Icterus galbula*		
Bank Swallow	*Riparia riparia*		
Barn Swallow	*Hirundo rustica*		
Belted Kingfisher	*Megaceryle alcyon*		
Black-billed Magpie	*Pica hudsonia*	PIF	
Black-capped Chickadee	*Poecile atricapillus*		
Black-headed Grosbeak	*Pheucticus melanocephalus*		
Black-throated Gray Warbler	*Setophaga nigrescens*		
Blue Grosbeak	*Passerina caerulea*		
Blue Jay	*Cyanocitta cristata*		
Blue-gray Gnatcatcher	*Poloioptila caerulea*		
Blue-winged Teal	*Anas discors*		
Bohemian Waxwing	*Bombycilla garrulus*	PIF	
Brewer's Blackbird	*Euphagus cyanocephalus*		
Brewer's Sparrow	*Spizella breweri*	BCC, PIF, SGCN	II
Broad-tailed Hummingbird	*Selasphorus platycercus*		
Broad-winged Hawk*	*Buteo platypterus*		
Brown Thrasher	*Toxostoma rufum*		
Brown-headed Cowbird	*Molothrus ater*		
Bufflehead	*Bucephala albeola*		
Bullock's Oriole	*Icterus bullockii*		
Burrowing Owl*	*Athene cunicularia*	BCC, PIF, SGCN	I
California Gull	*Larus californicus*		
Canada Goose	*Branta canadensis*		
Canyon Wren	*Catherpes mexicanus*		
Carolinia Wren	*Thryothorus ludovicianus*		
Cassin's Finch	*Carpodacus cassinii*		

Common Name	Species	Species of Concern[1]	SGCN Tier[2]
Cassin's Kingbird	*Tyrannus vociferans*		
Cassin's Vireo	*Vireo cassinii*		
Cedar Waxwing	*Bombycilla cedrorum*		
Chimney Swift	*Chaetura pelagica*		
Chipping Sparrow	*Spizella passerina*		
Clay-colored Sparrow	*Spizella pallida*		
Cliff Swallow	*Petrochelidon pyrrhonota*		
Common Goldeneye	*Bucephala clangula*		
Common Grackle	*Quiscalus quiscula*		
Common Loon	*Gavia immer*	SGCN	I
Common Merganser	*Mergus merganser*		
Common Nighthawk	*Chordeiles minor*		
Common Poorwill	*Phalaenoptilus nuttallii*		
Common Raven	*Corvus corax*		
Common Redpoll	*Acanthis flammea*		
Common Tern	*Sterna hirundo*		
Common Yellowthroat	*Geothlypis trichas*		
Cooper's Hawk*	*Accipiter cooperii*		
Cordilleran Flycatcher	*Empidonax occidentalis*		
Dark-eyed Junco	*Junco hyemalis*		
Downy Woodpecker	*Picoides pubescens*		
Dusky Flycatcher	*Empidonax oberholseri*		
Eastern Kingbird	*Tyrannus tyrannus*		
Eastern Bluebird	*Sialia sialis*		
Eastern Screech-Owl*	*Megascops asio*		
Eurasian Collared-Dove	*Streptopelia decaocto*		
European Starling	*Sturnus vulgaris*		
Evening Grosbeak	*Coccothraustes vespertinus*		
Ferruginous Hawk*	*Buteo regalis*	BCC, PIF, SGCN	I
Gadwall	*Anas strepera*		
Golden Eagle*	*Aquila chrysaetos*	BCC, PIF	
Grasshopper Sparrow	*Ammodramus savannarum*	BCC, PIF, SGCN	II
Gray Catbird	*Dumetella carolinensis*		
Gray Flycatcher	*Empidonax wrightii*		
Great Blue Heron	*Ardea herodias*		
Great Horned Owl*	*Bubo virginianus*		
Greater Sage-Grouse[3]	*Centrocercus urophasianus*	SGCN, Candidate	II
Green-tailed Towhee	*Pipilo chlorurus*		
Green-winged Teal	*Anas crecca*		

Common Name	Species	Species of Concern[1]	SGCN Tier[2]
Hairy Woodpecker	*Picoides villosus*		
Hammond's Flycatcher	*Empidonax hammondii*		
Hermit Thrush	*Catharus guttatus*		
Herring Gull	*Larus argentatus*		
Horned Lark	*Eremophila alpestris*		
House Finch	*Carpodacus mexicanus*		
House Wren	*Troglodytes aedon*		
Killdeer	*Charadrius vociferus*	PIF	
Lapland Longspur	*Calcarius lapponicus*		
Lark Bunting	*Calamospiza melanocorys*	PIF, SGCN	II
Lark Sparrow	*Chondestes grammacus*		
Lazuli Bunting	*Passerina amoena*		
Lesser Goldfinch	*Spinus psaltria*		
Lewis's Woodpecker	*Melanerpes lewis*	PIF, SGCN	II
Loggerhead Shrike	*Lanius ludovicianus*	PIF	
Long-billed Curlew	*Numenius americanus*	BCC, PIF, SGCN	II
Long-eared Owl*	*Asio otus*		
MacGillivray's Warbler	*Geothlypis tolmiei*		
Mallard	*Anas platyrhynchos*		
McCown's Longspur	*Rhynchophanes mccownii*	BCC, PIF, SGCN	II
Merlin*	*Falco columbarius*	SGCN	III
Mountain Bluebird	*Sialia currucoides*	PIF	
Mountain Chickadee	*Poecile gambeli*		
Mourning Dove	*Zenaida macroura*		
Northern Flicker	*Colaptes auratus*		
Northern Goshawk*	*Accipiter gentilis*	SGCN	I
Northern Harrier*	*Circus cyaneus*	PIF	
Northern Mockingbird	*Mimus polyglottos*		
Northern Pintail	*Anas acuta*		
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	PIF	
Northern Saw-whet Owl*	*Aegolius acadicus*		
Northern Waterthrush	*Parkesia noveboracensis*		
Orange-crowned Warbler	*Oreothlypis celata*		
Orchard Oriole	*Icterus spurius*		
Osprey*	*Pandion haliaetus*		
Pied-billed Grebe	*Podilymbus podiceps*		
Pine Siskin	*Spinus pinus*		
Pinyon Jay	*Gymnorhinus cyanocephalus*		
Plumbeous Vireo	*Vireo plumbeus*		

Common Name	Species	Species of Concern[1]	SGCN Tier[2]
Prairie Falcon*	*Falco mexicanus*	BCC, PIF	
Pygmy Nuthatch	*Sitta pygmaea*	SGCN	II
Red Crossbill	*Loxia curvirostra*		
Red-breasted Nuthatch	*Sitta canadensis*		
Redhead	*Aythya americana*	SGCN	II
Red-headed Woodpecker	*Melanerpes erythrocephalus*	PIF	
Red-naped Sapsucker	*Sphyrapicus nuchalis*	BCC, PIF	
Red-tailed Hawk*	*Buteo jamaicensis*		
Red-winged Blackbird	*Agelaius phoeniceus*		
Ring-billed Gull	*Larus delawarensis*		
Rock Pigeon	*Columba livia*		
Rock Wren	*Salpinctes obsoletus*		
Rose-breasted Grosbeak	*Pheucticus ludovicianus*		
Rough-legged Hawk*	*Buteo lagopus*		
Ruby-crowned Kinglet	*Regulus calendula*		
Rufous-sided Towhee	*Pipilo erythrophthalmus*		
Sage Sparrow	*Amphispiza belli*	SGCN	II
Sandhill Crane	*Grus canadensis*	SGCN	III
Savannah Sparrow	*Passerculus sandwichensis*		
Say's Phoebe	*Sayornis saya*	PIF	
Sharp-shinned Hawk*	*Accipiter striatus*		
Snowy Plover	*Charadrius alexandrinus*		
Song Sparrow	*Melospiza melodia*		
Sora	*Porzana carolina*		
Spotted Towhee	*Pipilo maculatus*		
Steller's Jay	*Cyanocitta stelleri*		
Swainson's Hawk*	*Buteo swainsoni*	PIF	II
Swainson's Thrush	*Catharus ustulatus*		
Tennessee Warbler	*Oreothlypis peregrina*		
Townsend's Solitaire	*Myadestes townsendi*		
Townsend's Warbler	*Setophaga townsendi*		
Tree Swallow	*Tachycineta bicolor*		
Turkey Vulture	*Cathartes aura*		
Upland Sandpiper	*Bartramia longicauda*	BCC, PIF	II
Vesper Sparrow	*Pooecetes gramineus*		
Violet-green Swallow	*Tachycineta thalassina*		
Western Kingbird	*Tyrannus verticalis*		
Western Meadowlark	*Sturnella neglecta*		
Western Scrub-Jay	*Aphelocoma californica*	SGCN	II

Common Name	Species	Species of Concern[1]	SGCN Tier[2]
Western Tanager	*Piranga ludoviciana*		
Western Wood-Pewee	*Contopus sordidulus*		
White-breasted Nuthatch	*Sitta carolinensis*		
White-crowned Sparrow	*Zonotrichia leucophrys*		
White-throated Swift	*Aeronautes saxatalis*	PIF	
Wild Turkey	*Meleagris gallopavo*		
Willow Flycatcher	*Empidonax traillii*	SGCN	III
Wilson's Phalarope	*Phalaropus tricolor*	BCC, PIF	
Wilson's Warbler	*Cardellina pusilla*		
Wood Duck	*Aix sponsa*	PIF	
Worm-Yellow Warbler	*Setophaga petechia*		
Yellow-billed Cuckoo	*Coccyzus americanus*	SGCN	III
Yellow-breasted Chat	*Icteria virens*		
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*		
Yellow-rumped Warbler	*Setophaga coronata*		

[1] BCC = USFWS Birds of Conservation Concern; PIF = Partners in Flight Priority Species; SGCN = Wyoming Species of Greatest Conservation Need; Candidate = Candidate species of listing under the Federal Threatened and Endangered Species Act.

[2] Species of Greatest Conservation Tier; I = highest priority; II = moderate priority; III = lowest priority.

[3] Single observations in 1978 and 1991 within a mile of Camp Guernsey. Greater Sage Grouse are not considered to be present on the Camp at this time.

Table B-3. Fish known from Camp Guernsey (WYARNG 2000a, 2004, 2010c).

Common Name	Species	WGFD Tier[1]
Black bullhead	*Ameiurus melas*	
Black crappie	*Pomoxis nigromaculatus*	
Brassy minnow	*Hybognathus hankinsoni*	III
Brook trout	*Salvelinus fontinalis*	
Brown trout	*Salmo trutta*	
Central stoneroller	*Campostoma anomalum*	III
Common carp	*Cyprinus carpio*	
Creek chub	*Semotilus atromaculatus*	
Emerald shiner	*Notropis dorsalis*	
Emerald shiner	*Notropis atherinoides*	
Fathead minnow	*Pimephales promelas*	
Gizzard shad	*Dorsoma cepedianum*	
Goldfish	*Carassius auratus*	
Green sunfish	*Lepomis cyanellus*	
Johnny darter	*Etheostoma nigrum*	
Longnose dace	*Rhinichthys cataractae*	
Longnose sucker	*Catostomus catostomus*	
Rainbow trout	*Oncorhynchus mykiss*	
Red shiner	*Cyprinella lutrensis*	
Sand shiner	*Notropis stramineus*	
Smallmouth bass	*Micropterus dolomieu*	
Spottail shiner	*Notropis hudsonius*	
Stonecat	*Noturus flavus*	
Suckermouth minnow	*Phenacobius mirabilis*	II
Walleye	*Stizostedion vitreum*	
White crappie	*Pomoxis annularis*	
White sucker	*Catostomus commersoni*	
Yellow perch	*Perca flavescens*	

[1] Species of Greatest Conservation Tier; I = highest priority; II = moderate priority; III = lowest priority.

Table B-3. Amphibians known from Camp Guernsey (WYARNG 2000b, 2005c, 2010d).

Common Name	Species	WGFD Tier[1]
American Bullfrog	*Rana catesbeiana*	
Northern Leopard Frog	*Rana pipiens*	III
Plains Spadefoot	*Spea bombifrons*	III
Tiger Salamander	*Ambystoma tigrinum*	
Woodhouse's Toad	*Bufo woodhousei*	

[1] Species of Greatest Conservation Tier; I = highest priority; II = moderate priority; III = lowest priority.

Table B-4. Reptiles known from Camp Guernsey (WYARNG 2000b, 2005c, 2010e).

Common Name	Species	WGFD Tier[1]
Bullsnake	*Pituophis melanoleucas sayi*	
Common Garter Snake	*Thamnophis sirtalis*	
Eastern Yellowbelly Racer	*Coluber constrictor flaviventris*	
Greater Short-horned Lizard	*Phrynosoma douglassi*	III
Northern Sagebrush Lizard	*Sceloporus graciosus*	
Plains Garter Snake	*Thamnophis radix*	II
Prairie Rattlesnake	*Crotalus viridis*	
Wandering Garter Snake	*Thamnophis elegans*	
Western Spiny Softshell	*Apalone spinifera hartwegi*	III

[1] Species of Greatest Conservation Tier; I = highest priority; II = moderate priority; III = lowest priority.

Table B-5. Plant species known from Camp Guernsey (WYARNG 1997, 2003, 2007, 2010a, 2013f).

Family	Scientific Name	Common Name
Aceraceae	*Acer negundo var. interius*	boxelder
Agavaceae	*Yucca glauca*	soapweed yucca
Alismataceae	*Alisma triviale*	northern water plantain
Alismataceae	*Sagittaria cuneata*	arumleaf arrowhead
Amaranthaceae	*Amaranthus albus*	prostrate pigweed
Amaranthaceae	*Amaranthus blitoides*	mat amaranth
Amaranthaceae	*Amaranthus californicus*	California amaranth
Amaranthaceae	*Amaranthus retroflexus*	redroot amaranth
Anacardiaceae	*Rhus trilobata var. trilobata*	skunkbush sumac
Anacardiaceae	*Toxicodendron rydbergii*	western poison ivy
Apiaceae	*Berula erecta var. incisa*	cutleaf waterparsnip
Apiaceae	*Cicuta maculata var. angustifolia*	spotted water hemlock
Apiaceae	*Cymopterus acaulis*	plains springparsley
Apiaceae	*Cymopterus montanus*	mountain springparsley
Apiaceae	*Harbouria trachypleura*	whiskbroom parsley
Apiaceae	*Lomatium orientale*	Northern Idaho biscuitroot
Apiaceae	*Musineon divaricatum*	leafy wildparsley
Apiaceae	*Musineon tenuifolium*	slender wildparsley
Apiaceae	*Osmorhiza longistylis*	longstyle sweetroot
Apocynaceae	*Apocynum androsaemifolium*	spreading dogbane
Apocynaceae	*Apocynum cannabinum*	Indianhemp
Asclepiadaceae	*Asclepias pumila*	plains milkweed
Asclepiadaceae	*Asclepias speciosa*	showy milkweed
Asclepiadaceae	*Asclepias viridiflora*	green comet milkweed
Asteraceae	*Achillea millefolium var. lanulosa*	western yarrow
Asteraceae	*Acroptilon repens*	hardheads
Asteraceae	*Agoseris glauca var. dasycephala*	pale agoseris
Asteraceae	*Agoseris glauca var. laciniata*	false agoseris
Asteraceae	*Ambrosia acanthicarpa*	flatspine burr ragweed
Asteraceae	*Ambrosia psilostachya*	Cuman ragweed
Asteraceae	*Ambrosia tomentosa*	skeletonleaf burr ragweed
Asteraceae	*Ambrosia trifida*	great ragweed
Asteraceae	*Antennaria anaphaloides*	pearly pussytoes
Asteraceae	*Antennaria dimorpha*	low pussytoes
Asteraceae	*Antennaria microphylla*	littleleaf pussytoes
Asteraceae	*Antennaria parvifolia*	small-leaf pussytoes
Asteraceae	*Antennaria rosea*	rosy pussytoes
Asteraceae	*Arctium minus*	lesser burrdock
Asteraceae	*Arnica fulgens*	foothill arnica

Family	Scientific Name	Common Name
Asteraceae	*Artemisia biennis var. biennis*	biennial wormwood
Asteraceae	*Artemisia campestris var. scouleriana*	field sagewort
Asteraceae	*Artemisia cana ssp. cana*	silver sagebrush
Asteraceae	*Artemisia dracunculus*	tarragon
Asteraceae	*Artemisia filifolia*	sand sagebrush
Asteraceae	*Artemisia frigida*	prairie sagewort
Asteraceae	*Artemisia ludoviciana var. ludoviciana*	white sagebrush
Asteraceae	*Artemisia nova*	black sagebrush
Asteraceae	*Artemisia tridentata var. wyomingensis*	Wyoming big sagebrush
Asteraceae	*Bidens cernua*	nodding beggartick
Asteraceae	*Bidens frondosa*	devil's beggartick
Asteraceae	*Brickellia eupatorioides var. corymbulosa*	false boneset
Asteraceae	*Brickellia grandiflora*	tasselflower brickellbrush
Asteraceae	*Carduus acanthoides*	spiny plumeless thistle
Asteraceae	*Carduus nutans*	nodding plumeless thistle
Asteraceae	*Chrysothamnus viscidiflorus var. viscidiflorus*	yellow rabbitbrush
Asteraceae	*Cirsium arvense*	Canada thistle
Asteraceae	*Cirsium canescens*	prairie thistle
Asteraceae	*Cirsium cf. ochrocentrum*	yellowspine thistle
Asteraceae	*Cirsium undulatum*	wavyleaf thistle
Asteraceae	*Cirsium vulgare*	bull thistle
Asteraceae	*Conyza canadensis*	Canadian horseweed
Asteraceae	*Crepis atribarba*	slender hawksbeard
Asteraceae	*Crepis intermedia*	limestone hawksbeard
Asteraceae	*Crepis modocensis*	Modoc hawksbeard
Asteraceae	*Crepis occidentalis ssp. costata*	largeflower hawksbeard
Asteraceae	*Dyssodia papposa*	fetid marigold
Asteraceae	*Echinacea angustifolia*	blacksamson echinacea
Asteraceae	*Ericameria nauseosa ssp. nauseosa var. graveolens*	rubber rabbitbrush
Asteraceae	*Erigeron bellidiastrum*	western daisy fleabane
Asteraceae	*Erigeron caespitosus*	tufted fleabane
Asteraceae	*Erigeron canus*	hoary fleabane
Asteraceae	*Erigeron compositus*	cutleaf daisy
Asteraceae	*Erigeron divergens*	spreading fleabane
Asteraceae	*Erigeron flagellaris*	trailing fleabane
Asteraceae	*Erigeron formosissimus*	beautiful fleabane
Asteraceae	*Erigeron ochroleucus var. ochroleucus*	buff fleabane
Asteraceae	*Erigeron ochroleucus var. scribneri*	buff fleabane
Asteraceae	*Erigeron pumilus var. pumilus*	shaggy fleabane
Asteraceae	*Euthamia occidentalis*	western goldentop
Asteraceae	*Filago prolifera*	bighead pygmycudweed

