

**SUPPLEMENTAL
ENVIRONMENTAL ASSESSMENT**

**INTEGRATED NATURAL RESOURCES
MANAGEMENT PLAN**

**U.S. ARMY GARRISON
FORT GORDON, GEORGIA**

August 2016

**Prepared for:
U.S. Army Garrison, Fort Gordon
Fort Gordon, Georgia
Directorate of Public Works
Environmental Division**



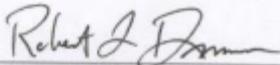
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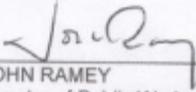


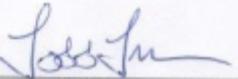
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

**Integrated Natural Resources Management Plan
U.S. Army Garrison
Fort Gordon, Georgia**

August 2016

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SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT
Integrated Natural Resources Management Plan
U.S. Army Garrison
Fort Gordon, Georgia

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Acronyms and Abbreviations

AAFES	Army Air Force Exchange Service
AIA	Artillery Impact Area
AIT	Advanced Individual Training
AR	Army Regulation
AUD	Augusta Utilities Department
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CSS	Central Security Service
Dbh	diameter at breast height
DDEAMC	Dwight D. Eisenhower Army Medical Center
DOD	Department of Defense
DPW	Directorate of Public Works
EA	Environmental Assessment
ED	Environmental Division
EESMP	Endangered Species Management Plan
EIS	Environmental Impact Statement
EO	Executive Order
ESMC	Endangered Species Management Component
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FPPA	Farmland Protection Policy Act
Ft	Feet
Ft ² /ac	square feet per acre
GADNR	Georgia Department of Natural Resources
GAEPD	Georgia Environmental Protection Division
GASHPO	Georgia State Historic Preservation Office
GC	Garrison Commander
GHG	Greenhouse Gas
FNSI	Finding of No Significant Impact
FY	Fiscal Year
HMU	Habitat Management Unit
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IPG	Installation Population Goal
IWFMP	Integrated Wildland Fire Management Plan
JLUS	Joint Land Use Study
MGD	million gallons per day
MS4	Municipal Separate Storm Sewer System
NCO	Non-Commissioned Officer
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act

NPDES	National Pollutant Discharge Elimination System
NRFL	Non-Reimbursable forestland
NRHP	National Register of Historic Places
NSA	National Security Agency
PA	Programmatic Agreement
PL	Public Law
POW	Prisoner-of-War
PX	Post Exchange
RCW	Red-Cockaded Woodpecker
RFL	Reimbursable forestland
RPPB	Real Property Planning Board
RTG	Road to Growth
SAIA	Small Arms Impact Area
SAR	Species at Risk
SEA	Supplemental Environmental Assessment
SESCC	Soil Erosion and Sediment Control Component
SOP	Standard Operating Procedures
Stems/acre	pine stems per acre
SWPPP	Stormwater Pollution Prevention Plan
TA	Training Area
U.S.	United States
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
VEC	Valued Environmental Components
WWTP	Wastewater Treatment Plant

1.0 Purpose, Need and Scope

1.1 Background

Fort Gordon encompasses approximately 55,590 acres in east-central Georgia. Most of the Installation and the entire cantonment area lie within Richmond County, with portions of some training areas in Jefferson, Columbia, and McDuffie counties (Figure 1). Fort Gordon is located approximately 145 miles east of Atlanta, Georgia and approximately 115 miles northwest of Savannah, Georgia. Augusta, Georgia is the nearest urban center and is located approximately 9 miles northeast of the Installation. Fort Gordon is bounded on the north by U.S. Highway 78/State Highway 10 (Gordon Highway), on the west by U.S. Highway 221, and on the south by U.S Highway 1. Interstate 20 (I-20), located 2 miles north of the Installation, and Interstate 520 (Bobby Jones Expressway), located 2 miles east of Gate One, provide access to the Installation. There are no public roads or highways on the Installation. Approximately 50,000 acres (90 percent) of Fort Gordon are used for training missions. The Installation is subdivided into 49 training areas, two restricted impact areas (small arms and artillery), and two cantonment areas (main and industrial) (Figure 2). Impact areas occupy approximately 13,000 acres and on-post maneuver and training areas occupy approximately 37,000 acres (Fort Gordon 2014a). The remaining 5,590 acres are cantonment areas that include military housing, administrative offices, community facilities, medical facilities, industrial facilities, maintenance facilities, supply/storage facilities, lakes and ponds, recreational areas, and forested areas (Fort Gordon 2014a).

The U.S. Army Garrison at Fort Gordon operates the Installation on behalf of the Cyber Center of Excellence and numerous other units and organizations that are housed and headquartered at Fort Gordon. The garrison supports the post through directorates and agencies that provide a full range of city services and quality-of-life functions — everything from facilities maintenance, recreation and family programs to training support and emergency services. The garrison is part of the Atlantic Region of the Installation Management Command, which operates Army installations around the world. The mission of the U.S. Army Garrison at Fort Gordon is to provide

Installation services, facilities, and infrastructure that support mission readiness and provide an enhanced quality of life for the Soldiers, families and civilians of Fort Gordon.

Fort Gordon is the home of the newly established U.S. Army Cyber Center of Excellence, and was previously called the Signal Center of Excellence. Fort Gordon is the largest communications training facility in the Armed Forces, and is the focal point for the development of tactical communications, information systems, and cyber security. The Leader College of Information Technology, located at Fort Gordon, is the U.S. Army's premiere site for all automation training and home to the Regimental Non-Commissioned Officer (NCO) Academy.