Family	Scientific Name	Common Name
Asteraceae	*Gnaphalium palustre*	western marsh cudweed
Asteraceae	*Grindelia squarrosa var. squarrosa*	curlycup gumweed
Asteraceae	*Gutierrezia sarothrae*	broom snakeweed
Asteraceae	*Helianthus annuus*	common sunflower
Asteraceae	*Helianthus petiolaris*	prairie sunflower
Asteraceae	*Helianthus pumilus*	little sunflower
Asteraceae	*Heterotheca villosa var. minor*	hairy false goldenaster
Asteraceae	*Heterotheca villosa var. villosa*	hairy false goldenaster
Asteraceae	*Hymenopappus filifolius var. polycephalus*	manyhead hymenopappus
Asteraceae	*Iva axillaris var. robustior*	povertyweed
Asteraceae	*Iva xanthifolia*	giant sumpweed
Asteraceae	*Lactuca oblongifolia*	blue lettuce
Asteraceae	*Lactuca serriola*	prickly lettuce
Asteraceae	*Liatris punctata*	dotted blazing star
Asteraceae	*Logfia arvensis*	field cottonrose
Asteraceae	*Lygodesmia juncea*	rush skeletonplant
Asteraceae	*Machaeranthera canescens var. canescens*	hoary tansyaster
Asteraceae	*Machaeranthera grindelioides var. grindelioides*	rayless tansyaster
Asteraceae	*Machaeranthera pinnatifida var. pinnatifida*	lacy tansyaster
Asteraceae	*Machaeranthera tanacetifolia*	tanseyleaf tansyaster
Asteraceae	*Microseris nutans*	nodding microceris
Asteraceae	*Nothocalais cuspidata*	sharppoint prairie-dandelion
Asteraceae	*Onopordum acanthium*	Scotch cottonthistle
Asteraceae	*Packera cana*	woolly groundsel
Asteraceae	*Packera plattensis*	prairie groundsel
Asteraceae	*Parthenium alpinum*	alpine feverfew
Asteraceae	*Ratibida columnifera*	upright prairie coneflower
Asteraceae	*Scorzonera laciniata*	cutleaf vipergrass
Asteraceae	*Senecio integerrimus var. exaltatus*	Columbia ragwort
Asteraceae	*Senecio integerrimus var. integerrimus*	lambstongue ragwort
Asteraceae	*Senecio riddellii*	Riddell's ragwort
Asteraceae	*Senecio spartioides*	Riddell's ragwort
Asteraceae	*Shinnersoseris rostrata*	beaked skeletonweed
Asteraceae	*Solidago canadensis var. gilvocanescens*	shorthair goldenrod
Asteraceae	*Solidago missouriensis var. fasciculata*	Missouri goldenrod
Asteraceae	*Solidago missouriensis var. missouriensis*	Missouri goldenrod
Asteraceae	*Solidago mollis*	velvety goldenrod
Asteraceae	*Solidago nemoralis var. longipetiolata*	gray goldenrod
Asteraceae	*Solidago rigida*	stiff goldenrod
Asteraceae	*Solidago rigida var. humilis*	stiff goldenrod
Asteraceae	*Solidago velutina*	threenerve goldenrod

Family	Scientific Name	Common Name
Asteraceae	*Sonchus arvensis ssp. uliginosus*	moist sowthistle
Asteraceae	*Stenotus armerioides var. armerioides*	thrift mock goldenweed
Asteraceae	*Symphyotrichum ascendens*	western aster
Asteraceae	*Symphyotrichum ciliatum*	rayless alkali aster
Asteraceae	*Symphyotrichum ericoides var. stricticaule*	white heath aster
Asteraceae	*Symphyotrichum falcatum var. commutatum*	white prairie aster
Asteraceae	*Symphyotrichum falcatum var. falcatum*	white prairie aster
Asteraceae	*Symphyotrichum laeve var. laeve*	smooth blue aster
Asteraceae	*Symphyotrichum lanceolatum ssp. hesperium var. hesperium*	white panicle aster
Asteraceae	*Taraxacum laevigatum*	rock dandelion
Asteraceae	*Taraxacum officinale*	common dandelion
Asteraceae	*Tetraneuris acaulis var. acaulis*	stemless four-nerve daisy
Asteraceae	*Thelesperma megapotamicum*	Hopi tea greenthread
Asteraceae	*Townsendia exscapa*	stemless Townsend daisy
Asteraceae	*Townsendia grandiflora*	largeflower Townsend daisy
Asteraceae	*Townsendia hookeri*	Hooker's Townsend daisy
Asteraceae	*Tragopogon dubius*	yellow salsify
Asteraceae	*Xanthium strumarium var. canadense*	rough cockleburr
Berberidaceae	*Mahonia repens*	Oregon grape, creeping barberry
Boraginaceae	*Asperugo procumbens*	German-madwort
Boraginaceae	*Cryptantha cana*	mountain cryptantha
Boraginaceae	*Cryptantha celosioides*	buttecandle
Boraginaceae	*Cryptantha cinerea var. jamesii*	James' cryptantha
Boraginaceae	*Cryptantha minima*	little cryptantha
Boraginaceae	*Cryptantha thyrsiflora*	calcareous cryptantha
Boraginaceae	*Cynoglossum officinale*	gypsyflower
Boraginaceae	*Hackelia deflexa var. americana*	American stickseed
Boraginaceae	*Hackelia floribunda*	manyflower stickseed
Boraginaceae	*Lappula occidentalis var. cupulata*	flatspine stickseed
Boraginaceae	*Lappula occidentalis var. occidentalis*	flatspine stickseed
Boraginaceae	*Lithospermum incisum*	narrowleaf stoneseed
Boraginaceae	*Mertensia lanceolata*	prairie bluebells
Boraginaceae	*Onosmodium molle var. occidentale*	western marbleseed
Brassicaceae	*Alyssum alyssoides*	pale madwort
Brassicaceae	*Alyssum desertorum*	desert madwort
Brassicaceae	*Alyssum simplex*	alyssum
Brassicaceae	*Arabis fendleri var. spatifolia*	spoonleaf rockcress
Brassicaceae	*Arabis hirsuta var. pycnocarpa*	creamflower rockcress
Brassicaceae	*Arabis holboellii var. collinsii*	Collins' rockcress
Brassicaceae	*Barbarea vulgaris*	garden yellowrocket
Brassicaceae	*Camelina microcarpa*	littlepod false flax

Family	Scientific Name	Common Name
Brassicaceae	*Capsella bursa-pastoris*	shepherd's purse
Brassicaceae	*Cardamine breweri var. breweri*	Brewer's bittercress
Brassicaceae	*Cardaria pubescens*	hairy whitetop
Brassicaceae	*Cardaria chalepensis*	Lenspod whitetop
Brassicaceae	*Chorispora tenella*	crossflower
Brassicaceae	*Descurainia pinnata var. brachycarpa*	western tansymustard
Brassicaceae	*Descurainia pinnata var. nelsonii*	Nelson's tansymustard
Brassicaceae	*Descurainia pinnata var. osmiarum*	western tansymustard
Brassicaceae	*Descurainia sophia*	herb sophia
Brassicaceae	*Draba nemorosa*	woodland draba
Brassicaceae	*Draba reptans*	Carolina draba
Brassicaceae	*Erysimum asperum*	western wallflower
Brassicaceae	*Erysimum capitatum var. capitatum*	sanddune wallflower
Brassicaceae	*Hesperis matronalis*	dames rocket
Brassicaceae	*Lepidium densiflorum var. densiflorum*	common pepperweed
Brassicaceae	*Lepidium densiflorum var. macrocarpum*	bigseed pepperweed
Brassicaceae	*Lepidium perfoliatum*	clasping pepperweed
Brassicaceae	*Lesquerella alpina var. alpina*	alpine bladderpod
Brassicaceae	*Lesquerella arenosa var. arenosa*	Great Plains bladderpod
Brassicaceae	*Lesquerella ludoviciana*	foothill bladderpod
Brassicaceae	*Physaria brassicoides*	double twinpod
Brassicaceae	*Rorippa nasturtium-aquaticum*	watercress
Brassicaceae	*Rorippa palustris var. fernaldiana*	Fernald's yellowcress
Brassicaceae	*Rorippa sinuata*	spreading yellowcress
Brassicaceae	*Sisymbrium altissimum*	tall tumblemustard
Brassicaceae	*Thlaspi arvense*	field pennycress
Cactaceae	*Coryphantha missouriensis var. missouriensis*	Missouri foxtail cactus
Cactaceae	*Coryphantha vivipara var. vivipara*	spinystar
Cactaceae	*Echinocereus viridiflorus*	nylon hedgehog cactus
Cactaceae	*Opuntia fragilis*	brittle pricklypear
Cactaceae	*Opuntia macrorhiza var. macrorhiza*	twistspine pricklypear
Cactaceae	*Opuntia polyacantha var. polyacantha*	hairspine pricklypear
Campanulaceae	*Campanula rotundifolia*	bluebell bellflower
Cannabaceae	*Humulus lupulus var. neomexicanus*	common hop
Capparaceae	*Cleome serrulata*	Rocky Mountain beeplant
Capparaceae	*Polanisia dodecandra var. trachysperma*	sandyseed clammyweed
Caprifoliaceae	*Lonicera tatarica*	Tatarian honeysuckle
Caprifoliaceae	*Sambucus nigra ssp. canadensis*	common elderberry
Caprifoliaceae	*Symphoricarpos occidentalis*	western snowberry
Caryophyllaceae	*Cerastium arvense*	field chickweed
Caryophyllaceae	*Eremogone hookeri var. hookeri*	Hooker's sandwort

Family	Scientific Name	Common Name
Caryophyllaceae	*Eremogone hookeri var. pinetorum*	Hooker's sandwort
Caryophyllaceae	*Paronychia depressa*	spreading nailwort
Caryophyllaceae	*Paronychia sessiliflora*	creeping nailwort
Caryophyllaceae	*Silene antirrhina*	sleepy silene
Chenopodiaceae	*Atriplex canescens var. canescens*	fourwing saltbush
Chenopodiaceae	*Atriplex heterosperma*	twoscale saltbush
Chenopodiaceae	*Bassia hyssopifolia*	fivehorn smotherweed
Chenopodiaceae	*Chenopodium album*	lambsquarters
Chenopodiaceae	*Chenopodium berlandieri var. zschackii*	Zschack's goosefoot
Chenopodiaceae	*Chenopodium fremontii*	Fremont's goosefoot
Chenopodiaceae	*Chenopodium glaucum var. salinum*	Rocky Mountain goosefoot
Chenopodiaceae	*Chenopodium cf. leptophyllum*	narrowleaf goosefoot
Chenopodiaceae	*Chenopodium pratericola*	desert goosefoot
Chenopodiaceae	*Chenopodium simplex*	mapleleaf goosefoot
Chenopodiaceae	*Corispermum americanum*	shiny bugseed
Chenopodiaceae	*Corispermum welshii*	American bugseed
Chenopodiaceae	*Cycloloma atriplicifolium*	winged pigweed
Chenopodiaceae	*Kochia scoparia*	Mexican-fireweed
Chenopodiaceae	*Krascheninnikovia lanata*	winterfat
Chenopodiaceae	*Salsola collina*	slender Russian thistle
Chenopodiaceae	*Salsola tragus*	prickly Russian thistle
Chenopodiaceae	*Suckleya suckleyana*	poison suckleya
Commelinaceae	*Tradescantia occidentalis*	prairie spiderwort
Convolvulaceae	*Convolvulus arvensis*	field bindweed
Convolvulaceae	*Evolvulus nuttallianus*	shaggy dwarf morning-glory
Convolvulaceae	*Ipomoea leptophylla*	bush morning-glory
Crassulaceae	*Sedum lanceolatum*	spearleaf stonecrop
Cupressaceae	*Juniperus horizontalis*	creeping juniper
Cupressaceae	*Juniperus scopulorum*	Rocky Mountain juniper
Cyperaceae	*Carex brevior*	shortbeak sedge
Cyperaceae	*Carex douglasii*	Douglas' sedge
Cyperaceae	*Carex duriuscula*	needleleaf sedge
Cyperaceae	*Carex emoryi*	Emory's sedge
Cyperaceae	*Carex filifolia*	threadleaf sedge
Cyperaceae	*Carex foenea*	dryspike sedge
Cyperaceae	*Carex inops ssp. heliophila*	sun sedge
Cyperaceae	*Carex lanuginosa*	woolly sedge
Cyperaceae	*Carex nebrascensis*	Nebraska sedge
Cyperaceae	*Carex praegracilis*	clustered field sedge
Cyperaceae	*Carex rossii*	Ross' sedge
Cyperaceae	*Carex utriculata*	beaked sedge

Family	Scientific Name	Common Name
Cyperaceae	*Cyperus squarrosus*	bearded flatsedge
Cyperaceae	*Eleocharis palustris*	common spikerush
Cyperaceae	*Lipocarpha drummondii*	Drummond's halfchaff sedge
Cyperaceae	*Schoenoplectus pungens var. pungens*	common threesquare
Cyperaceae	*Schoenoplectus tabernaemontani*	softstem bulrush
Cyperaceae	*Scirpus microcarpus*	panicled bulrush
Cyperaceae	*Scirpus pallidus*	cloaked bulrush
Dryopteridaceae	*Cystopteris fragilis*	brittle bladderfern
Dryopteridaceae	*Woodsia oregana ssp. cathcartiana*	Oregon cliff fern
Elaeagnaceae	*Elaeagnus angustifolia*	Russian olive
Elaeagnaceae	*Shepherdia argentea*	silver buffaloberry
Equisetaceae	*Equisetum arvense*	field horsetail
Equisetaceae	*Equisetum laevigatum*	smooth horsetail
Euphorbiaceae	*Chamaesyce fendleri*	Fendler's sandmat
Euphorbiaceae	*Chamaesyce glyptosperma*	ribseed sandmat
Euphorbiaceae	*Chamaesyce missurica*	prairie sandmat
Euphorbiaceae	*Chamaesyce nutans*	eyebane
Euphorbiaceae	*Chamaesyce serpyllifolia ssp. serpyllifolia*	thymeleaf sandmat
Euphorbiaceae	*Croton texensis*	Texas croton
Euphorbiaceae	*Euphorbia brachycera*	horned spurge
Euphorbiaceae	*Euphorbia dentata*	toothed spurge
Euphorbiaceae	*Euphorbia esula var. uralensis*	Russian leafy spurge
Euphorbiaceae	*Euphorbia exstipulata*	squareseed spurge
Euphorbiaceae	*Euphorbia hexagona*	sixangle spurge
Euphorbiaceae	*Euphorbia spathulata*	warty spurge
Fabaceae	*Amorpha fruticosa*	desert false indigo
Fabaceae	*Astragalus adsurgens var. robustior*	prairie milkvetch
Fabaceae	*Astragalus canadensis var. canadensis*	Canadian milkvetch
Fabaceae	*Astragalus ceramicus var. filifolius*	painted milkvetch
Fabaceae	*Astragalus cicer*	cicer milkvetch
Fabaceae	*Astragalus crassicarpus var. paysonii*	groundplum milkvetch
Fabaceae	*Astragalus drummondii*	Drummond's milkvetch
Fabaceae	*Astragalus flexuosus*	flexile milkvetch
Fabaceae	*Astragalus gilviflorus var. gilviflorus*	plains milkvetch
Fabaceae	*Astragalus gracilis*	slender milkvetch
Fabaceae	*Astragalus kentrophyta var. kentrophyta*	spiny milkvetch
Fabaceae	*Astragalus lotiflorus*	lotus milkvetch
Fabaceae	*Astragalus megacarpus*	great bladdery milkvetch
Fabaceae	*Astragalus missouriensis*	Missouri milkvetch
Fabaceae	*Astragalus pectinatus*	narrowleaf milkvetch
Fabaceae	*Astragalus purshii*	woollypod milkvetch

Family	Scientific Name	Common Name
Fabaceae	*Astragalus sericoleucus*	silky milkvetch
Fabaceae	*Astragalus spatulatus*	tufted milkvetch
Fabaceae	*Caragana arborescens*	Siberian peashrub
Fabaceae	*Coronilla varia*	purple crownvetch
Fabaceae	*Dalea aurea*	golden prairie clover
Fabaceae	*Dalea candida var. oligophylla*	white prairie clover
Fabaceae	*Dalea purpurea var. arenicola*	violet prairie clover
Fabaceae	*Gleditsia triacanthos*	honeylocust
Fabaceae	*Glycyrrhiza lepidota*	American licorice
Fabaceae	*Lathyrus polymorphus var. incanus*	hoary pea
Fabaceae	*Lupinus argenteus var. argenteus*	silvery lupine
Fabaceae	*Lupinus argenteus var. laxiflorus*	silvery lupine
Fabaceae	*Lupinus plattensis*	Nebraska lupine
Fabaceae	*Lupinus pusillus ssp. pusillus*	rusty lupine
Fabaceae	*Medicago lupulina*	black medick
Fabaceae	*Medicago sativa ssp. sativa*	alfalfa
Fabaceae	*Melilotus albus*	white sweetclover
Fabaceae	*Melilotus officinalis*	yellow sweetclover
Fabaceae	*Oxytropis lagopus var. atropurpurea*	haresfoot locoweed
Fabaceae	*Oxytropis lambertii*	purple locoweed
Fabaceae	*Oxytropis multiceps*	Nuttall's oxytrope
Fabaceae	*Oxytropis sericea var. sericea*	white locoweed
Fabaceae	*Pediomelum argophyllum*	silverleaf Indian breadroot
Fabaceae	*Pediomelum esculentum*	large Indian breadroot
Fabaceae	*Pediomelum hypogaeum*	subterranean Indian breadroot
Fabaceae	*Psoralidium lanceolatum*	lemon scurfpea
Fabaceae	*Psoralidium tenuiflorum*	slimflower scurfpea
Fabaceae	*Thermopsis rhombifolia var. rhombifolia*	prairie thermopsis
Fabaceae	*Trifolium fragiferum*	strawberry clover
Fabaceae	*Trifolium pratense*	red clover
Fabaceae	*Trifolium repens*	white clover
Fabaceae	*Vicia americana var. minor*	mat vetch
Fumariaceae	*Corydalis aurea var. occidentalis*	curvepod fumewort
Geraniaceae	*Erodium cicutarium*	redstem stork's bill
Grossulariaceae	*Ribes aureum var. villosum*	golden currant
Grossulariaceae	*Ribes cereum var. pedicellare*	whisky currant
Grossulariaceae	*Ribes oxyacanthoides ssp. oxyacanthoides*	Canadian gooseberry
Hydrophyllaceae	*Ellisia nyctelea*	Aunt Lucy
Hydrophyllaceae	*Phacelia hastata var. hastata*	silverleaf phacelia
Iridaceae	*Sisyrinchium angustifolium*	narrowleaf blue-eyed grass
Iridaceae	*Sisyrinchium montanum*	strict blue-eyed grass