Fort Gordon is also the home to the 706th Military Intelligence Group; the Naval Security Group Activity; United States Air Force 480th Intelligence, Surveillance, and Reconnaissance Group; 67th Signal Battalion; the Southeast Region Medical Command; the Southeast Region Dental Command; Southeast Region Veterinary Command; the Dwight D. Eisenhower Army Medical Center (DDEAMC); U.S. Army Dental Lab; Regional Training Site-Medical; 35th Signal Brigade (deployable); 513th Military Intelligence Brigade (deployable); and Georgia National Guard Youth Challenge Academy.

Additionally, numerous Army Reserve and National Guard units from Georgia and South Carolina use Fort Gordon's weapons ranges and training areas. The current workforce population on Fort Gordon (military and civilian) is approximately 23,950, of which approximately 14,150 are active and reserve military and 9,800 are civilians and contractors (Fort Gordon 2015a).

1.2 Purpose and Need for the Proposed Action

1.2.1 *Background to the Purpose and Need*

The Fort Gordon Integrated Natural Resources Management Plan (INRMP) coordinates the Integrated Training Area Management program, ecosystem management, and military training at Fort Gordon to ensure the sustainable use of training lands, maintenance and improvement of natural resources, protection of

Federally protected species, and education of the users of the lands on Fort Gordon. The goal of the INRMP is to implement an ecosystem-based conservation program that provides for conservation and rehabilitation of natural resources in a manner consistent with the military mission; integrates and coordinates all installation natural resources management; provides for sustainable multiple uses of natural resources; and allows controlled public access for enjoyment of natural resources, subject to safety and military security considerations.

The INRMP was prepared to meet statutory requirements under the Sikes Act Improvement Amendment, Public Law (PL) 105-85, Div. B. Title XXIX, Nov. 18, 1997, 111 Stat 2017-2019, 2020-2022. In November 1997, the Sikes Act, 16 U.S. Code § 670a et seq., was amended to require the Secretary of Defense to carry out a program to provide for the conservation and rehabilitation of natural resources on military installations. To facilitate such programs, the Sikes Act requires the secretary of each military department to prepare and implement an INRMP at major military installations throughout the U.S. under their respective jurisdictions, unless the secretary determines the absence of significant natural resources on a particular installation makes the preparation of such a plan inappropriate.

The (2015) INRMP for which this supplemental environmental assessment (SEA) has been prepared is a revision of the INRMP that was implemented at Fort Gordon in 2008. Notable changes in the 2008 INRMP that drive this revised SEA include:

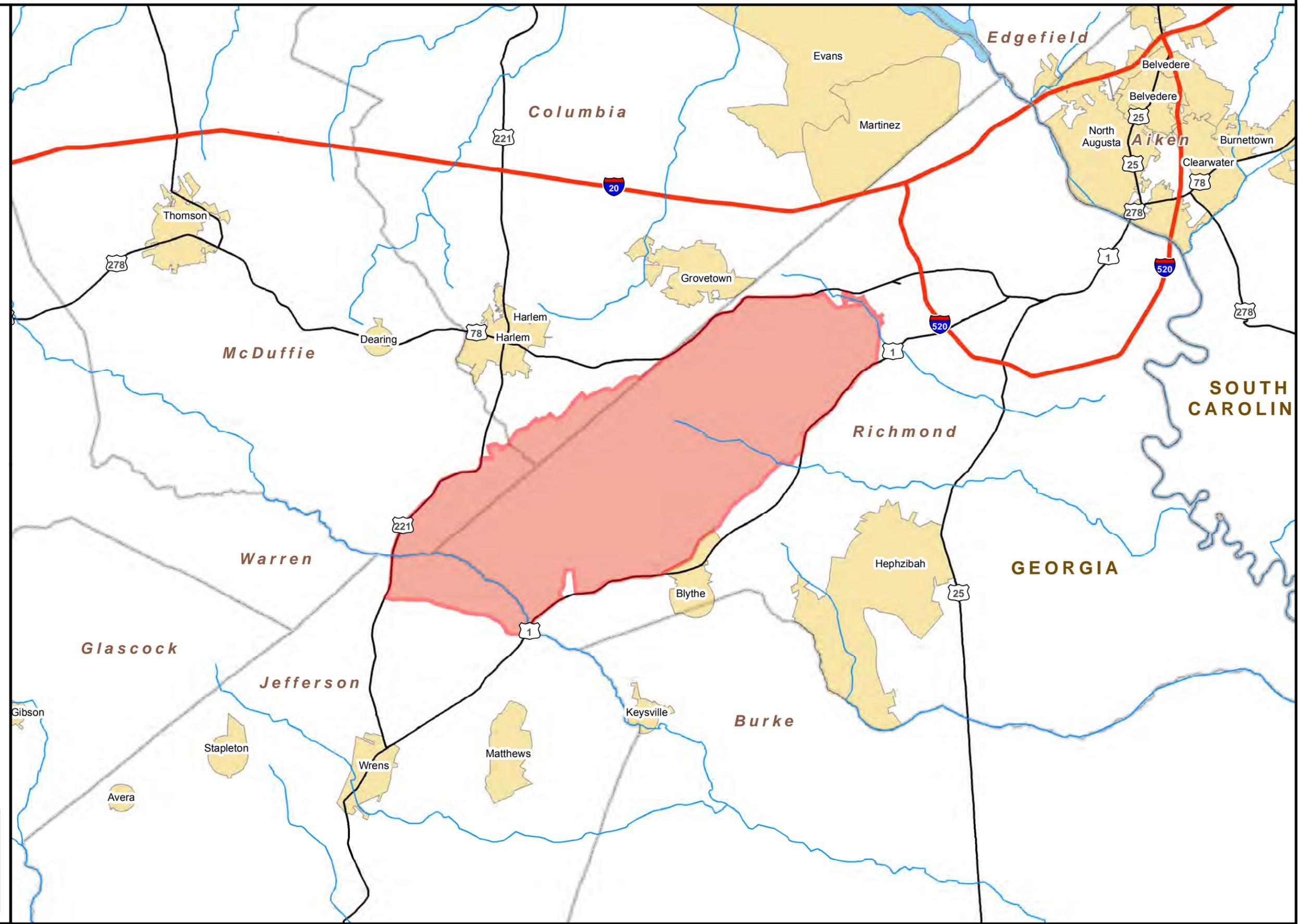
- Changes to the 2008 Endangered Species Management Component (ESMC);
- Changes in the Army's list of Species at Risk (SAR), three of which require special consideration at Fort Gordon;
- Changes in the list of "target species" that Fort Gordon monitors and manages;
- Fort Gordon assuming control of the Gillem Enclave, outside of Atlanta;

- Minor changes to public access and outreach.

An environmental assessment (EA) was prepared for the implementation of the original 2001 INRMP at Fort Gordon (Fort Gordon 2001). That EA analyzed the potential effects associated with implementation of an ecosystem-based approach for management of all of Fort Gordon's natural resources and implementation of the Ecosystem-based Endangered Species Management Plan (EESMP). In 2008 the INRMP was updated for another five year planning cycle. The EESMP was replaced with an ESMC. A SEA was subsequently prepared to address changes to the INRMP that required additional NEPA analysis (Fort Gordon 2008). The existing environment and natural resources found on Fort Gordon were described in detail in both documents and will be incorporated by reference in this SEA where appropriate

Figure 1: Fort Gordon Vicinity Map

- Legend**
- State Boundary
 - County Boundary
 - City Boundary
 - Fort Gordon Boundary
 - Lake
 - Stream
 - Interstate
 - Highway



1:200,000
0 4,000 8,000 16,000 24,000 32,000 Feet

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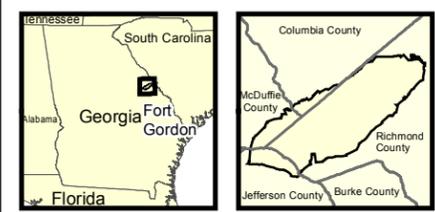


Figure 2: Fort Gordon Map

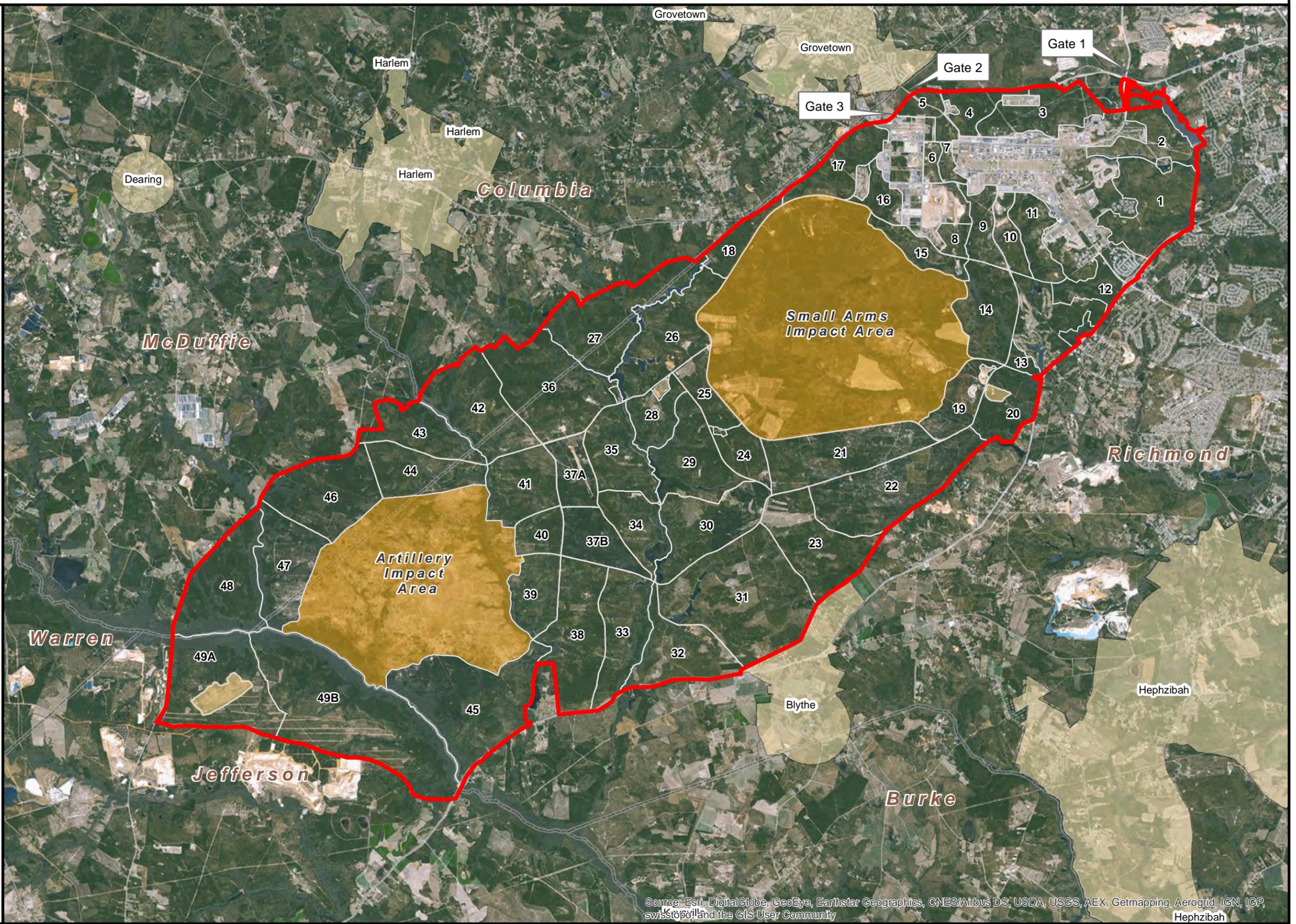
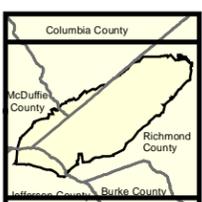
Legend