Family	Scientific Name	Common Name
Juncaceae	*Juncus balticus var. montanus*	mountain rush
Juncaceae	*Juncus bufonius*	toad rush
Juncaceae	*Juncus compressus*	roundfruit rush
Juncaceae	*Juncus dudleyi*	Dudley's rush
Juncaceae	*Juncus interior var. interior*	inland rush
Juncaceae	*Juncus torreyi*	Torrey's rush
Juncaginaceae	*Triglochin maritima*	seaside arrowgrass
Lamiaceae	*Hedeoma drummondii*	Drummond's false pennyroyal
Lamiaceae	*Hedeoma hispida*	rough false pennyroyal
Lamiaceae	*Lycopus americanus*	American water horehound
Lamiaceae	*Lycopus asper*	rough bugleweed
Lamiaceae	*Marrubium vulgare*	horehound
Lamiaceae	*Mentha arvensis var. canadensis*	wild mint
Lamiaceae	*Monarda fistulosa var. menthifolia*	mintleaf bergamot
Lamiaceae	*Nepeta cataria*	catnip
Lamiaceae	*Salvia reflexa*	lanceleaf sage
Lamiaceae	*Scutellaria brittonii*	Britton's skullcap
Lamiaceae	*Scutellaria galericulata*	marsh skullcap
Lamiaceae	*Stachys palustris var. pilosa*	hairy hedgenettle
Lemnaceae	*Lemna minor*	common duckweed
Lemnaceae	*Lemna turionifera*	turion duckweed
Liliaceae	*Allium caeruleum*	blue globe onion
Liliaceae	*Allium textile*	textile onion
Liliaceae	*Asparagus officinalis*	garden asparagus
Liliaceae	*Calochortus nuttallii*	sego lily
Liliaceae	*Disporum trachycarpum*	roughfruit fairybells
Liliaceae	*Leucocrinum montanum*	common starlily
Liliaceae	*Maianthemum stellatum*	starry false lily of the vally
Liliaceae	*Zigadenus venenosus var. gramineus*	grassy deathcamas
Linaceae	*Linum australe*	southern flax
Linaceae	*Linum lewisii var. lewisii*	prairie flax
Linaceae	*Linum puberulum*	plains flax
Linaceae	*Linum rigidum var. rigidum*	stiffstem flax
Loasaceae	*Mentzelia albicaulis*	whitestem blazingstar
Loasaceae	*Mentzelia decapetala*	tenpetal blazingstar
Loasaceae	*Mentzelia nuda*	bractless blazingstar
Loasaceae	*Mentzelia oligosperma*	chickenthief
Malvaceae	*Malva pusilla*	low mallow
Malvaceae	*Sphaeralcea coccinea*	scarlet globemallow
Nyctaginaceae	*Abronia fragrans*	snowball sand verbena
Nyctaginaceae	*Mirabilis hirsuta*	hairy four o'clock

Family	Scientific Name	Common Name
Nyctaginaceae	*Mirabilis linearis*	narrowleaf four o'clock
Nyctaginaceae	*Mirabilis nyctaginea*	heartleaf four o'clock
Nyctaginaceae	*Tripterocalyx micranthus*	smallflower sandverbena
Oleaceae	*Fraxinus pennsylvanica*	green ash
Oleaceae	*Syringa vulgaris*	common lilac
Onagraceae	*Calylophus lavandulifolius*	lavenderleaf sundrops
Onagraceae	*Calylophus serrulatus*	yellow sundrops
Onagraceae	*Epilobium ciliatum var. ciliatum*	fringed willowherb
Onagraceae	*Oenothera albicaulis*	whitest evening-primrose
Onagraceae	*Oenothera cespitosa var. cespitosa*	tufted evening primrose
Onagraceae	*Oenothera coronopifolia*	crownleaf evening-primrose
Onagraceae	*Oenothera curtifolia*	velvetweed
Onagraceae	*Oenothera latifolia*	mountain evening-primrose
Onagraceae	*Oenothera suffrutescens*	scarlet beeblossom
Onagraceae	*Oenothera villosa var. villosa*	hairy evening primrose
Orobanchaceae	*Orobanche fasciculata*	clustered broomrape
Orobanchaceae	*Orobanche ludoviciana var. ludoviciana*	Louisiana broomrape
Papaveraceae	*Argemone polyanthemos*	crested pricklypoppy
Pinaceae	*Pinus ponderosa*	ponderosa pine
Plantaginaceae	*Plantago eriopoda*	redwool plantain
Plantaginaceae	*Plantago major*	common plantain
Plantaginaceae	*Plantago patagonica var. patagonica*	woolly plantain
Plantaginaceae	*Plantago patagonica var. spinulosa*	woolly plantain
Poaceae	*Achnatherum hymenoides*	Indian ricegrass
Poaceae	*Agropyron cristatum var. cristatum*	crested wheatgrass
Poaceae	*Agropyron cristatum var. desertorum*	desert wheatgrass
Poaceae	*Agrostis stolonifera*	creeping bentgrass
Poaceae	*Alopecurus aequalis*	shortawn foxtail
Poaceae	*Alopecurus arundinaceus*	creeping meadow foxtail
Poaceae	*Andropogon hallii*	sand bluestem
Poaceae	*Aristida purpurea var. fendleriana*	Fendler's threeawn
Poaceae	*Aristida purpurea var. longiseta*	Fendler threeawn
Poaceae	*Beckmannia syzigachne*	American sloughgrass
Poaceae	*Bouteloua curtipendula var. curtipendula*	sideoats grama
Poaceae	*Bouteloua gracilis*	blue grama
Poaceae	*Bouteloua hirsuta*	hairy grama
Poaceae	*Bromus inermis var. inermis*	smooth brome
Poaceae	*Bromus japonicus*	Japanese brome
Poaceae	*Bromus squarrosus*	corn brome
Poaceae	*Bromus tectorum*	cheatgrass
Poaceae	*Buchloe dactyloides*	buffalograss

Family	Scientific Name	Common Name
Poaceae	*Calamovilfa longifolia*	prairie sandreed
Poaceae	*Catabrosa aquatica*	water whorlgrass
Poaceae	*Cenchrus longispinus*	mat sandbur
Poaceae	*Chloris verticillata*	tumble windmill grass
Poaceae	*Dactylis glomerata*	orchardgrass
Poaceae	*Distichlis spicata*	inland saltgrass
Poaceae	*Echinochloa muricata var. microstachya*	rough barnyardgrass
Poaceae	*Elymus albicans var. albicans*	Montana wheatgrass
Poaceae	*Elymus albicans var. griffithsii*	Montana wheatgrass
Poaceae	*Elymus canadensis var. canadensis*	Canada wildrye
Poaceae	*Elymus elongatus var. ponticus*	rush wheatgrass
Poaceae	*Elymus elymoides ssp. brevifolius*	squirreltail
Poaceae	*Elymus lanceolatus var. lanceolatus*	streambank wheatgrass
Poaceae	*Elymus lanceolatus var. riparius*	thickspike wheatgrass
Poaceae	*Elymus repens var. repens*	Quackgrass
Poaceae	*Elymus smithii*	western wheatgrass
Poaceae	*Elymus spicatus*	bluebunch wheatgrass
Poaceae	*Elymus trachycaulus var. trachycaulus*	slender wheatgrass
Poaceae	*Elymus villosus*	hairy wildrye
Poaceae	*Elymus X macounii*	Macoun's barley
Poaceae	*Elymus × saundersii*	
Poaceae	*Eragrostis cilianensis*	stinkgrass
Poaceae	*Glyceria grandis*	American mannagrass
Poaceae	*Glyceria striata*	fowl mannagrass
Poaceae	*Hesperostipa comata ssp. comata*	needle and thread
Poaceae	*Hesperostipa neomexicana*	New Mexico feathergrass
Poaceae	*Hordeum jubatum*	foxtail barley
Poaceae	*Hordeum pusillum*	little barley
Poaceae	*Koeleria macrantha*	prairie Junegrass
Poaceae	*Leymus cinereus*	basin wildrye
Poaceae	*Monroa squarrosa*	false buffalograss
Poaceae	*Muhlenbergia asperifolia*	scratchgrass
Poaceae	*Muhlenbergia cuspidata*	plains muhly
Poaceae	*Muhlenbergia racemosa*	marsh muhly
Poaceae	*Nassella viridula*	green needlegrass
Poaceae	*Panicum capillare*	witchgrass
Poaceae	*Panicum virgatum*	switchgrass
Poaceae	*Phalaris arundinacea*	reed canarygrass
Poaceae	*Phleum pratense*	timothy
Poaceae	*Phragmites australis*	common reed
Poaceae	*Piptatherum micranthum*	littleseed ricegrass

Family	Scientific Name	Common Name
Poaceae	*Poa bulbosa*	bulbous bluegrass
Poaceae	*Poa compressa*	Canada bluegrass
Poaceae	*Poa cusickii var. cusickii*	Cusick's bluegrass
Poaceae	*Poa fendleriana ssp. longiligula*	muttongrass
Poaceae	*Poa interior*	inland bluegrass
Poaceae	*Poa palustris*	fowl bluegrass
Poaceae	*Poa pratensis*	Kentucky bluegrass
Poaceae	*Poa secunda ssp. juncifolia*	bluegrass, alkali bluegrass
Poaceae	*Poa secunda ssp. secunda*	Sandberg bluegrass
Poaceae	*Polypogon monspeliensis*	annual rabbitsfoot grass
Poaceae	*Puccinellia nuttalliana*	Nuttall's alkaligrass
Poaceae	*Schedonnardus paniculatus*	tumblegrass
Poaceae	*Schizachyrium scoparium ssp. scoparium*	little bluestem
Poaceae	*Secale cereale*	cereal rye
Poaceae	*Setaria pumila ssp. pumila*	yellow foxtail
Poaceae	*Setaria viridis*	green bristlegrass
Poaceae	*Spartina gracilis*	alkali cordgrass
Poaceae	*Sporobolus airoides*	alkali sacaton
Poaceae	*Sporobolus cryptandrus*	sand dropseed
Poaceae	*Triticum aestivum*	common wheat
Poaceae	*Vulpia octoflora var. hirtella*	sixweeks fescue
Poaceae	*Vulpia octoflora var. octoflora*	sixweeks fescue
Polemoniaceae	*Collomia linearis*	tiny trumpet
Polemoniaceae	*Ipomopsis spicata var. spicata*	spiked ipomopsis
Polemoniaceae	*Leptodactylon caespitosum*	mat prickly phlox
Polemoniaceae	*Microsteris gracilis var. humilior*	slender phlox
Polemoniaceae	*Phlox alyssifolia*	alyssumleaf phlox
Polemoniaceae	*Phlox andicola*	prairie phlox
Polemoniaceae	*Phlox hoodii*	spiny phlox
Polemoniaceae	*Phlox muscoides*	musk phlox
Polygonaceae	*Eriogonum alatum*	winged buckwheat
Polygonaceae	*Eriogonum annuum*	annual buckwheat
Polygonaceae	*Eriogonum brevicaule var. brevicaule*	shortstem buckwheat
Polygonaceae	*Eriogonum flavum var. flavum*	alpine golden buckwheat
Polygonaceae	*Eriogonum microthecum var. effusum*	spreading buckwheat
Polygonaceae	*Eriogonum pauciflorum var. gnaphalodes*	fewflower buckwheat
Polygonaceae	*Eriogonum × nebraskense*	Nebraska buckwheat
Polygonaceae	*Polygonum amphibium var. emersum*	longroot smartweed
Polygonaceae	*Polygonum amphibium var. stipulaceum*	water smartweed
Polygonaceae	*Polygonum aviculare*	prostrate knotweed
Polygonaceae	*Polygonum convolvulus*	black bindweed

Family	Scientific Name	Common Name
Polygonaceae	*Polygonum douglasii var. douglasii*	Douglas' knotweed
Polygonaceae	*Polygonum lapathifolium*	curlytop knotweed
Polygonaceae	*Polygonum persicaria*	spotted ladysthumb
Polygonaceae	*Polygonum ramosissimum*	bushy knotweed
Polygonaceae	*Polygonum sawatchense*	Johnston's knotweed
Polygonaceae	*Rumex crispus*	curly dock
Polygonaceae	*Rumex stenophyllus*	narrowleaf dock
Polygonaceae	*Rumex triangulivalvis*	Mexican dock
Polygonaceae	*Rumex utahensis*	toothed willow dock
Polygonaceae	*Rumex venosus*	veiny dock
Portulacaceae	*Portulaca oleracea*	little hogweed
Potamogetonaceae	*Potamogeton nodosus*	longleaf pondweed
Potamogetonaceae	*Stuckenia filiformis ssp. filiformis*	fineleaf pondweed
Potamogetonaceae	*Stuckenia pectinatus*	sago pondweed
Primulaceae	*Androsace occidentalis*	western rockjasmine
Pteridaceae	*Cheilanthes feei*	slender lipfern
Pteridaceae	*Pellaea glabella ssp. occidentalis*	western dwarf cliffbrake
Ranunculaceae	*Anemone cylindrica*	candle anemone
Ranunculaceae	*Anemone patens var. multifida*	cutleaf anemone
Ranunculaceae	*Clematis hirsutissima var. scottii*	Scott's clematis
Ranunculaceae	*Clematis ligusticifolia*	western white clematis
Ranunculaceae	*Delphinium geyeri*	Geyer's larkspur
Ranunculaceae	*Delphinium nuttallianum*	twolobe larkspur
Ranunculaceae	*Ranunculus aquatilis var. diffusus*	longbeak buttercup
Ranunculaceae	*Ranunculus cymbalaria*	alkali buttercup
Ranunculaceae	*Ranunculus macounii*	Macoun's buttercup
Ranunculaceae	*Ranunculus sceleratus var. multifidus*	cursed buttercup
Ranunculaceae	*Ranunculus testiculatus*	curveseed butterwort
Rosaceae	*Amelanchier alnifolia*	Saskatoon serviceberry
Rosaceae	*Cercocarpus montanus*	alderleaf mountain mahogany
Rosaceae	*Geum triflorum var. triflorum*	old man's whiskers
Rosaceae	*Holodiscus dumosus*	rockspirea
Rosaceae	*Malus pumila*	paradise apple
Rosaceae	*Physocarpus monogynus*	mountain ninebark
Rosaceae	*Potentilla anserina*	silverweed cinquefoil
Rosaceae	*Potentilla concinna var. concinna*	elegant cinquefoil
Rosaceae	*Potentilla hippiana var. effusa*	branched cinquefoil
Rosaceae	*Potentilla norvegica*	Norwegian cinquefoil
Rosaceae	*Potentilla paradoxa*	Paradox cinquefoil
Rosaceae	*Potentilla pensylvanica*	Pennsylvania cinquefoil
Rosaceae	*Potentilla rivalis var. millegrana*	brook cinquefoil

Family	Scientific Name	Common Name
Rosaceae	*Prunus americana*	American plum
Rosaceae	*Prunus pumila var. besseyi*	western sandcherry
Rosaceae	*Prunus virginiana var. melanocarpa*	black chokecherry
Rosaceae	*Rosa woodsii*	Woods' rose
Rubiaceae	*Galium aparine*	stickywilly
Rubiaceae	*Galium boreale*	northern bedstraw
Salicaceae	*Populus angustifolia*	narrowleaf cottonwood
Salicaceae	*Populus deltoides var. occidentalis*	plains cottonwood
Salicaceae	*Populus tremuloides*	quaking aspen
Salicaceae	*Populus X acuminata*	lanceleaf cottonwood
Salicaceae	*Salix amygdaloides*	peachleaf willow
Salicaceae	*Salix exigua*	narrowleaf willow
Salicaceae	*Salix fragilis*	crack willow
Santalaceae	*Comandra umbellata var. pallida*	pale bastard toadflax
Saxifragaceae	*Heuchera parvifolia*	littleleaf alumroot
Saxifragaceae	*Heuchera richardsonii*	Richardson's alumroot
Scrophulariaceae	*Besseya wyomingensis*	Wyoming besseya
Scrophulariaceae	*Castilleja angustifolia var. dubia*	
Scrophulariaceae	*Castilleja sessiliflora*	downy paintedcup
Scrophulariaceae	*Collinsia parviflora*	maiden blue eyed Mary
Scrophulariaceae	*Limosella aquatica*	water mudwort
Scrophulariaceae	*Mimulus glabratus var. jamesii*	James' monkeyflower
Scrophulariaceae	*Orthocarpus luteus*	yellow owl's-clover
Scrophulariaceae	*Penstemon albidus*	white penstemon
Scrophulariaceae	*Penstemon angustifolius var. angustifolius*	broadbeard beardtongue
Scrophulariaceae	*Penstemon eriantherus var. eriantherus*	fuzzytongue penstemon
Scrophulariaceae	*Penstemon glaber var. alpinus*	alpine sawsepal penstemon
Scrophulariaceae	*Verbascum thapsus*	common mullein
Scrophulariaceae	*Veronica americana*	American speedwell
Scrophulariaceae	*Veronica anagallis-aquatica*	water speedwell
Selaginellaceae	*Selaginella densa*	lesser spikemoss
Solanaceae	*Hyoscyamus niger*	black henbane
Solanaceae	*Lycium barbarum*	matrimony vine
Solanaceae	*Physalis hispida*	prairie groundcherry
Solanaceae	*Physalis longifolia*	longleaf groundcherry
Solanaceae	*Solanum americanum*	American black nightshade
Solanaceae	*Solanum rostratum*	buffalobur nightshade
Solanaceae	*Solanum triflorum*	cutleaf nightshade
Tamaricaceae	*Tamarix chinensis*	fivestamen tamarisk
Typhaceae	*Typha latifolia*	broadleaf cattail
Ulmaceae	*Ulmus americana*	American elm

Family	Scientific Name	Common Name
Ulmaceae	*Ulmus pumila*	Siberian elm
Urticaceae	*Parietaria pensylvanica*	Pennsylvania pellitory
Urticaceae	*Urtica dioica var. procera*	California nettle
Verbenaceae	*Verbena bracteata*	bigbract verbena
Verbenaceae	*Verbena stricta*	hoary verbena
Violaceae	*Viola adunca*	hookedspur violet
Violaceae	*Viola nuttallii*	Nuttall's violet
Violaceae	*Viola vallicola*	sagebrush violet
Vitaceae	*Parthenocissus vitacea*	woodbine
Vitaceae	*Vitis riparia*	riverbank grape
Zannichelliaceae	*Zannichellia palustris*	horned pondweed
Zygophyllaceae	*Tribulus terrestris*	puncturevine