- Fort Gordon Boundary
- Training Areas
- Impact/UXO Areas
- City Boundary
- County Boundary

1:95,000

0 1,900 3,800 7,600 11,400 15,200 Feet

Produced by Tetra Tech, Inc.
March 2016.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

1.2.2 Purpose and Need

The purpose of implementing the revised and updated INRMP is to provide a basis for managing the entire range of natural resources at Fort Gordon over the next five-year planning period (Fiscal Years (FY) 2014-2018). The INRMP lists important natural resource management goals and objectives and describes specific activities and projects that will be carried out to achieve these goals and objectives. The INRMP was originally prepared in 2001 and has been revised and updated twice, in 2008 and 2015, in compliance with the requirements of the Sikes Act (Title 16, United States Code 670) and the Sikes Act Improvement Act of 1997 (P.L. 105-85).

1.3 Decision to be Made

The proponent for this project is the Garrison Commander (GC) of Fort Gordon. It is the responsibility of the GC to review the information and analyses in this SEA and decide which alternative to execute.

1.4 Public Involvement

The SEA and draft Finding of No Significant Impact (FNSI) were made available to federal, state, and local agencies and the public for review and comment for 30 days. A Notice of Availability for the SEA and draft FNSI were published in the *Augusta Chronicle*. During the public review and comment period, copies of the SEA were made available at the Fort Gordon Public Affairs Office (Building 33720, Darling Hall, Chamberlain Ave., Fort Gordon, GA), Woodworth Library (Building 33500, Rice Road, Fort Gordon, GA), and the Augusta-Richmond County Library (823 Telfair St., Augusta, GA). During and immediately following this public comment period, the Army collected, logged, and incorporated any comments received into the SEA and FNSI as necessary. The Army will prepare and release a final FNSI and SEA to the appropriate local, state, and federal repositories after receiving all comments. The signed FNSI and SEA will remain on record with the Fort Gordon, Directorate of Public Works (DPW), Environmental Division (ED) Office.

1.5 Scope of this EA

This SEA, which assesses the potential impacts of implementing a revised and updated INRMP for Fort Gordon, was written with the best data and information available at the time of its development. It has been developed in accordance with the National Environmental Policy Act (NEPA) of 1969, the President’s Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, (40 Code of Federal Regulations [CFR] Parts 1500–1508), and the Army’s environmental implementing regulations, Environmental Analysis of Army Actions (32 CFR Part 651). The purpose of this SEA is to inform decision makers and the public of the likely environmental consequences of the Proposed Action and alternatives.

In FY 2010, Fort Gordon assumed command and control of the Gillem Enclave in Clayton County, Georgia, in the southeastern suburbs of Atlanta. The Gillem Enclave is small (260 acres, total), with some wooded and natural areas, but is surrounded by highways, residential housing developments, and light industrial facilities. Army installations are required to prepare INRMPs when “significant” natural resources are present; but the Gillem Enclave satisfies none of the criteria in Army Regulation (AR) 200-1 [4-3.d(1)(a)] that would indicate the presence of significant natural resources. The limited natural resources of the Gillem Enclave, although technically managed by Fort Gordon’s Natural Resources Branch, are not addressed in detail in the INRMP and are touched on only briefly in this SEA.

1.6 Applicable Environmental Statutes and Regulations

This SEA was prepared in accordance with the provisions of the National Environmental Policy Act of 1969 as amended (42 U.S. Code [U.S.C.] 4321 et seq.), the CEQ NEPA implementing regulations at 40 CFR Part 1500, and 32 CFR Part 651. Table 1 summarizes the pertinent environmental regulations, laws, and Executive Orders (E.O.) that guided the development of this SEA.

Table 1: Applicable Environmental Statutes and Regulations

Federal Laws and Regulations
Archaeological Resources Protection Act
Clean Air Act of 1970, as amended
Clean Water Act of 1987, as amended
Comprehensive Environmental Response, Compensation and Liability Act of 1986
Endangered Species Act of 1973, as amended
Energy Independence and Security Act of 2007
Farmland Protection Policy Act
Magnuson-Stevens Fisheries Conservation and Management Act
Migratory Bird Treaty Act of 1972
National Environmental Policy Act of 1969, as amended
National Historic Preservation Act of 1966, as amended
Native American Graves Protection and Repatriation Act of 1990
Resource Conservation and Recovery Act of 1976
Safe Drinking Water Act of 1974
Watershed Protection and Flood Prevention Act of 1954
10 U.S.C. 2665 (Provides for reimbursable forestry funds)
10 U.S.C. 2687 (Base Closures and Realignment)
40 CFR Part 1500-1508, Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act
Executive Orders and Army Regulations
Army Regulatory Guidance Memorandum for Reimbursable Agriculture/Grazing and Forestry Programs dated 17 August 1999
Environmental Effects of Army Actions (32 CFR Part 651)
Environmental Protection and Enhancement (AR 200-1)

Invasive Species (E.O. 13112)
Protection of Migratory Birds and Game Mammals (E.O. 11629)
Executive Orders and Army Regulations
Army's 2007 Management Guidelines for the RCW on Army Installations
Army's 2008 Management Guidelines for the Gopher Tortoise on Army Installations
Floodplain Management (E.O. 11988); Protection of Wetlands (E.O. 11990)
Federal Actions to Address Environmental Justice in Minority Populations And Low-Income Populations (E.O. 12898)
Protection of Children from Environmental Health Risks and Safety Risks (E.O. 13045)

2.0 Description of Proposed Action and Alternatives

2.1 Description of the Proposed Action

The United States (U.S.) Army Garrison, Fort Gordon (Fort Gordon) proposes to implement the (2015) INRMP at Fort Gordon, Georgia. Implementation of an INRMP is a Federal mandate, authorized and funded by the U.S. Congress. Managed lands at Fort Gordon are currently managed in accordance with the INRMP prepared in 2008. The Sikes Act Improvement Amendment requires Department of Defense (DoD) installations to review their INRMPs every 5 years and update as necessary. The Proposed Action described herein is in response to the mandated 5-year review.

2.2 Alternatives Considered in this SEA

Because implementation of an INRMP is a Federal mandate, authorized and funded by the U.S. Congress, the only practical alternative is to comply with the mandate by implementing an INRMP. A No Action Alternative will be included as required by the CEQ regulations to identify the existing baseline conditions against which potential impacts will be evaluated.

2.2.1 Alternative 1 (Preferred Alternative): INRMP Implementation

Alternative 1 (Preferred Alternative) is to implement the (2015) INRMP during the next five-year planning period (FY 2014 through 2018). The goals and objectives of the revised INRMP are essentially the same as those of the 2008 version, centering around the restoration of native ecosystems, the enhancement of biological diversity, the conservation of rare and endemic species, and the development of productive working relationships with resource agencies and interested members of the public. As in previous planning cycles, the installation's natural resources would be managed using an ecosystem-based management philosophy. The most notable changes in the (2015) INRMP concern the management guidelines for Fort Gordon's red-cockaded woodpeckers (RCW) as laid out in the ESMC of the document.

As part of the original 2008 ESMC, Fort Gordon established an approximately 24,300-acre Habitat Management Unit (HMU) for the RCW. Based on the size of

the HMU, Fort Gordon’s installation population goal (IPG) was 122 potential breeding groups. The IPG reflected Fort Gordon’s contribution to the Regional Recovery Goal, as outlined in the revised 2003 RCW Recovery Plan (USFWS 2003).

As part of the current 5-year review, an updated ESMC was developed and would be implemented as part of the Proposed Action. The updated ESMC was developed in accordance with the revised 2003 RCW Recovery Plan (USFWS 2003) and the 2007 Guidelines (Army 2007). The updated ESMC for the 2014-2018 INRMP period calls for a slightly larger HMU, a smaller IPG, and an increase in recruitment cluster goals (Fort Gordon 2015b). These changes are summarized below in Table 2.

Table 2: Summary of Major Changes in Fort Gordon ESMC

ESMC 2008-2013	ESMC 2014-2018
24,300-acre HMU	25,543-acre HMU
Installation Population Goal of 122 potential breeding groups	Installation Population Goal of 103 active clusters*
	Delete 5 clusters from management (inactive for more than 5 years)
A total of 25 recruitment clusters were to be provisioned and five existing recruitment clusters were to be activated.	Provision 26 to 30 recruitment clusters over the next 5 years, depending on availability of resources

* Reflects a new, improved method of developing the population goal that takes into account irregular shape of HMU

As with the original ESMC, forest stands associated with recruitment clusters and their foraging areas would be actively managed to provide the habitat necessary to support the RCW population goal. Timber management in the HMU would be consistent with RCW conservation practices and comply with the revised 2003

RCW Recovery Plan (USFWS 2003). Adequate foraging habitat and quality foraging stands are necessary to fulfill the requirements of the revised 2003 RCW Recovery Plan (USFWS 2003). Silviculture methods that maintain or regenerate the historic pine ecosystem will continue to be used. Prescribed burning would be primary means of controlling mid-story vegetation, but rotary mowers (“bush-hogs”), chainsaws, and herbicides will all be employed when circumstances dictate their use. Consistent with the recommendations in the 2003 Recovery Plan, the following guidelines would be used for managing timber within the HMU:

- a. Maintain 18 or more pine stems per acre (stems/acre) that are at least 60 years in age and at least 14 inches in diameter at breast height (dbh). Minimum basal area for these pines is 20 square feet per acre (ft²/ac).
- b. Maintain basal area of pines 10 to 14 inches dbh at 40 ft²/ac.
- c. Maintain basal area of pines less than 10 inches dbh below 10 ft²/ac and below 20 stems/acre.
- d. Maintain all pines 10 inches dbh at 40 ft²/ac. For example, the minimum basal area for pines in categories (a) and (b) above is 40 ft²/ac.
- e. Remove or control sparse hardwood midstory below 7 feet (ft) in height.
- f. Hardwoods should occupy no more than 10 percent of the canopy in longleaf pine (*Pinus palustris*) forests and less than 30 percent of the canopy in loblolly (*P. taeda*) and shortleaf (*P. echinata*) pine forests.

Prescribed burns would be conducted in accordance with the Integrated Wildland Fire Management Plan (IWFMP), updated in 2015 (Fort Gordon 2015c). In accordance with the IWFMP, growing season (spring/summer) burns would continue to be conducted when appropriate to replicate historic, natural patterns in order to better control understory hardwoods and promote growth of herbaceous species that are typical of the longleaf pine/wiregrass (*Aristida stricta*) community.

2.2.2 Alternative 2: No Action Alternative

Under the No Action Alternative, Fort Gordon would continue to manage natural resources under the INRMP that has been in place since 2008. Since there would

be no change in resource management or to policies and procedures governing this management, this alternative is defined as the No Action Alternative.