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APPENDIX C: CONSTRAINT MAP

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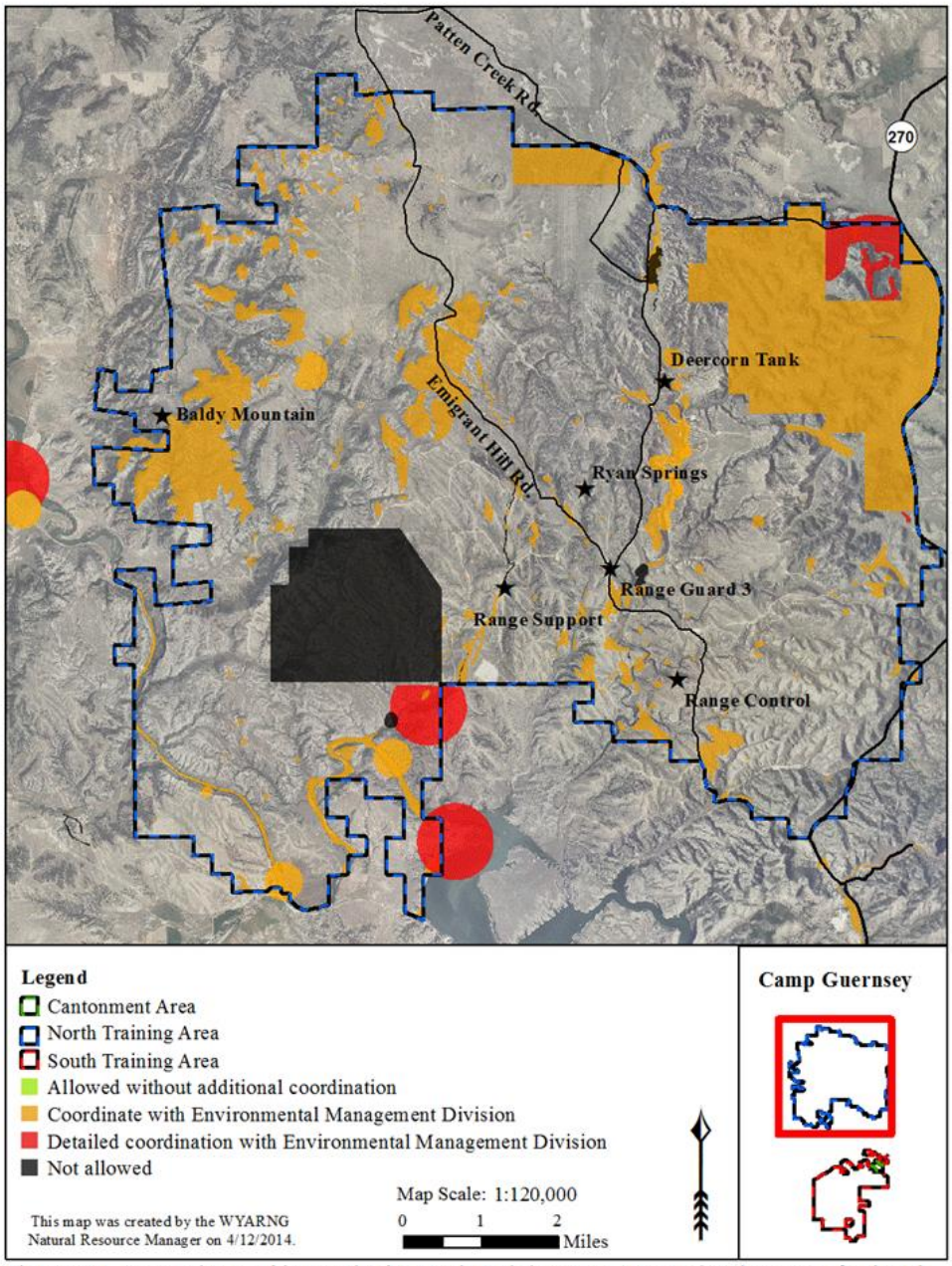

Figure C-1. Constraints on bivouac in the North Training Area. Constraints because of cultural resources, natural resources, and safety concerns (i.e. Impact Area) are shown.

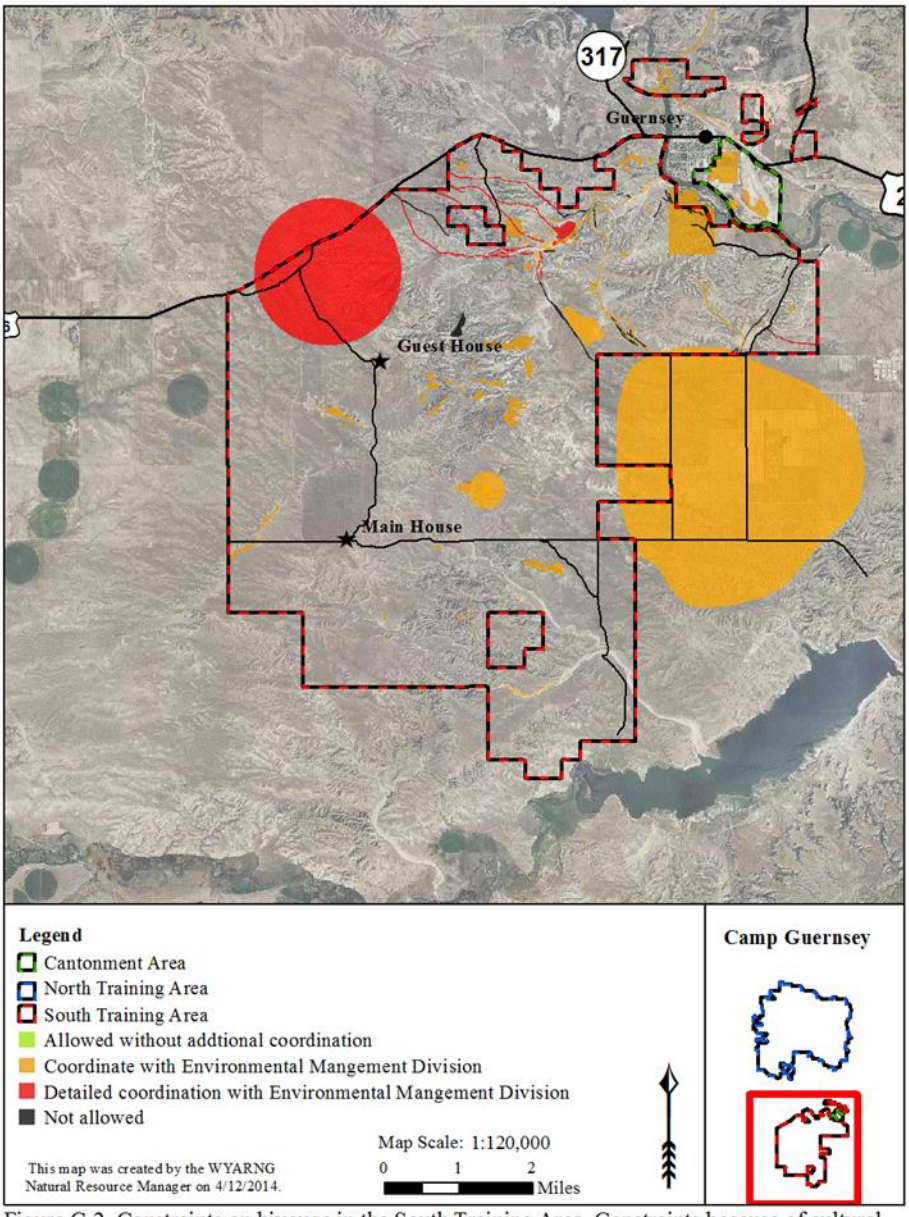

Figure C-2. Constraints on bivouac in the South Training Area. Constraints because of cultural resources, natural resources, and safety concerns (i.e. Impact Area) are shown.

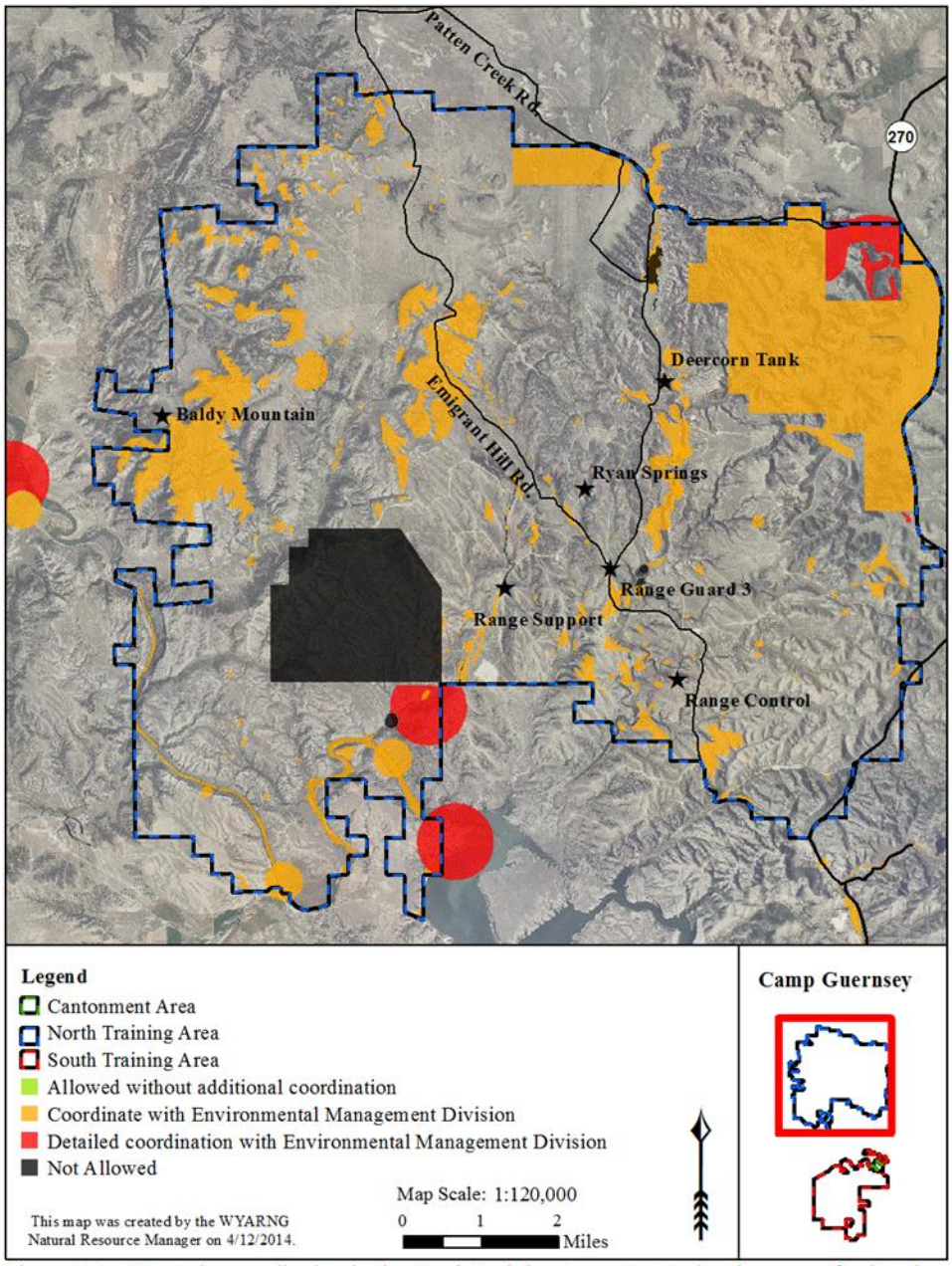

Figure C-3. Constraints on digging in the North Training Area. Constraints because of cultural resources, natural resources, and safety concerns (i.e. Impact Area) are shown.

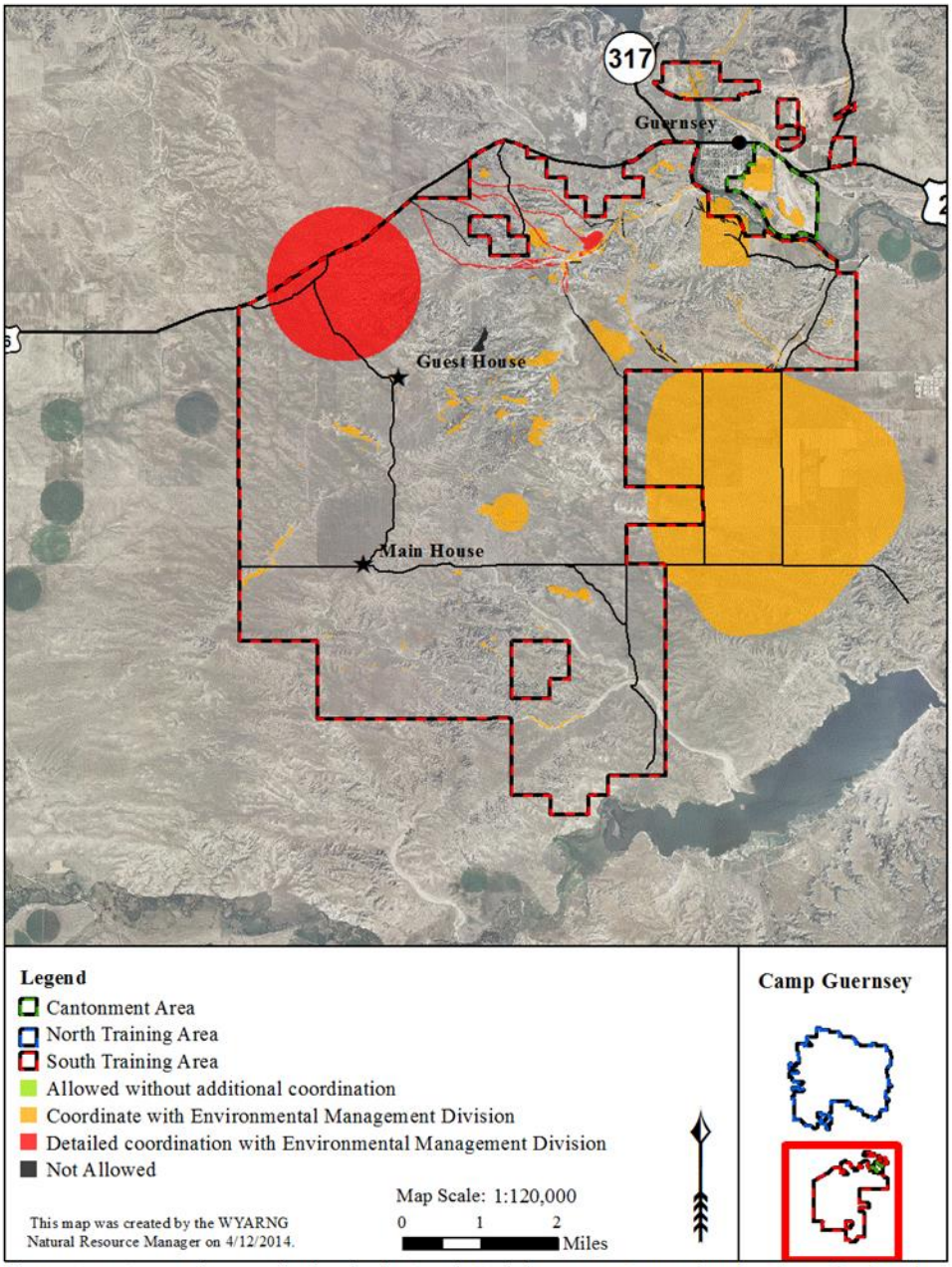

Figure C-4. Constraints on digging in the South Training Area. Constraints because of cultural resources, natural resources, and safety concerns (i.e. Impact Area) are shown.

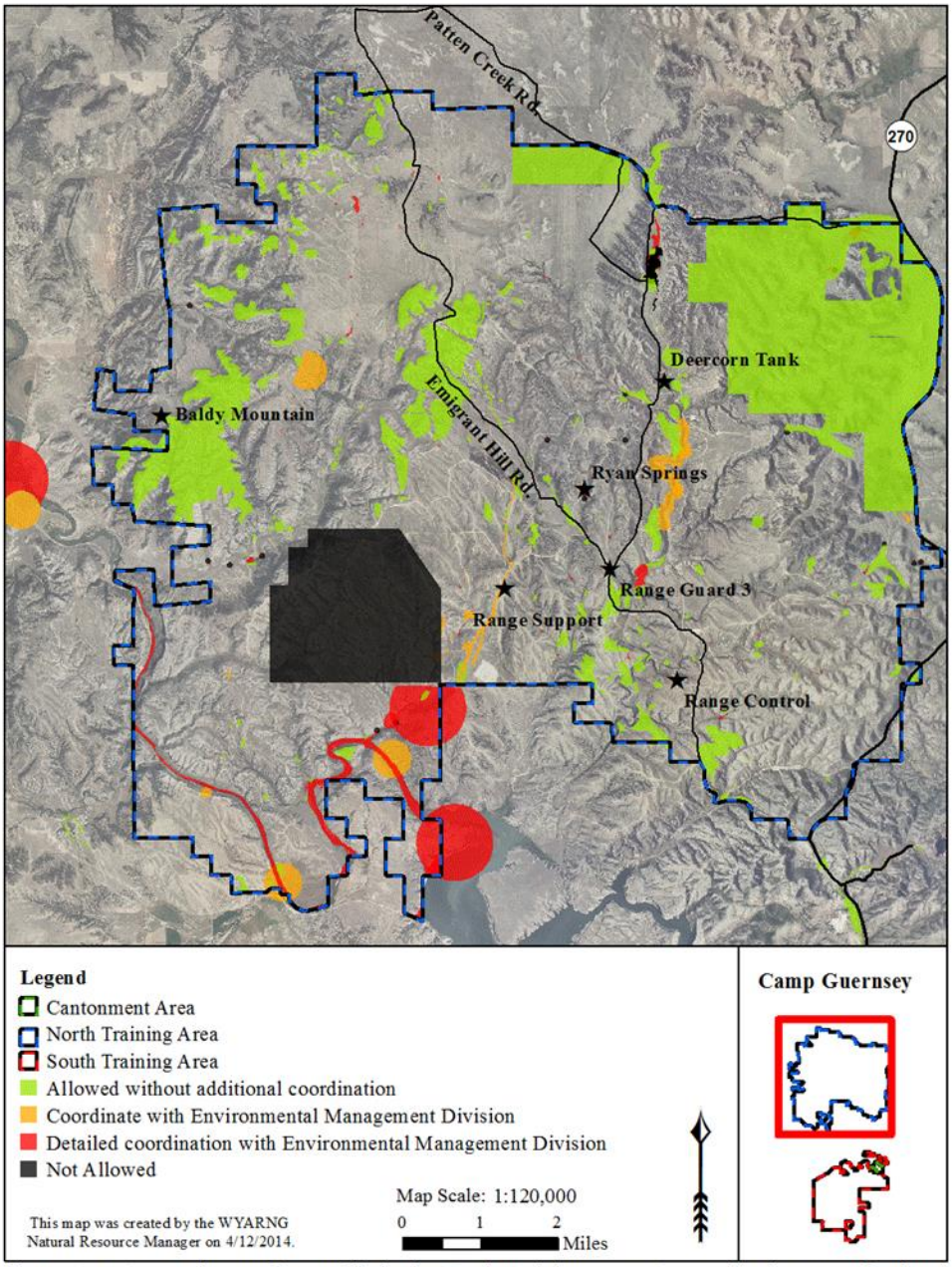

Figure C-5. Constraints on foot traffic in the North Training Area. Constraints because of cultural resources, natural resources, and safety concerns (i.e. Impact Area) are shown.

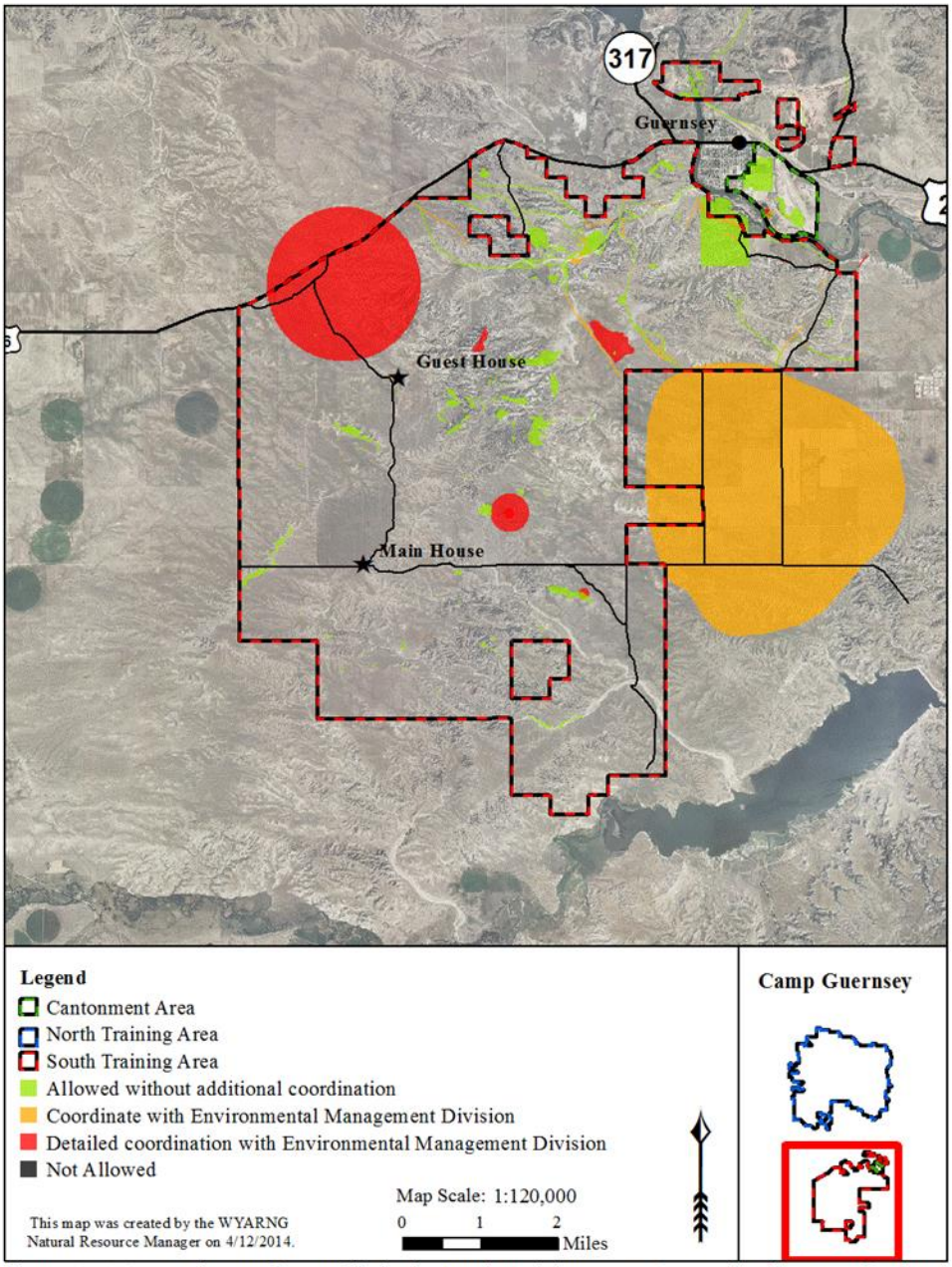

Figure C-6. Constraints on foot traffic in the South Training Area. Constraints because of cultural resources, natural resources, and safety concerns (i.e. Impact Area) are shown.

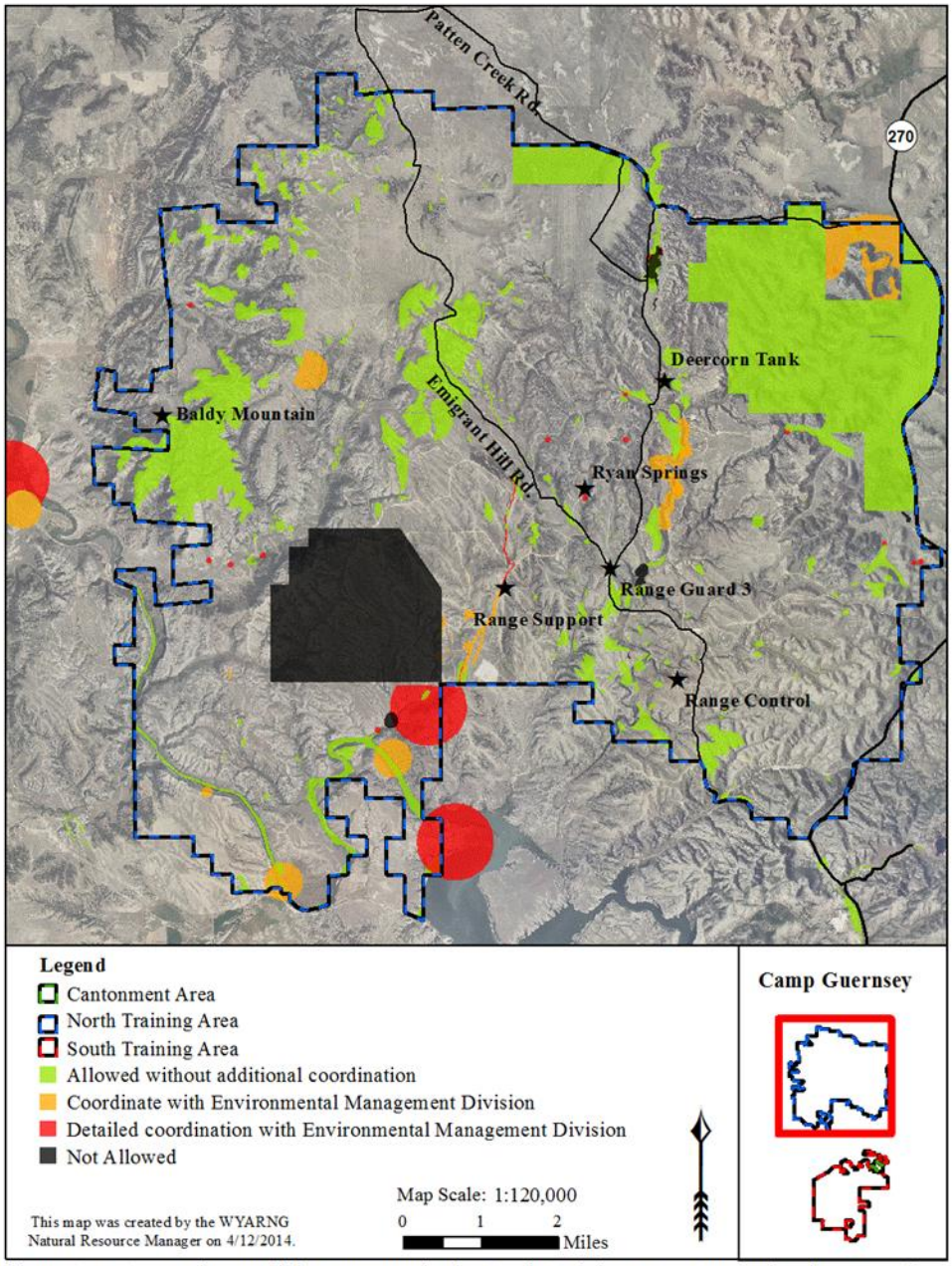

Figure C-7. Constraints on light maneuver in the North Training Area. Constraints because of cultural resources, natural resources, and safety concerns (i.e. Impact Area) are shown.

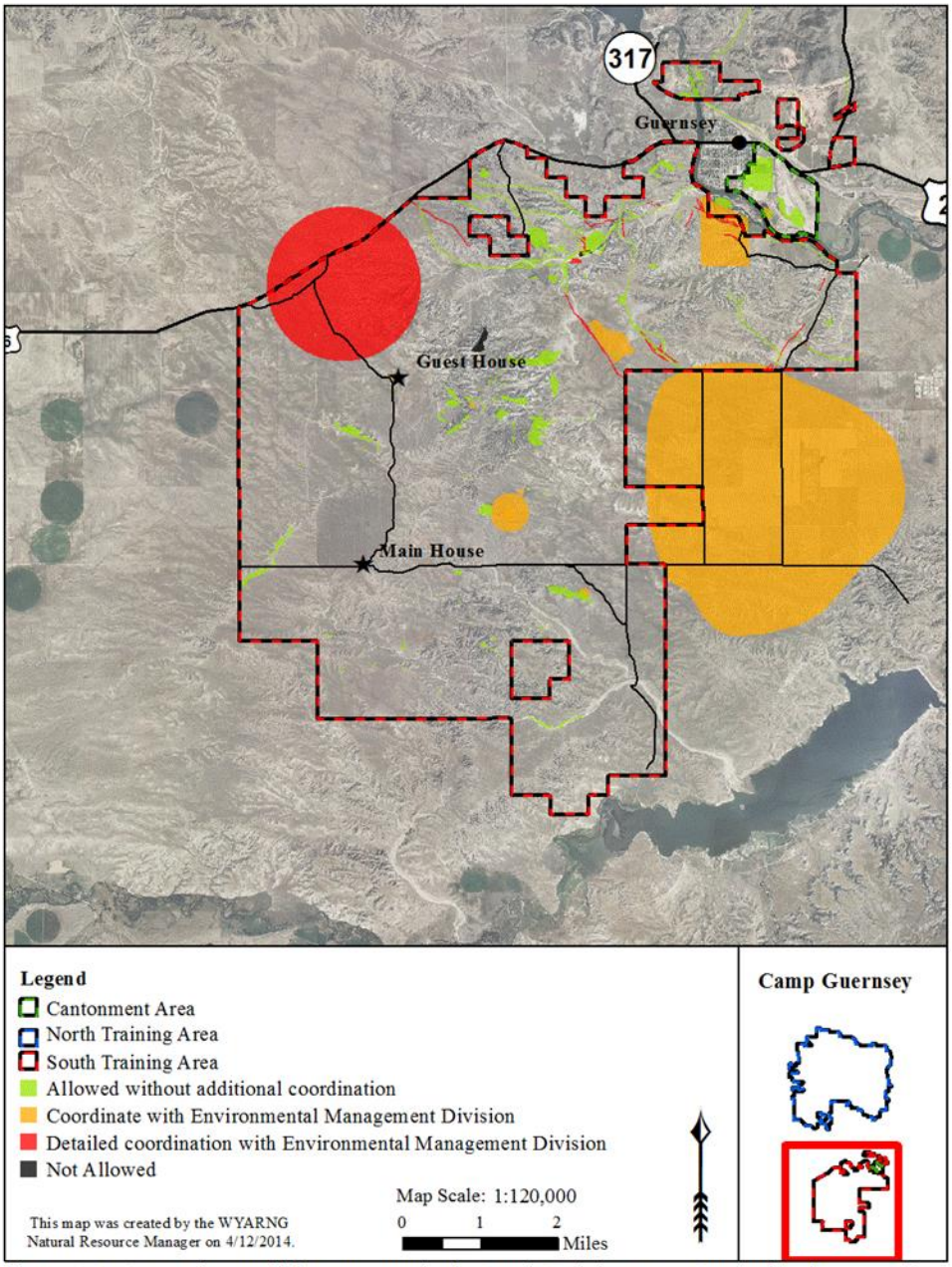

Figure C-8. Constraints on light maneuver in the South Training Area. Constraints because of cultural resources, natural resources, and safety concerns (i.e. Impact Area) are shown.

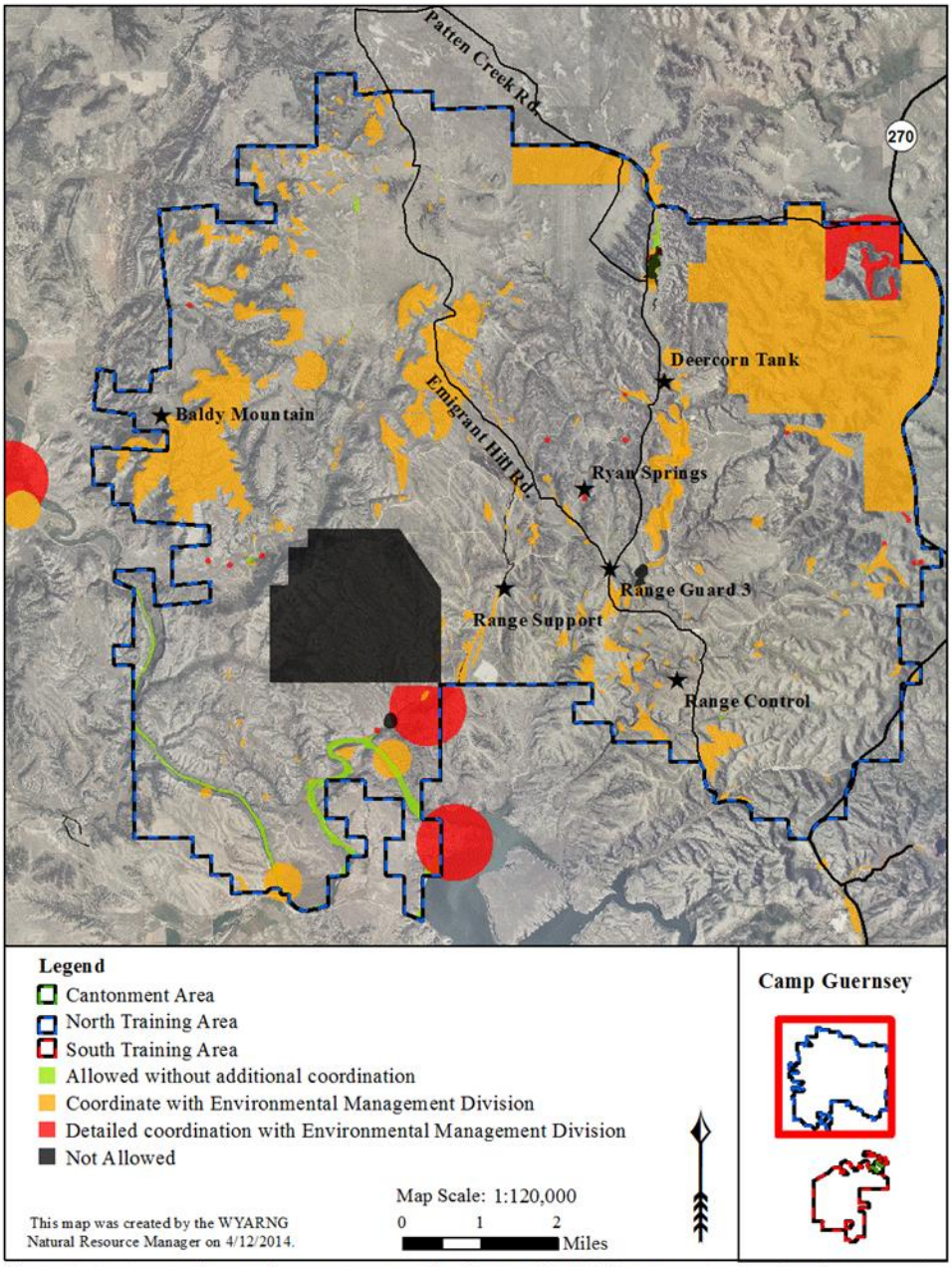

Figure C-9. Constraints on heavy maneuver in the North Training Area. Constraints because of cultural resources, natural resources, and safety concerns (i.e. Impact Area) are shown.

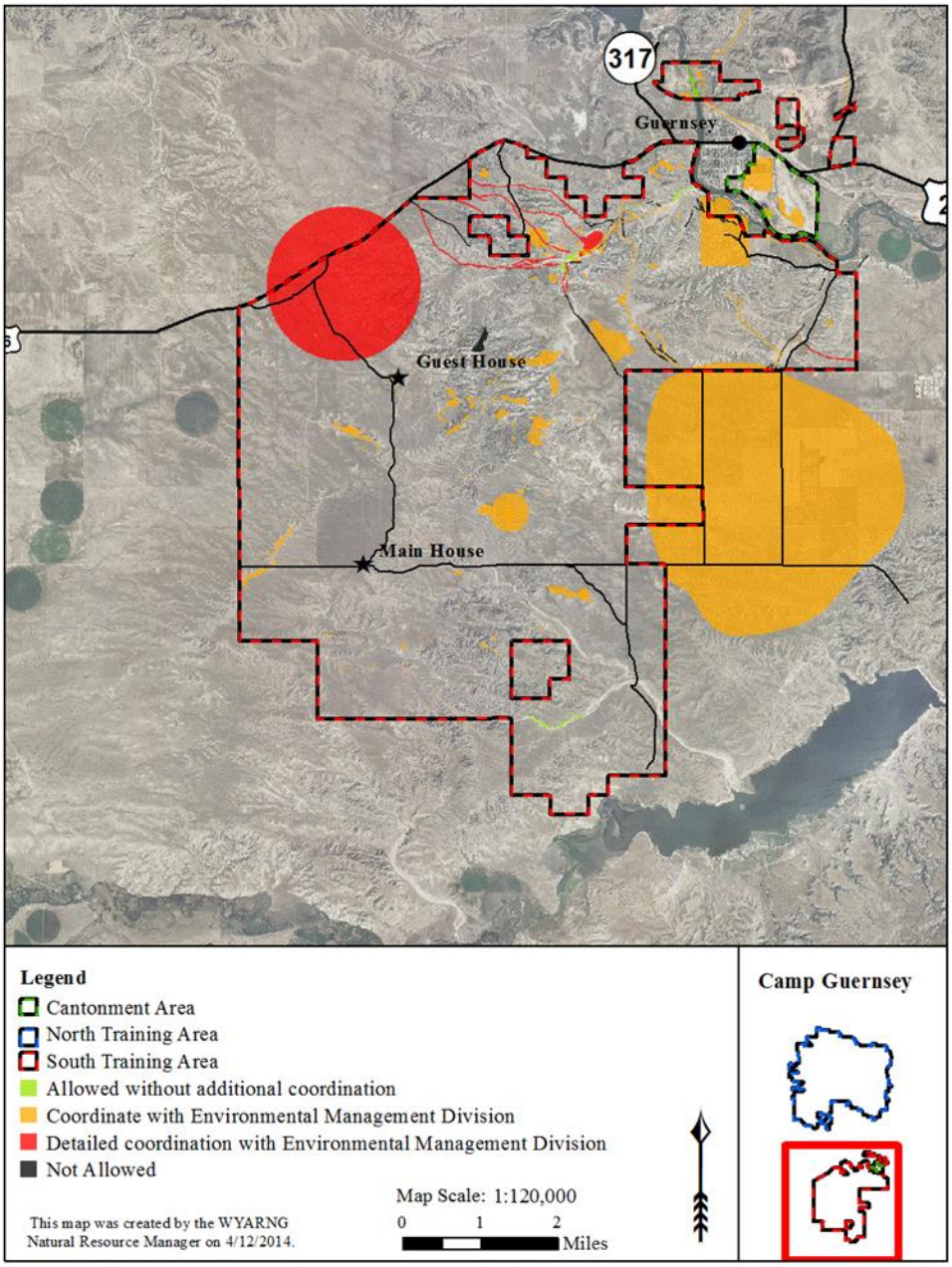

Figure C-10. Constraints on heavy maneuver in the South Training Area. Constraints because of cultural resources, natural resources, and safety concerns (i.e. Impact Area) are shown.