2.3 *Alternative Evaluation*

This SEA evaluates the impacts of the Proposed Action and Alternatives to many environmental resource areas, herein referred to as Valued Environmental Components (VEC). Impacts to VECs are largely qualitative, but where a unit of measure is available, quantitative evaluation is used. In compliance with CEQ and Army NEPA guidance, this SEA will only identify the impacts that are expected and determine if the impact is significant. Table 3 defines the significance thresholds for each VEC.

Table 3: Thresholds of Significance for Valued Environmental Components

Resource	Significance Threshold
Geology and Soils	A significant impact would occur if the project would (a) expose people or structures to substantial adverse effects, including the risk of loss, injury, or death; (b) result in substantial soil erosion or loss of topsoil; (d) be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.
Water Resources	A significant impact would (a) violate any water quality standards or waste discharge requirements; (b) substantially deplete groundwater supplies or interfere substantially with groundwater recharge; (c) substantially alter the existing drainage pattern of the site or area in a manner which would result in substantial erosion or siltation on- or off-site; (d) substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site; (e) create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or (f) otherwise substantially degrade water quality.
Wetlands	A significant impact would occur if the project would have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act.
Floodplains	A significant impact would substantially increase the rate or amount of surface runoff in a manner that would result in flooding on-site or off-site.

Resource	Significance Threshold
Ecological Resources	<p>A significant impact would occur if the project would (a) have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies or regulations by the Georgia Department of Natural Resources (GADNR) or the U.S. Fish and Wildlife Service (USFWS); (b) have a substantial adverse effect on any sensitive or unique natural community identified in local or regional plans, policies or regulations GADNR or USFWS; (c) interfere substantially with the movement of native resident or migratory fish or wildlife, obstruct wildlife corridors, or harm wildlife nursery sites; (d) conflict with local policies ordinances protecting biological resources, such as a tree preservation policy or ordinance; or (e) conflict with the provisions of an approved local, regional, or state habitat conservation plan. Specific significance thresholds for Fort Gordon include (a) reduction of the Installation RCW population; (b) reduction of forage habitat at active clusters below threshold levels and (c) direct effect to a living RCW or active cavity tree.</p>
Air	<p>A significant impact would occur if the project would (a) exceed the general conformity rule <i>de minimis</i> (of minimal importance) threshold values; (b) exceed the greenhouse gas (GHG) threshold in the draft CEQ guidance; or (c) contribute to a violation of any federal, state, or local air regulation.</p>
Noise	<p>A significant impact would occur if the project would (1) result in the violation of applicable federal, state, or local noise regulation, or (2) create appreciable areas of incompatible land use off-post.</p>
Cultural Resources	<p>A significant impact would occur if the project would (a) cause a significant adverse change in the significance of a historical or archeological resource as defined in the National Historic Preservation Act (NHPA); (b) directly or indirectly damage a unique paleontological resource or site with a unique geologic feature; (c) disturb any human remains, including those buried outside of formal cemeteries.</p>
Land Use	<p>A significant impact would occur if the project would (a) physically divide an established community; (b) conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project; or (c) conflict with any applicable habitat conservation plan or natural community conservation plan.</p>

Resource	Significance Threshold
Infrastructure, Utilities and Facilities	A significant impact would occur if the project would result in a substantial increase in any utility consumption to the extent that an existing or planned capacity is exceeded, based on currently available projections; unacceptable demands placed on infrastructure supply and distribution system; or the need for new or renovated facilities and the required construction/renovation would produce significant environmental impacts.
Socioeconomics	A significant impact would occur if the project would (a) induce a substantial population growth or decline in an area, either directly or indirectly; (b) displace substantial numbers of existing housing units or people, necessitating the construction of replacement housing elsewhere; (c) produce an impact to the regional economy that would exceed the historical precedent for past economic fluctuation for employment and regional income according to the EIFS (Economic Impact Forecast System) economic model; (d) produce substantial disproportionate adverse environmental, economic, social, or health impacts on minority or low-income populations; (e) produce disproportionate environmental health or safety risk to children; (f) produce a substantial increased public safety hazard from military operations; or (g) produce a long-term substantial loss of recreational opportunities and resources relative to baseline.

2.4 Assessing Impacts

2.4.1 General Information

As discussed in Section 2.2, environmental impacts of the two alternatives are analyzed:

- Alternative 1 (Preferred Alternative) – INRMP Implementation and
- No Action Alternative.

An impact is defined as a noticeable change in a resource from the existing environmental baseline conditions caused by an action. The degree of change is determined by measuring the difference between the baseline conditions and the conditions that result following the assessed action. Any difference between the baseline conditions and the site conditions following an action suggests that the action has an impact on that resource.

2.4.2 Types of Impacts

Context and intensity are taken into consideration in determining a potential impact's significance, as defined in 40 CFR Part 1508.27. The intensity of a potential impact refers to the impact's severity and includes consideration of beneficial and adverse impacts, the level of controversy associated with a project's impacts on human health, whether the action establishes a precedent for future actions with significant effects, the level of uncertainty about project impacts, or whether the action threatens to violate federal, state, or local law requirements imposed for the protection of the environment.

The severity of environmental impacts may be characterized as none, minor, moderate, significant, or beneficial.

- **None** – No measurable impacts are expected. Any environmental impact would be barely perceptible, confined to a single location, or would not require a long recovery period (days to months).
- **Minor** – Short-term but measurable impacts are expected. The resource would recover in a relatively short period of time (days to months).
- **Moderate** – Measurable and long term impacts that may not remain localized. Recovery may require several years or decades.
- **Significant** – Impacts that result in a substantial change in the current or future condition of the VEC. The threshold of significance, developed for each VEC, identifies when an impact would result in a substantial or permanent adverse change. Thresholds of significance were developed for each resource (Table 3).
- **Beneficial** – Impacts that result in a positive change in the current or future condition of the VEC.