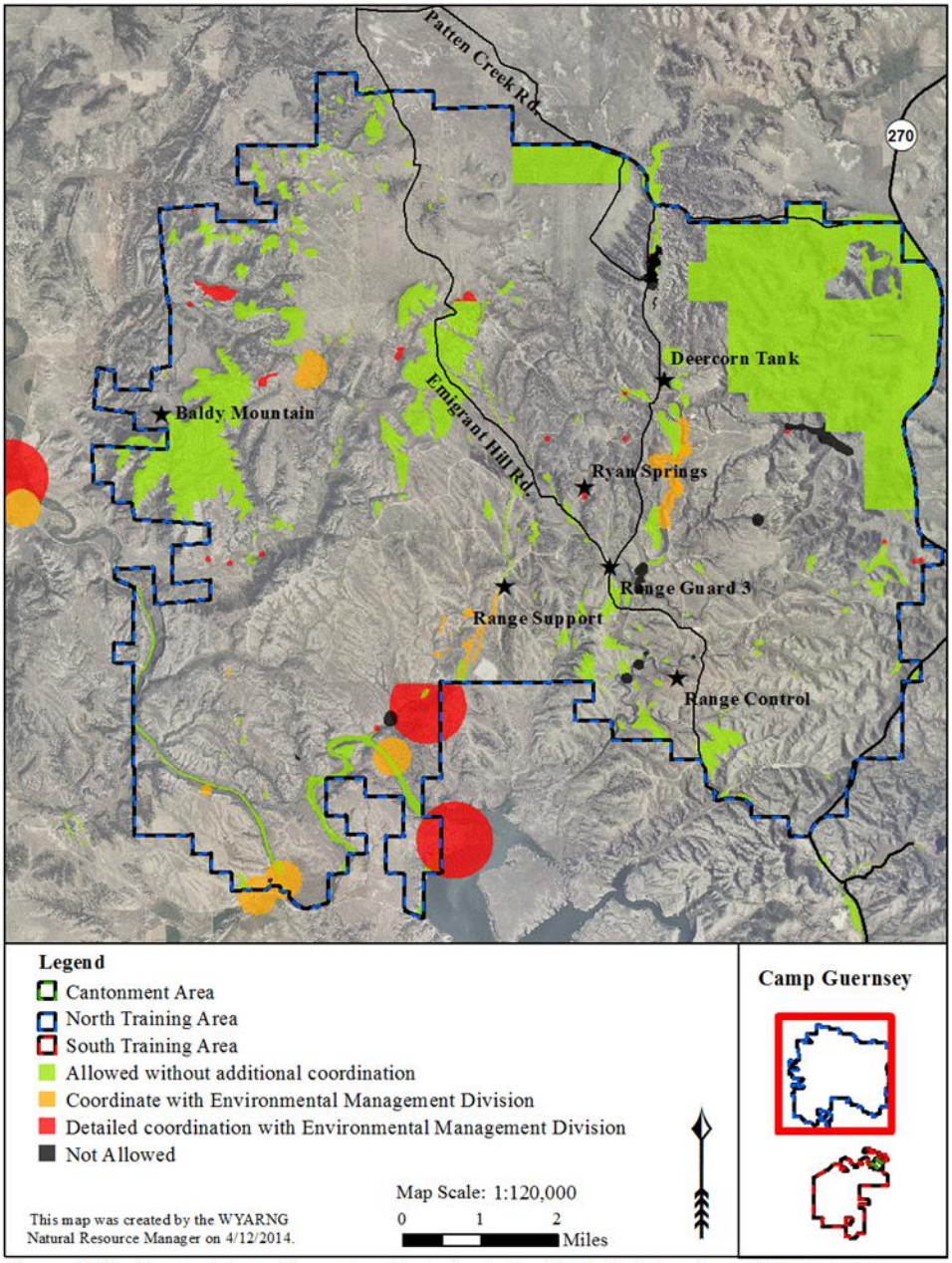

Figure C-11. Constraints on flames/pyrotechnics in the North Training Area. Constraints because of cultural resources, natural resources, and safety concerns (i.e. Impact Area) are shown.

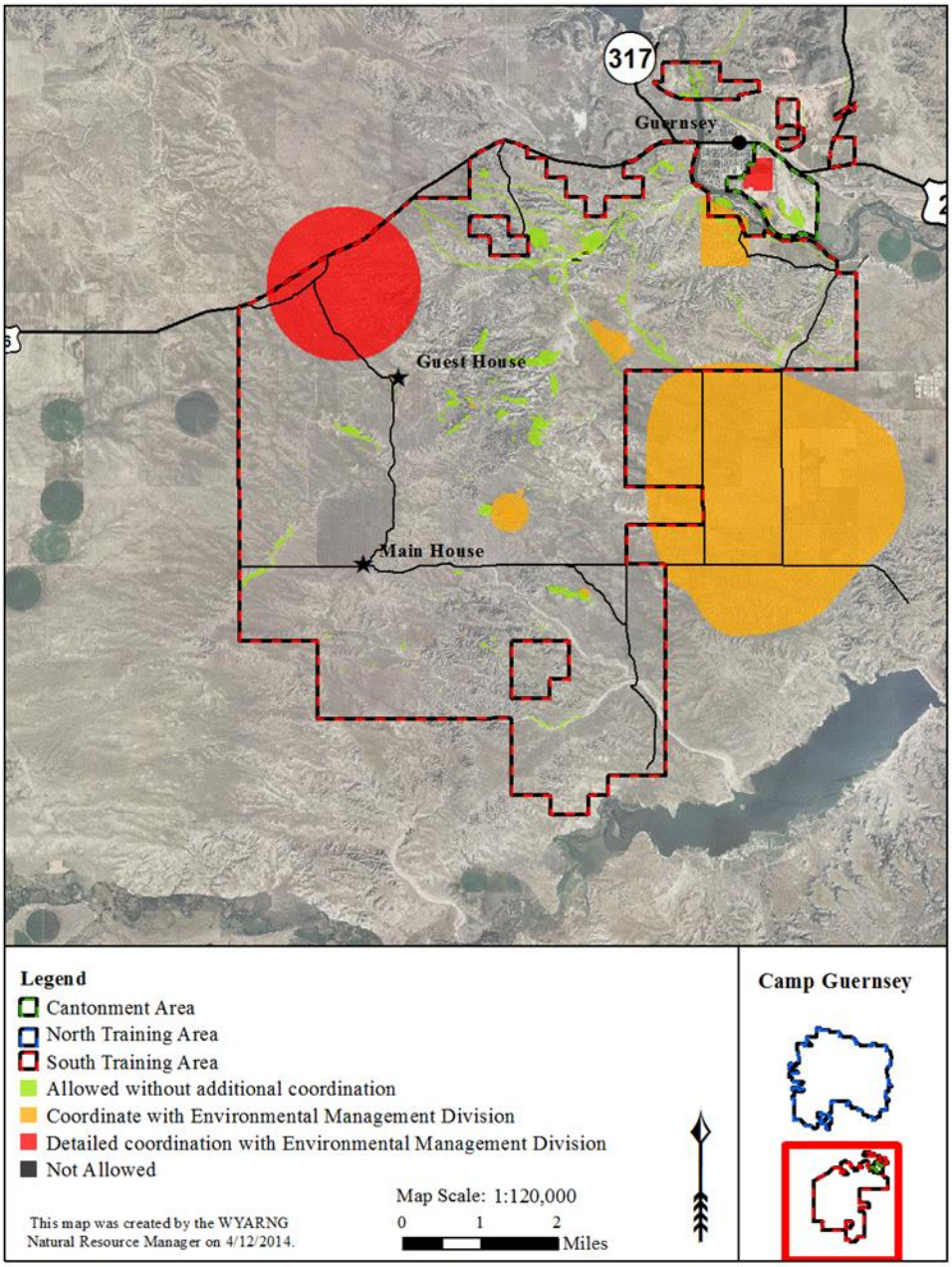

Figure C-12. Constraints on flames/pyrotechnics in the South Training Area. Constraints because of cultural resources, natural resources, and safety concerns (i.e. Impact Area) are shown.

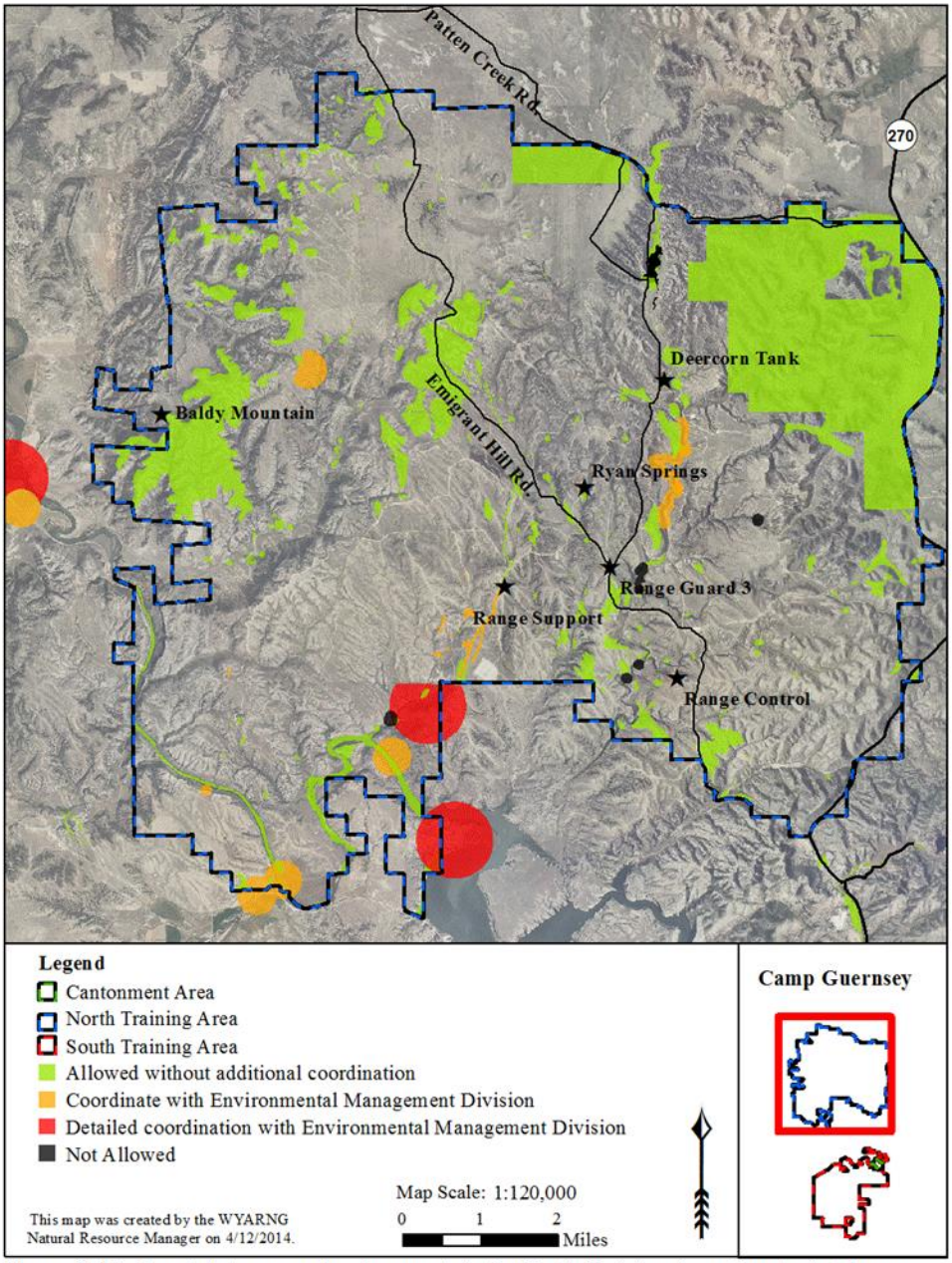

Figure C-13. Constraints on smoke obscurants in the North Training Area. Constraints because of cultural resources, natural resources, and safety concerns (i.e. Impact Area) are shown.

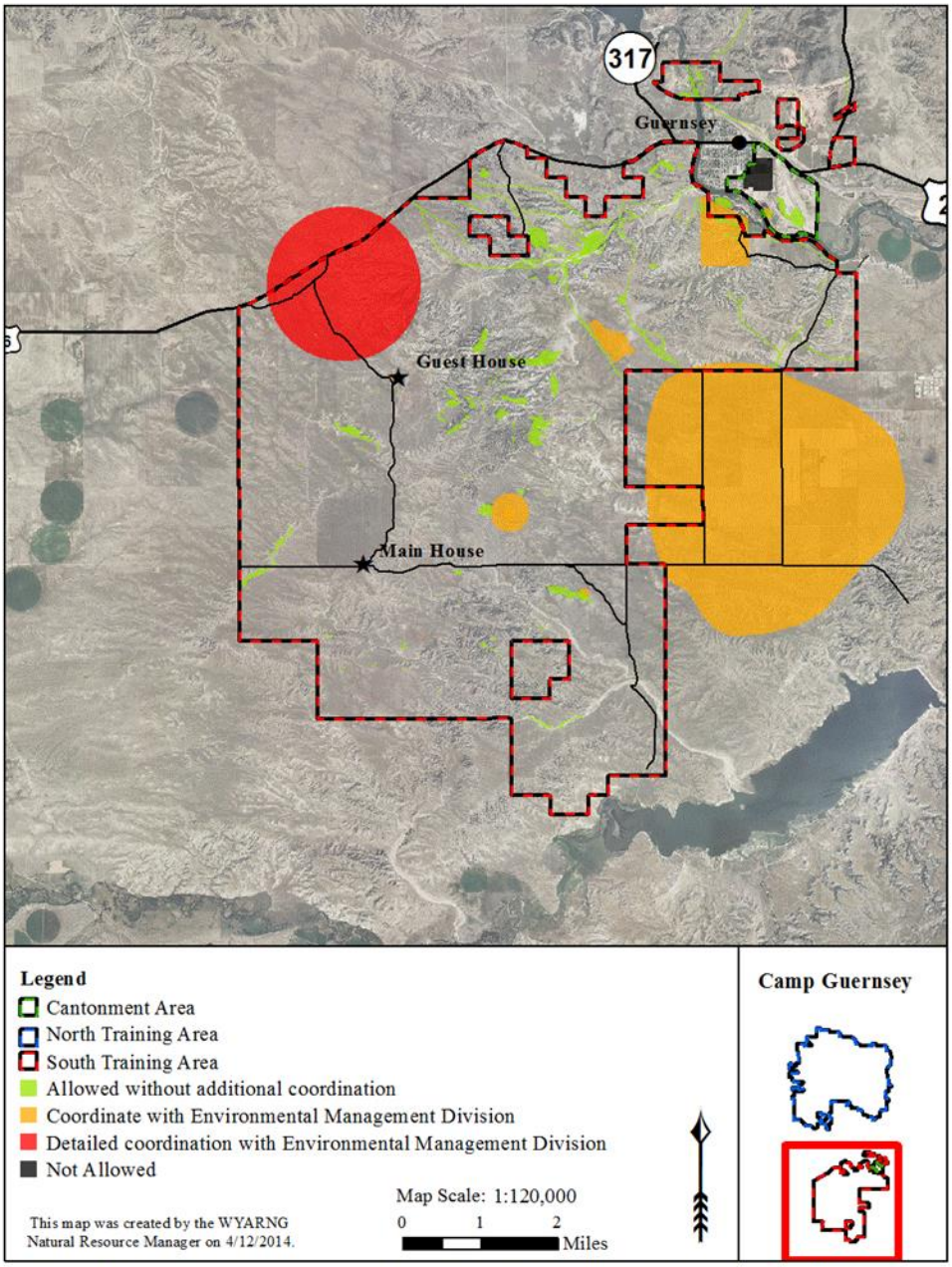

Figure C-14. Constraints on smoke obscurants in the South Training Area. Constraints because of cultural resources, natural resources, and safety concerns (i.e. Impact Area) are shown.

Appendix D: Reclamation Procedures

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Reclamation of disturbed ground

- Seeding is generally recommended to occur between March 15 - May 15 or September 1-October 15.
- If seeding does not occur during these times, the area must be prepared in a contoured and roughened manner in order to resist erosion and if deemed necessary, mulched using clean straw at the rate of 3 tons/acre.
- Seed must be certified weed free; all seed labels shall be provided to EMD.
- Areas shall be considered permanently stabilized when the site meets 50% vegetative ground cover of perennial species. Should this not be attainable then the area will be considered successful when the total ground cover (absolute) is within 5% of the total ground cover at reference site(s). Reference sites will be chosen by EMD. Success will be determined by EMD no later than 3 years after seeding using standard vegetation measuring techniques.

Example Native Seed Mix

Species	Common Name	Variety/Cultivar	Drilled PLS lbs./acre	Broadcast PLS lbs./acre
Schizachyrium scoparium	Little bluestem	Badlands	1.2	2.4
Bouteloua gracilis	Blue grama	Bad River	0.6	1.2
Calamovilfa longifolia	Prairie sandreed	Goshen	1.2	2.4
Hesperostipa comata ssp. *comata*	Needle and thread	Common	1.8	3.6
Koeleria macrantha	Prairie junegrass	Common	0.1	0.2
Elymus lanceolatus ssp. *lanceolatus*	Thickspike wheatgrass	Critana	1.8	3.6
Pascopyrum smithii	Western wheatgrass	Rosana	1.8	3.6
Sphaeralcea coccinea	Globemallow	Common	0.08	0.16
Ratibida columnifera	Prairie coneflower	Stillwater	0.06	0.12
Liatris punctata	Dotted gayfeather	Common	0.26	0.52
Vicia americana	American vetch	Antelope	2.12	4.24
Dalea candida	White prairie clover	Bismarck	0.1	0.2
Lupinus sericeus	Silky lupine		2.84	5.68
Artemisia frigida	Fringed sagewort	Northern Great Plains origin	0.02	0.04
Artemisia cana ssp. *cana*	Silver sagebrush		0.12	0.24

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APPENDIX E: PROJECT TABLE

INRMP Program Element	Responsible Party	Project Description	Planned Fiscal Year	Year Completed
Wetlands and Riparian Management	Natural Resource Manager	Identify riparian/wetland areas that are degraded due to livestock and off-road vehicle use. Prioritize riparian/wetland areas for restoration.	2016	
Wetlands and Riparian Management	Natural Resource Manager	Fence 3 reaches/springs to prevent damage by off-road vehicle and livestock use.	2016-2020	
Wetlands and Riparian Management	Natural Resource Manager	Initiate a plan to monitor recovery of riparian areas. This could be through photo points or more detailed vegetation measurements.	2016-2020	
Wetlands and Riparian Management	Natural Resource Manager	Map and record all locations of springs on Camp Guernsey	2017	
Wetlands and Riparian Management	Natural Resource Manager	Establish monitoring plan for springs	2016-2020	
Forestry Mangement	Natural Resource Manager	Approve and implement an Integrated Wildland Fire Management Plan (IWFMP).	2016	
Vegetative Management	Natural Resource Manager	Map locations of rare plants found during previous surveys of Camp Guernsey.	2017	
Vegetative Management	Natural Resource Manager	Develop goals and objectives for each vegetation community. Incorporate these goals and objectives into the INRMP with associated projects.	2019	
Vegetative Management	Natural Resource Manager	Implement permanent vegetation monitoring.	2017	
Vegetative Management	Natural Resource Manager	Map areas where juniper is encroaching into shrubland and riparian communities.	2017	
Vegetative Management	Natural Resource Manager	Remove junipers from areas where they have encroached on riparian areas.	2016-2020	

INRMP Program Element	Responsible Party	Project Description	Planned Fiscal Year	Year Completed
Vegetative Management	Natural Resource Manager	Monitor reclaimed areas to determine the success of native seedings.	2016-2020	
ITAM	ITAM	Create annual ITAM *Plan* and *Workplan*	2016-2020	
ITAM	NEPA Manager	Prepare a NEPA document analyzing the environmental effects of these federal actions.	2020	
ITAM	ITAM	Repair and maintain maneuver lands annually.	2016-2020	
ITAM	ITAM	Prioritize and execute trail maintenance activities on an annual and as needed basis (repair, semi-hardening, LWX's, hazard tree removal, etc.) on trail providing access to maneuver lands.	2016-2020	
ITAM	ITAM	Continue assessment and monitoring maneuver trails using GPS equipment to map problem areas and features. Those features that inhibit training will be prioritized for correction.	2016-2020	
ITAM	ITAM	Maintain earthen check dams for sediment containment when training is inhibited.	2016-2020	
ITAM	ITAM	Expand or maintain the movement corridor annually or as needed.	2016-2020	
Invasive Species Management	Natural Resource Manager	Eradicate non-native thistles from 41 acres on the Smith Parcel. This will require multiple pesticide applications over several years.	2016-2020	
Invasive Species Management	Natural Resource Manager	Eradicate non-native thistle at Deercorn Springs (approximately 1 acre).	2016-2020	
Invasive Species Management	Natural Resource Manager	Remove and treat the Russian olive trees along the North Platte River in the Cantonment Area.	2016-2020	

INRMP Program Element	Responsible Party	Project Description	Planned Fiscal Year	Year Completed
Invasive Species Management	Natural Resource Manager	Start a management program to treat areas where cheatgrass is dominant.	2016-2020	
Livestock Grazing	Natural Resource Manager	Complete a *Rangeland Health Assessment* for all lands at Camp Guernsey.	2016	
Livestock Grazing	Natural Resource Manager	Complete a 5-year *Integrated Livestock Grazing Management Plan* for Camp Guernsey.	2016	
Livestock Grazing	Natural Resource Manager	Prepare *Lease-Specific Annual Grazing Management Work Plans* for each lease	2016	
Livestock Grazing	Planning & Programming Manger	Issue new grazing leases based on the lease-specific *Annual Grazing Management Work Plans.*	2017	
Wildland Fire Management	Natural Resource Manager, Camp Guernsey Department of Public Works, Wildland Fire Manager	Approve and implement the *Integrated Wildland Fire Management Plan* (IWFMP).	2016	
Wildland Fire Management	Natural Resource Manager, Camp Guernsey Department of Public Works, Wildland Fire Manager	Annually update the *Integrated Wildland Fire Management Plan*.	2016-2020	
Wildland Fire Management	Camp Guernsey Department of Public Works, Wildland Fire Manager	Formalize standard operating procedures.	2016-2020	

INRMP Program Element	Responsible Party	Project Description	Planned Fiscal Year	Year Completed
Wildland Fire Management	Wildland Fire Manager, Camp Guernsey Fire Chief	Participate in the *Platte County Annual Operating Plan* or establish mutual aid agreements with individual fire departments.	2016-2020	
Wildland Fire Management	Camp Guernsey Department of Public Works, Natural Resource Manager, Wildland Fire Manager	An internal working group will meet quarterly to plan fire mitigation activities and manage progress on mitigation activities.	2016-2020	
Wildland Fire Management	Camp Guernsey Department of Public Works, Natural Resource Manager, Wildland Fire Manager	An *Annual Fire Mitigation Plan* will be written that will plan activities for the upcoming fiscal year.	2016-2020	
Wildland Fire Management	CFMO	Coordinate with Camp Guernsey Range Operations staff to use livestock grazing to help reduce fuel loads.	2016-2020	
Wildland Fire Management (Forestry Management)	Natural Resource Manager	Thin trees on approximately fifty acres in FMU C.	2015	
Wildland Fire Management	Wildland Fire Manager, CFMO, Camp Guernsey Department of Public Works	Improve access for firefighters and fuel mitigation crews in FMU C	2016	

INRMP Program Element	Responsible Party	Project Description	Planned Fiscal Year	Year Completed
Wildland Fire Management (Forestry Management)	Camp Guernsey Fire Department	Use prescribed fire to reduce fine fuels every three to five years as needed at OPS Areas.	2016-2020	
Wildland Fire Management (Forestry Management)	Natural Resources Manager	Expand the existing firewood gathering program to remove dead trees on Camp Guernsey.	2017	
Wildland Fire Management (Forestry Management)	Natural Resources Manager	Explore the possibility of timber and pole sales as a means to reduce fuel loads in forested portions of Camp Guernsey.	2017	
Wildland Fire Management	Camp Guernsey Range Operations	Annually maintain existing firebreaks and fuelbreaks.	2016-2020	
Wildland Fire Management	Camp Guernsey Range Operations	Implement North Training Area (NTA) and South Training Area (STA) firebreaks and fuelbreak projects outlined in the Camp Guernsey *Annual Fire Mitigation Plan*.	2016-2020	
Wildland Fire Management	Camp Guernsey Fire Department, Wildland Fire Manager	Provide courses of instruction developed by the NWCG for each position in the wildfire ICS at Camp Guernsey or, if impractical to hold course instruction at Camp Guernsey for some positions, send personnel to training off site.	2016-2020	
Wildland Fire Management	Camp Guernsey Fire Department, Wildland Fire Manager	Establish and maintain a centralized cache of firefighting equipment as funding allows.	2019	
Wildland Fire Management	Camp Guernsey Fire Department	Annually inventory and inspect equipment to ensure readiness for fire suppression.	2016-2020	

INRMP Program Element	Responsible Party	Project Description	Planned Fiscal Year	Year Completed
Wildland Fire Management	CFMO for state employees	Equip firefighting personnel with proper PPE that meet or exceed National Fire Protection Association 1977 Standard on Protective Clothing and Equipment for Firefighters. Funding for PPE is dependent on the status of the firefighting personnel.	2016-2020	
Wildland Fire Management	Camp Guernsey Fire Department, Wildland Fire Manager	Annually review standard operating procedures for safety considerations.	2016-2020	
Wildland Fire Management (Vegetation Management)	Natural Resource Manager	Implement a monitoring program to document the effects of the prescribed burn program on ecosystem properties and fire behavior during wildfire pending the availability of funds and personnel.	2017	
Wildland Fire Management (Vegetation Management)	Natural Resource Manager	Implement a monitoring program to assess non-native weed species invasion pending the availability of funds and personnel.	2017	
Wildland Fire Management (Vegetation Management)	Natural Resource Manager, Camp Guernsey Fire Department, Wildland Fire Manager	Enter habitats at Camp Guernsey into a prescribed burn rotation that is appropriate for the current vegetation, while considering habitat diversity and desired vegetation community.	2017	
Floodplain Mangement	Natural Resource Manager	Map flood hazard areas at Camp Guernsey.	2019	
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	Train Environmental staff to survey for Ute ladies'-tresses and Preble's meadow jumping mouse.	2015	

INRMP Program Element	Responsible Party	Project Description	Planned Fiscal Year	Year Completed
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	Identify "potential habitat" for Ute ladies'-tresses and Preble's meadow jumping mouse on Camp Guernsey.	2016	
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	Conduct a field inventory to determine if the potential habitat is "suitable habitat" using USFWS descriptions.	2016	
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	Conduct field surveys for Ute ladies'-tresses and Preble's meadow jumping mouse in suitable habitat using USFWS survey procedures every five years.	2016-2020	
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	Continually update the list of species and critical habitat that may be present on Camp Guernsey.	2016-2020	
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	Make an effects determination for all project-specific federal actions.	2016-2020	
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	If our determination is that the action "may affect" a listed species or critical habitat, conduct informal consultation with the USFWS to reach a "not likely to adversely affect" determination.	2016-2020	
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	If our determination is that the proposed action is "likely to adversely affect" a listed species, conduct formal consultation with the USFWS.	2016-2020	

INRMP Program Element	Responsible Party	Project Description	Planned Fiscal Year	Year Completed
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	Map prairie dog colonies every five years.	2017	
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	Determine whether prairie dog colonies are active annually.	2016-2020	
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	Record use of prairie dog colonies by other species annually; especially use by Burrowing Owl, Golden Eagle, Mountain Plover, and Ferruginous Hawk.	2016-2020	
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	Monitor the two previously identified Bald Eagle roosts	2015	
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	Map potential Mountain Plover habitat	2015	
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	Survey for Mountain Plover following USFWS protocols	2016	
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	Conduct annual or biennial hibernaculum surveys of Bat's Balcony.	2016-2020	

INRMP Program Element	Responsible Party	Project Description	Planned Fiscal Year	Year Completed
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	Perform annual roost exit counts at the Townsend's big eared bat colony at Bat's Balcony.	2016-2020	
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	Monitor bat use across Camp Guernsey.	2016-2020	
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	Annually monitor bat roosts for signs of white nose syndrome	2016-2020	
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	Monitor temperature and humidity at bat roosts.	2016-2020	
T&E, Critical Habitat, and Other Special Status Species	Natural Resource Manager	Search for unidentified bat roosts	2018	
Migratory Bird Management	Natural Resource Manager	Determine occupancy rates for different avian species on Camp Guernsey.	2017	
Migratory Bird Management	Natural Resource Manager	Develop an avian monitoring plan.	2016	
Migratory Bird Management	Natural Resource Manager	Create a map that illustrates habitats that are likely to be occupied by USFWS Birds of Conservation Concern, Partners in Flight Priority Species, and Wyoming Species of Greatest Conservation Need. This map will then be used in the planning process.	2017	

INRMP Program Element	Responsible Party	Project Description	Planned Fiscal Year	Year Completed
Migratory Bird Management	Natural Resource Manager	Survey for new raptor nests annually with priority given to areas used for military training and future construction projects.	2016-2020	
Migratory Bird Management	Natural Resource Manager	Monitor known raptor nests for activity, including production, annually.	2016-2020	
Migratory Bird Management	Natural Resource Manager	Create bird checklist to distribute to interested personnel and troops.	2019	
Wildlife Management	Natural Resource Manager	Use the vegetation communities map to create a map that delineates potential habitats for species on Camp Guernsey.	2017	
Wildlife Management	Natural Resource Manager	Use camera traps to determine the status of swift fox on the installation.	2018	
Wildlife Management	Natural Resource Manager	Conduct an annual amphibian monitoring program using breeding survey call protocols from PARC.	2016 - 2020	
Wildlife Management	Natural Resource Manager	Review fence specifications to ensure that they are wildlife friendly.	2016-2020	
Wildlife Management	Natural Resource Manager	Map all fences on Camp Guernsey.	2016	
Wildlife Management	Natural Resource Manager	Remove all unneeded fences from Camp Guernsey with the priority to remove woven wire sheep fence.	2017	
Wildlife Management	Natural Resource Manager	Install wildlife escape ramps on all stock tanks.	2016	
Wildlife Management	Natural Resource Manager	Conduct annual aerial surveys of elk, mule deer, and pronghorn. If an annual aerial survey is not possible, conduct ground surveys will be conducted.	2016-2020	
Wildlife Management	Natural Resource Manager	Collect annual data on harvested elk, mule deer, and pronghorn using check stations and hunter surveys.	2016-2020	
Wildlife Management	Natural Resource Manager	Collect data on elk migration in cooperation with WGFD using GPS radio collars.	2017-2018	

INRMP Program Element	Responsible Party	Project Description	Planned Fiscal Year	Year Completed
Wildlife Management	Natural Resource Manager	Develop a *Wildlife Habitat Improvement Plan* that outlines and prioritizes projects.	2019	
Pest Management	Natural Resource Manager	Update the *Integrated Pest Management Plan* by September 30 each year.	2016-2020	
Pest Management	Natural Resource Manager	Update all pest management records by September 30 each year.	2016-2020	
Soil Management	Natural Resource Manager	Comply with WDEQ requirements for WYPDES permits for construction sites.	2016-2020	
Soil Management	Natural Resource Manager	Revegetate disturbed sites in accordance with procedures in Appendix D.	2016-2020	
Wildlife Aircraft Strike Hazard	Natural Resource Manager & Airfield Manager	Review Bird Aircraft Strike Hazard Plan annually.	2016-2020	
Wildlife Aircraft Strike Hazard	Natural Resource Manager & Airfield Manager	If necessary, acquire a special permit from WGFD to lethally remove deer from the airfield	2016-2020	
Outdoor Recreation	Natural Resource Manager	Continue to meet with Wyoming Game and Fish Department annually to coordinate the Hunter Management Program at Camp Guernsey.	2016-2020	
Outdoor Recreation	Natural Resource Manager	Conduct quarterly Sportsman Program Meetings.	2016-2020	
Outdoor Recreation	Camp Manager	Release 500 chucker's for recreational bird hunting. Three hundred chucker's were released in the fall of 2014. If this release is successful, an additional 200 chucker's will be released.	2015	
GIS Management	Natural Resource Manager	Download Natural Wetlands Inventory and Natural Hydrography data every 5 years to fulfill the Planning Level Survey (PLS) requirement to correspond with the 5 year INRMP review for operation and effect.	2019	

INRMP Program Element	Responsible Party	Project Description	Planned Fiscal Year	Year Completed
GIS Management	Natural Resource Manager	Create a single spatial data layer that will contain all fauna observations across Camp Guernsey.	2017	
GIS Management	Natural Resource Manager	Create a single spatial data layer that will contain all flora observations of invasive species and rare plants.	2017	
Private and public leases, right-of-ways (ROWs), and easements	EMD	Environmental Management Division will be part of the WYARNG team that reviews and approves all new leases, right-of-ways (ROWs), and easements crossing WY Military Department lands.	2016-2020	
Training	Natural Resource Manager	Train the Pest Management Coordinator and the Pest Management Quality Assurance Evaluators.	2016	
Training	Natural Resource Manager	Provide the Natural Resource Manager, Cultural Resource Manager, and Environmental Program Manager training so they may receive their red cards to be on hand to provide resource protection guidance during wildland fires. Train other Environmental Staff as deemed necessary.	2015	
Training	Natural Resource Manager	Coordinate with USFWS, local BLM office, and the WGFD to obtain training to the Natural Resource Manager and Natural Resource Specialist to survey for Ute ladies'-tresses and Preble's meadow jumping mouse	2015	
Training	Natural Resource Manager	Train Natural Resource Staff in wetland delineation.	2016	
Training	Natural Resource Manager	Train Camp Guernsey EMD staff and the Natural Resource Manager so they may become certified through WGFD to conduct Aquatic Invasive Species checks on watercraft and other equipment.	2016-2020	
Training	Natural Resource Manager	Annually attend the *DoD Natural Resources Annual Training Workshops* as practical.	2016-2020	

INRMP Program Element	Responsible Party	Project Description	Planned Fiscal Year	Year Completed
Training	Natural Resource Manager	Annually attend the *Wyoming Chapter Wildlife Society Meeting* as practical.	2016-2020	

APPENDIX F: ANNUAL COORDINATION AND REVIEW

(Future annual documentation will be inserted in this appendix)

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APPENDIX G: ENVIRONMENTAL ASSESSMENT

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APPENDIX H: FINDING OF NO SIGNIFICANT IMPACT (FNSI)

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Camp Guernsey
555 S Wyoming Ave
Guernsey, WY 82214

Inquiry Number: 5400576.3
August 21, 2018

Certified Sanborn® Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

08/21/18

Site Name:	Client Name:
Camp Guernsey	AECOM
555 S Wyoming Ave	12120 Shamrock Plaza
Guernsey, WY 82214	Omaha, NE 68154
EDR Inquiry # 5400576.3	Contact: Brittany Kirchmann

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by AECOM were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # 2E7E-4F80-BFBF

PO # NA

Project Camp Guernsey

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results

Certification #: 2E7E-4F80-BFBF

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

The Sanborn Library LLC Since 1866™

Limited Permission To Make Copies

AECOM (the client) is permitted to make up to FIVE photocopies of this Sanborn Map transmittal and each fire insurance map accompanying this report solely for the limited use of its customer. No one other than the client is authorized to make copies. Upon request made directly to an EDR Account Executive, the client may be permitted to make a limited number of additional photocopies. This permission is conditioned upon compliance by the client, its customer and their agents with EDR's copyright policy; a copy of which is available upon request.