Quantitative and qualitative analyses were used, as appropriate, in determining whether, and the extent to which, a threshold would be exceeded. Based on the results of these analyses, this SEA identifies whether a particular potential impact

would be adverse or beneficial, and to what extent. Impacts can further be categorized as direct, indirect, or cumulative.

- **Direct** – Caused by the action, occurring at the same time and place
- **Indirect** – Caused by the action and foreseeable, but occur at a later time or different place
- **Cumulative** – Effects on the environment that result from the incremental effect of a project in combination with other past, present, or reasonably foreseeable future actions, regardless of jurisdiction or entity. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over time.

2.4.3 Intensity of Impact

Once an impact is identified, it must also be determined if an impact approaches a level of significance. Significance, as defined by the CEQ in 40 CFR 1508.27 (Regulations for Implementing NEPA), requires consideration of both the context and intensity of the impact evaluated. Significance can vary in relation to the context of the Proposed Action and thus, where significance is not defined by regulation or policy it must be evaluated in several contexts. These contexts vary with the setting of the Proposed Action, and can include consideration of effects across both time (short vs. long-term effects) and space (local vs. regional scale). Thresholds of significance for each resource were defined for the analysis of the Proposed Action and are shown in Table 3.

3.0 Affected Environment and Environmental Consequences

The affected environment reviews the environmental setting or general environmental conditions of the proposed project area. It describes the environmental baseline against which the environmental effects can be evaluated.

3.1.1 Limiting the Impact Analysis

During the development of this SEA, specific resource areas were identified that may be affected by the proposed action. These included: geology and soils; water resources; floodplains and wetlands; ecological resources; cultural resources; land use; and infrastructure, utilities and facilities.

Impacts associated with air quality and climate change; noise; hazardous materials and waste; traffic and transportation; socioeconomics; environmental justice and protection of children were considered, but not examined in depth in this SEA because they are not expected to be impacted by the proposed action or because the analysis in previous INRMP EAs remains valid. A rationale for the exclusion of each of these resources is presented below in Table 4.

Table 4: Resources excluded from in-depth analysis

Resource	Exclusion Reason
Air Quality and Climate Change	Fort Gordon is located within an attainment area for all criteria pollutants. When prescribed burns are conducted, temporary emissions are expected to occur. As analyzed in the 2008 SEA, impacts to air quality as a result of either alternative would be expected to be temporary and insignificant. In addition, there would be a minimal amount of carbon dioxide emissions as a result of either alternative. Therefore, impacts to climate change would be expected to be temporary and insignificant as a result of implementing either alternative.

<p>Noise</p>	<p>During timber harvesting and site preparation activities implemented as part of the Proposed Action, noise levels could increase in proximity to areas where work is being performed. As analyzed in the 2008 SEA, impacts to the noise environment as a result of either alternative would be expected to be temporary and insignificant.</p>
<p>Hazardous Materials and Waste</p>	<p>The proposed action would not require the use of hazardous materials other than materials commonly used in timber and land management operations equipment (motor oil, lubricants, coolants, fuel). Small quantity spills and leaks of fuels and oils could potentially occur from heavy equipment machinery. Any spills would be responded to in accordance with Fort Gordon spill prevention and spill management plans and applicable state/federal regulations.</p>
<p>Traffic and Transportation</p>	<p>The proposed action will have no impacts to local or regional traffic and transportation. Natural resources management activities would occur within the Fort Gordon boundary but outside of the Fort Gordon main cantonment. Traffic resulting from these activities would be minimal and would have not impact locally or regionally.</p>
<p>Socioeconomics, Environmental Justice and Protection of Children</p>	<p>The proposed action will have no impacts to socioeconomics, environmental justice or protection or children. The proposed project will occur entirely within Fort Gordon boundaries. No direct or indirect impacts associated with either alternative would impact any of these areas of concern.</p>

3.2 Geology and Soils

3.2.1 Affected Environment

Geology

Fort Gordon is located near the Fall Line, the imaginary dividing line between the Lower Piedmont and Upper Coastal Plains physiographic provinces (Fort Gordon 2015c). The hilly Piedmont is associated with hard, erosion-resistant igneous and metamorphic rock; the relatively flat Coastal Plain is associated with more-erodible sedimentary rock. Sedimentary rock in the Fall Line area of east-central Georgia is composed primarily of two formations, the Barnwell Formation of the Jackson Group formed during the Eocene Period, and the Tuscaloosa Formation of the Cretaceous Period. Geologic components associated with the Tuscaloosa Formation include phyllite, quartzose, arkosic sands, kaolin, quartz gravel, and glint kaolin (Fort Gordon 2015c).

Soils

The Sand Hills (also known as “Fall Line Hills”) Eco-Region of the Upper Coastal Plain, in which Fort Gordon is located, consist of mostly unconsolidated soils derived from Eocene and Cretaceous marine sands, loams, and clays that were deposited over acid crystalline and metamorphic rocks (Fort Gordon 2015c). These soils are predominantly sandy in character, acidic, low in organic matter and moisture holding capacity and very low in natural fertility. Crops grown in the Sand Hills require varying applications of lime, potash, and phosphate. The surface and subsurface soil drainage is excessive, requiring more frequent fertilization.

Upland areas of Fort Gordon are generally associated with deep, well-drained, medium-to-fine sands. Stream floodplains on the Installation are more often associated with poorly-drained hydric soils. Twenty-six soil classes have been identified on Fort Gordon (Fort Gordon 2015c). The predominant soil types are the Troup and Lakeland series. Vaucluse and Ailey soil series are also found across the Installation. Twelve of the soil types on Fort Gordon are considered Prime Farmland and six of the soil types are considered Farmland of Statewide Importance under the Farmland Protection Policy Act (FPPA) (Fort Gordon 2015c).