Camp Guernsey

555 S Wyoming Ave

Guernsey, WY 82214

Inquiry Number: 5400576.5

August 22, 2018

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

08/22/18

Site Name:

Camp Guernsey
555 S Wyoming Ave
Guernsey, WY 82214
EDR Inquiry # 5400576.5

Client Name:

AECOM
12120 Shamrock Plaza
Omaha, NE 68154
Contact: Brittany Kirchmann

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	*Scale*	*Details*	*Source*
2017	1"=1000'	Flight Year: 2017	USDA/NAIP
2012	1"=1000'	Flight Year: 2012	USDA/NAIP
2009	1"=1000'	Flight Year: 2009	USDA/NAIP
2006	1"=1000'	Flight Year: 2006	USDA/NAIP
2003	1"=1000'	Flight Date: May 30, 2003	USGS
1994	1"=1000'	Acquisition Date: June 23, 1994	USGS/DOQQ
1980	1"=1000'	Flight Date: September 29, 1980	USGS
1979	1"=1000'	Flight Date: September 14, 1979	USGS
1954	1"=1000'	Flight Date: August 23, 1954	USGS
1948	1"=1000'	Flight Date: September 11, 1948	USGS

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.


INQUIRY #: 5400576.5
YEAR: 2017
= 1000'
N
EDR

INQUIRY #: 5400576.5

YEAR: 2012

= 1000'

N

EDR


INQUIRY #: 5400576.5
YEAR: 2009
= 1000'
N
EDR


INQUIRY #: 5400576.5
YEAR: 2006
= 1000'
N
EDR

INQUIRY #: 5400576.5

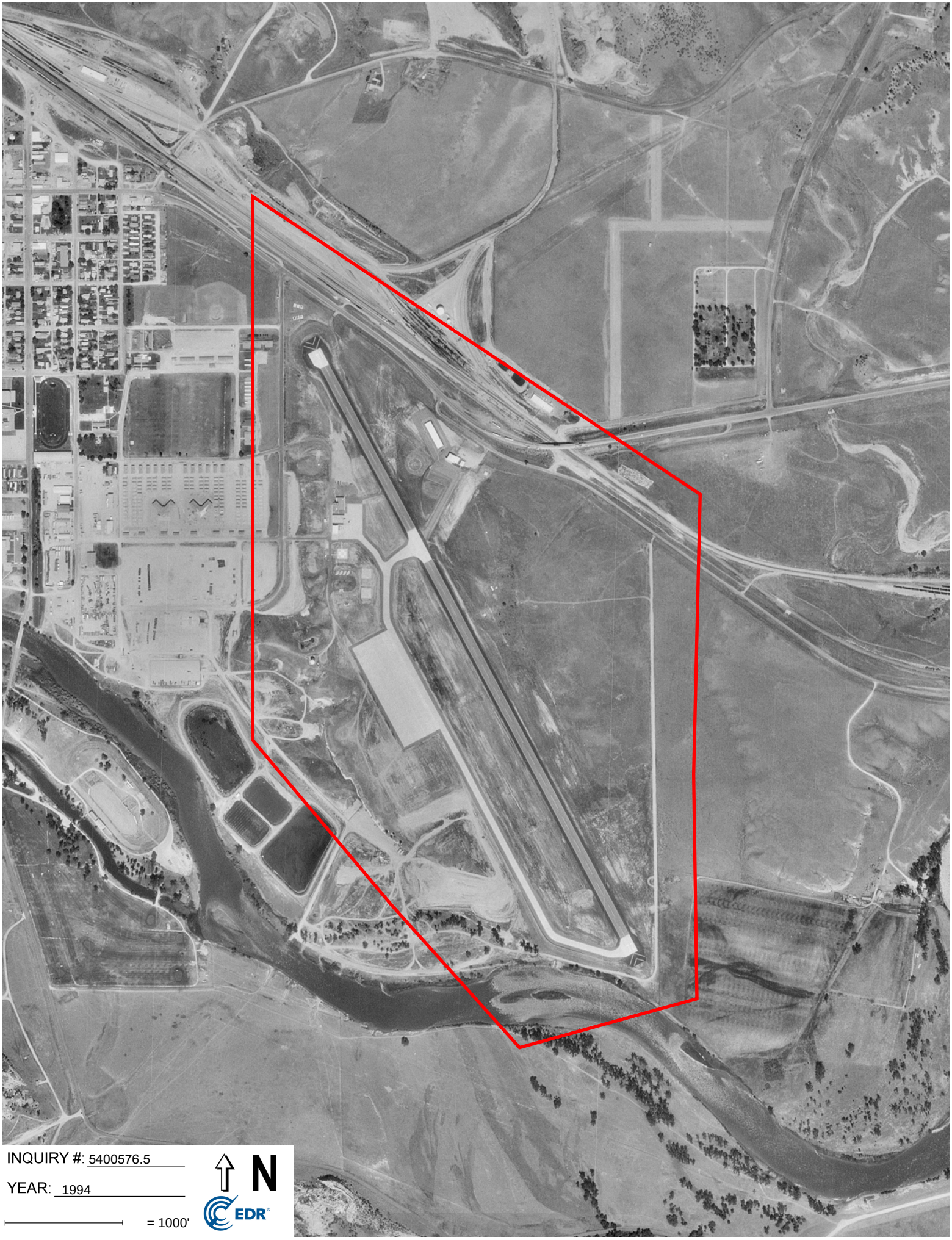
YEAR: 2003

= 1000'

N

EDR

Subject boundary not shown because it exceeds image extent or image is not georeferenced.


INQUIRY #: 5400576.5
YEAR: 1994
= 1000'
N
EDR

INQUIRY #: 5400576.5

YEAR: 1980

= 1000'

N

EDR

Subject boundary not shown because it exceeds image extent or image is not georeferenced.

INQUIRY #: 5400576.5

YEAR: 1979

= 1000'

N

EDR

Subject boundary not shown because it exceeds image extent or image is not georeferenced.

INQUIRY #: 5400576.5

YEAR: 1954

= 1000'

N

EDR

Subject boundary not shown because it exceeds image extent or image is not georeferenced.

INQUIRY #: 5400576.5

YEAR: 1948

= 1000'

N

EDR

Subject boundary not shown because it exceeds image extent or image is not georeferenced.

Appendix B
Preliminary Assessment Documentation

Appendix B.1
Interview Record

PA Interview Questionnaire – Fire Station

Facility: Camp Guernsey
Interviewer: [redacted]
Date/Time: 9 May 2018 / 1130 CDT

Interviewee Name & Title: [redacted], Fire Chief; [redacted], Airfield Manager; [redacted], Camp Gernsey Environmental, CPT [redacted], WYARNG Environmental **Phone Number:** See attached **Email:** See attached	Can your name/role be used in the PA Report? **Y** or N Can you recommend anyone we can interview? Y or **N**

1. Roles or activities with the Facility/years working at the Facility.

[redacted] has been at the facility the longest -- 10 years and has no recollection of AFFF discharge during that time.

2. What can you tell us about the history of AFFF at the Facility? Was it used for any of the following activities, circle all that apply and indicate years of active use, if known? Identify these locations on a facility map.

   Maintenance (e.g., ramp washing)
   Fire Training Areas
   Firefighting (Active Fire)
   Crash
   Fire Suppression Systems (Hangers/Dining Facilities)
   Fire Protection at Fueling Stations
   Non-Technical/Recreational/ Pest Management

3. Are any current buildings constructed with AFFF dispensing systems or fire suppression systems? What are the AFFF/suppression system test requirements? What is the frequency of testing at the AFFF/suppression systems?

No

4. Are fire suppression systems currently charged with AFFF or have they been retrofitted for use of high expansion foam?

No

5. How is AFFF procured? Do you have an inventory/procurement system that tracks use?

None recently procured

6. What type of AFFF has been/is being used (3%, 6%, Mil Spec Mil-F-24385, High Expansion)? Manufacturer (3M, Dupont, Ansul, National Foam, Angus, Chemguard, Buckeye, Fire Service Plus)?

6%; manufacturer unknown

7. Is AFFF formulated on base? If so, where is the solution mixed, contained, transferred, etc.?

No

PA Interview Questionnaire – Fire Station

Facility: Camp Guernsey
Interviewer: [redacted]
Date/Time: 9 May 2018 / 1130 CDT

8. Where is the AFFF stored? How is it stored (tanks, 55-gallon drums, 5-gallon buckets)? What size are the storage tanks? Is the AFFF stored as a mixed solution (3% or 6%) or concentrated material?

8 55-gallon drums
4 Airport Rescue Firefighter (ARF) vehicles
- 1 with 160 gallon tank
- 3 with 380 gallon tanks

9. How is the AFFF transferred to emergency response vehicles, suppression systems, flightline extinguishers? Is/was there a specified area on the facility where vehicles are filled with AFFF and does this area have secondary containment in case of spills? How and where are vehicles storing AFFF cleaned/decontaminated?

None has been recently transferred
Unknown when systems were tested with foam (>5 years). Current test procedures require AFFF sprayed into drum to test concentration percentage. Systems tested with water.

10. Provide a list of vehicles that carried AFFF, now and in the past, and where are/were they located?

4 Airport Rescue Firefighter (ARF) vehicles stored at the airfield.
- 1 with 160 gallon tank
- 3 with 380 gallon tanks

11. Any vehicles have a history of leaking AFFF? Do you/did you test the vehicles spray patterns to make sure equipment is working properly? How often are/were these spray tests performed and can you provide the locations of these tests, now and in the past?

No

12. How many FTAs are/were on this facility and where are they? Locate on a map. How many FTAs are active and inactive? For inactive FTAs, when was the last time that fire training using AFFF was conducted at them?

One; the airfield

13. What types of fuels/flammables were used at the FTAs?

N/A

14. What was the frequency of AFFF use at each location? When a release of AFFF occurs during a fire training exercise, now and in the past, how is/was the AFFF cleaned and disposed of? Were retention ponds built to store discharged AFFF? Was the AFFF trickled to the sanitary sewer or left in the pond to infiltrate?

N/A

PA Interview Questionnaire – Fire Station

Facility: Camp Guernsey
Interviewer: [redacted]
Date/Time: 9 May 2018 / 1130 CDT

15. Are there mutual aid/use agreements between county, city, local fire department? Please list, even if informal. If formalized, may we have a copy of the agreement? Can you recall specific times when city, county, state personnel came on-post for training? If so, please state which state/county agency, military entity? Do you have any records, including photographs to share with us? N/A
16. Did individual units come on-post with their own safety personnel, did they also bring their own AFFF? Was training with AFFF part of these exercises? How were emergencies handled under these circumstances? N/A
17. Did military routinely or occasionally fire train off-post? List units that you can recall used/trained at various areas. N/A
18. Are there specific emergency response incident reports (i.e., aircraft or vehicle crash sites and fires)? If so, may we please copy these reports? Who (entity) was the responder? N/A
19. Do you have records of fuel spill logs? Was it common practice to wash away fuel spills with AFFF? Is/was AFFF used as a precaution in response to fuel releases or emergency runway landings to prevent fires? N/A
20. Was AFFF used for forest fires or fire management on-post/off-post? If so, please describe what happened and who was involved? No
21. Can you provide any other locations where AFFF has been stored, released, or used (i.e. hangars, buildings, fire stations, firefighting equipment testing and maintenance areas, emergency response sites, storm water/surface water, waste water treatment plants, and AFFF ponds)? Warehouse next to the airfield operations building
22. Are you aware of any other creative uses of AFFF? If so, how was AFFF used? What entities were involved? No
23. How is off-spec AFFF disposed (used for training, turned in, or given to a local Fire Station)? If applicable, do you know the name of the vendor that removes off-spec AFFF? Do you have copies of the manifest or B/L? None recently disposed

PA Interview Questionnaire – Fire Station

Facility: Camp Guernsey
Interviewer: [redacted]
Date/Time: 9 May 2018 / 1130 CDT

24. Do you recommend anyone else we can interview? If so, do you have contact information for them?

No

December 16, 2016

Camp Guernsey has one area that is suspect release and it is located in the cantonment area at the joint use airport. An interview with [redacted] previous Fire Chief for Camp Guernsey determined that the fire department trained with foam every two years on the airfield. They only did this every two years because the foam would expire every two years. They did this approximately 5 times and then ceased the operation. When I arrived in 2004 they were no long doing this, most of this was done in the 1990s. The airport is label and highlighted on the GIS data that was sent to your office. We are not aware of any other releases in the state of Wyoming by the military department or other.

Appendix B.2
Visual Site Inspection Checklists

Visual Site Inspection Checklist

Names(s) of people performing VSI: [redacted]

Recorded by: [redacted]

ARNG Contact: [redacted]

Date and Time: 9 May 2018 / 1130 CDT

Method of visit (walking, driving, adjacent): Walking & Driving

Source/Release Information

Site Name / Area Name / Unique ID: Camp Guernsey

Site / Area Acreage: UNK

Historic Site Use (Brief Description): ARNG Airfield

Current Site Use (Brief Description): ARNG Airfield

Physical barriers or access restrictions: Active DoD facility

1. Was PFAS used (or spilled) at the site/area? **Y**

1a. If yes, document how PFAS was used and usage time (e.g., fire fighting training 2001 to 2014):

Firefighting training every two years in the 1990s

2. Has usage been documented? **N**

2a. If yes, keep a record (place electronic files on a disk):

3. What types of businesses are located near the site? **Industrial / Residential**

3a. Indicate what businesses are located near the site

Industrial operations and residences across the Platte River

4. Is this site located at an airport/flightline? **Y**

4a. If yes, provide a description of the airport/flightline tenants:

Guernsey Regional Airport shares the runway

Visual Survey Inspection Log

Other Significant Site Features:

1. Does the facility have a fire suppression system? **N**

1a. If yes, indicate which type of AFFF has been used:

1b. If yes, describe maintenance schedule/leaks:

1c. If yes, how often is the AFFF replaced:

1d. If yes, does the facility have floor drains and where do they lead? Can we obtain an as built drawing?

Transport / Pathway Information

Migration Potential:

1. Does site/area drainage flow off installation? **Y**

1a. If so, note observation and location:

Drainage has the potential to reach the Platte River

2. Is there channelized flow within the site/area? **N**

2a. If so, please note observation and location:

3. Are monitoring or drinking water wells located near the site? **Y**

3a. If so, please note the location:

See 26 Sep 2017 PFOS and PFOA Sampling and Analysis Report

4. Are surface water intakes located near the site? **N**

4a. If so, please note the location:

5. Can wind dispersion information be obtained? **N**

5a. If so, please note and observe the location.

6. Does an adjacent non-ARNG PFAS source exist? **N**

6a. If so, please note the source and location.

6b. Will off-site reconnaissance be conducted? **Y / N**

Visual Survey Inspection Log

Significant Topographical Features:

1. Has the infrastructure changed at the site/area? **N**

1a. If so, please describe change (ex. Structures no longer exist):

2. Is the site/area vegetated? **N**

2a. If not vegetated, briefly describe the site/area composition:

3. Does the site or area exhibit evidence of erosion? **N**

3a. If yes, describe the location and extent of the erosion:

4. Does the site/area exhibit any areas of ponding or standing water? **N**

4a. If yes, describe the location and extent of the ponding:

Receptor Information

1. Is access to the site restricted? **Y**

1a. If so, please note to what extent:

Active DoD facility

2. Who can access the site? **Site Workers / Construction Workers**

2a. Circle all that apply, note any not covered above:

3. Are residential areas located near the site? **Y**

3a. If so, please note the location/distance:

Across the Platte River

4. Are any schools/day care centers located near the site? **N**

4a. If so, please note the location/distance/type:

5. Are any wetlands located near the site? **N**

5a. If so, please note the location/distance/type:

Visual Survey Inspection Log

Additional Notes

Photographic Log

Photo ID/Name	Date & Location	Photograph Description

Appendix B.3
Conceptual Site Model Information

Preliminary Assessment – Conceptual Site Model Information

Site Name: Camp Guernsey

Why has this location been identified as a site?

Oral history given 16 December 2016 indicating AFFF was used in the 1990s by airfield personnel for training

Are there any other activities nearby that could also impact this location?

No

Training Events

Have any training events with AFFF occurred at this site? Yes

If so, how often? Every two years

How much material was used? Is it documented? Unknown

Identify Potential Pathways: Do we have enough information to fully understand over land surface water flow, groundwater flow, and geological formations on and around the facility? Any direct pathways to larger water bodies?

Surface Water:

Surface water flow direction? Southwest

Average rainfall? 13.8”

Any flooding during rainy season? Yes

Direct or indirect pathway to ditches? No

Direct or indirect pathway to larger bodies of water? Yes

Does surface water pond any place on site? No

Any impoundment areas or retention ponds? No

Any NPDES location points near the site? No

How does surface water drain on and around the flight line? Unknown

Preliminary Assessment – Conceptual Site Model Information

Groundwater:

Groundwater flow direction? Southwest

Depth to groundwater?

Uses (agricultural, drinking water, irrigation)? Drinking water

Any groundwater treatment systems? No

Any groundwater monitoring well locations near the site? Yes, installed by Town of Guernsey to monitor sewer lagoon

Is groundwater used for drinking water? Yes

Are there drinking water supply wells on installation? Yes

Do they serve off-post populations? No

Are there off-post drinking water wells downgradient? Yes

Waste Water Treatment Plant:

Has the installation ever had a WWTP, past or present? No, Town Guernsey's WWTP has always been utilized

If so, do we understand the process and which water is/was treated at the plant?

Do we understand the fate of sludge waste?

Is surface water from potential contaminated sites treated?

Equipment Rinse Water

1. Is firefighting equipment washed? Where does the rinse water go? Yes; drainage to OWS

2. Are nozzles tested? How often are nozzles tested? Where are nozzles tested? Are nozzles cleaned after use? Where does the rinse water flow after cleaning nozzles? Yes; runoff to OWS

3. Other?

Preliminary Assessment – Conceptual Site Model Information

Identify Potential Receptors:

Site Worker Yes

Construction Worker Yes

Recreational User Yes (Platte River off installation)

Residential Yes; other side of Platte River

Child included in residential

Ecological yes

Note what is located near by the site (e.g. daycare, schools, hospitals, churches, agricultural, livestock)?
Platte River

Documentation

Ask for Engineering drawings (if applicable).

Has there been a reconstruction or changes to the drainage system? When did that occur?

Appendix C
Photographic Log

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Guernsey	Guernsey, Wyoming

Photograph No. 1

Description:

AFFF stored in airfield warehouse

Photograph No. 2

Description:

Airfield drains are tied to oil water separator

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Guernsey	Guernsey, Wyoming

Photograph No. 3

Description:

Airfield oil water separator

Photograph No. 4

Description:

Looking southwest. Length of the airfield.

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Guernsey	Guernsey, Wyoming

Photograph No. 5

Description:

Airfield. Looking west.

Photograph No. 6

Description:

Airfield. Looking southeast.

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Guernsey	Guernsey, Wyoming

Photograph No. 7

Description:

Historical airfield photo

Photograph No. 8

Description:

Historical airfield photo (southern portion ending at the Platte River)

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Guernsey	Guernsey, Wyoming

Photograph No. 9

Description:

Titan L firefighting vehicle (poly 380 gallon foam tank)

Photograph No. 10

Description:

Titan L AFFF storage location

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Guernsey	Guernsey, Wyoming

Photograph No. 11

Description:

P-19 firefighting vehicle
(160 gallon poly foam tank)

Photograph No. 12

Description:

P-19 AFFF storage tank