However, land used for national defense purposes, like that on Fort Gordon, is not subject to the provisions of the FPPA. Table 5 lists the most common soil types at Fort Gordon and their characteristics, including suitability for silviculture and “urban uses” (e.g., for building foundations).

Table 5: Common Soil Series Occurring on Fort Gordon

Soil Series	Characteristics
Troup	Deep, well-drained, gently sloping sands, occurring on Coastal Plains ridgetops. Low in natural fertility, strongly acidic, rapid permeability in the surface layer. Slopes typically to 10 percent, up to 17 percent on steep slopes. Moderately suitable for loblolly, longleaf, and slash pine; well suited for most urban uses; not suitable for recreational uses.
Lakeland	Deep, excessively drained soils occurring on Sand Hills ridgetops and hillsides. Low fertility, strongly acidic, and very permeable. Slopes range from 0 to 10 percent and greater on steep slopes. Moderately suitable for common pine species. Suitable for urban uses but unsuitable for recreational uses.
Orangeburg	Deep, well-drained soils on gently sloping Coastal Plain hillsides. Medium fertility, strongly acidic, and moderately permeable. Suitable for loblolly and slash pine and well suited to urban uses.
Lucy	Deep, well-drained, level to gently sloping soils on broad ridgetops and hillsides of the Coastal Plain. Low natural fertility, strongly acidic, and moderately permeable. Moderately suitable to longleaf and slash pine. Suited to urban land uses and limited recreational uses.
Dothan	Deep, well-drained, level to gently sloping soils on broad ridgetops and hillsides of the Coastal Plain uplands. Low natural fertility, strongly acidic, and moderately permeable. Well suited to loblolly and slash pine and urban uses.
Vaucluse-Ailey Complex	Well-drained, gently sloping soils occurring on narrow ridgetops and hillsides of upland Sand Hills and Coastal Plain. Low fertility and strongly acidic. Permeability is slow in Vaucluse soils and the subsurface of Ailey soils, but rapid in the surface layer of Ailey soils. Moderately suitable for loblolly and slash pine. Well suited to urban uses but too sandy for recreational uses.
Bibb-Osier	Poorly drained, level, frequently flooded soils of the Coastal Plain floodplains. Strongly acidic with moderate to rapid permeability. Moderately suited to loblolly and slash pine, sweetgum (<i>Liquidambar styraciflua</i>), and water tupelo (<i>Nyssa aquatica</i>). Poorly suited to agriculture and urban land use.

Source: Fort Gordon 2015c

3.2.2 Environmental Consequences

Threshold of Significance for Geology and Soils: A significant impact would occur if the project would (a) expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death; (b) result in substantial soil erosion or loss of topsoil; (d) be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.

3.2.3 Alternative 1 (Preferred Alternative): INRMP Implementation

Implementation of the Proposed Action would have a beneficial effect on the Installation's soils. Existing forest roads and firebreaks, which are not essential to the goals of the INRMP and military mission, would continue to be abandoned, revegetated or allowed to naturally revegetate. Erosion control measures would be employed where needed, as funding is available, with the execution of the INRMP. The closing and reclamation of forest roads and firebreaks is expected to reduce the amount of soil (sediment) carried into Installation streams and ponds with storm water.

There is a potential for soils to be disturbed during timber harvesting and other forest management activities (e.g., raking, roller drum chopping). These disturbances could potentially increase soil erosion in treated areas. Additionally, improperly executed prescribed burning has the potential to expose mineral soils and increase erosion. Erosion from timber management activities would be short-term and would return to baseline with the re-establishment of ground vegetation. Fort Gordon's Forest Section implements best management practices (BMPs) to avoid or minimize soil disturbance and erosion during forest management activities. All forest management activities on Fort Gordon are planned and conducted in accordance with *Georgia's Best Management Practices for Forestry* (Georgia Forestry Commission 2009). With the use of properly implemented BMPs and positive impacts associated with the closure of forest roads and firebreaks, the Proposed Action would have long-term beneficial effects on Fort Gordon's soils. Additionally, the Proposed Action would not affect local geology as forest

management activities normally only affect surface soils (topsoil) and shallower sub-soils.

3.2.4 No Action Alternative

The No Action Alternative would result in effects similar to those described for the Proposed Action. The closure of roads and firebreaks was included in the implementation of the 2008 INRMP. The No Action Alternative would continue to implement the 2008 INRMP and its associated management requirements and objectives. The No Action Alternative was analyzed as the Proposed Action in the 2008 SEA and that analysis is incorporated herein by reference (Fort Gordon 2008).

3.3 *Water Resources*

The most comprehensive source of information on Fort Gordon's water resources is the INRMP (Fort Gordon 2015b). Protection of water resources is always a major concern at Fort Gordon, and is always factored into planning for development projects, military training exercises, and forest management activities.

Groundwater

Fort Gordon is located in the Coastal Plain hydrogeologic province of Georgia. The principal groundwater source in this province is the Southeastern Coastal Plain aquifer system. This aquifer system is composed of interbedded Cretaceous- and Tertiary-age sediments. The Upper Cretaceous Dublin-Midville aquifer, which is part of the regional Southeastern Coastal Plain aquifer system, underlies Fort Gordon. The Dublin-Midville aquifer system consist of two distinct aquifers (from oldest to youngest): the Upper and Lower Midville aquifers and the Lower Dublin aquifer. They are separated by the Upper Midville Confining Unit. The Lower Dublin aquifer is overlain by the Huber Formation (Lower Dublin Confining Unit) and occurs at depths of approximately 340- to 380-ft above mean sea level.

Depth to groundwater ranges from approximately 56 feet to 0 feet below ground surface at locations where seeps discharge to surface water along streams. Fort Gordon lies within the recharge area where the aquifer is relatively thin; therefore,

there is limited storage capacity and only moderate supplies of potable water are available. Typical yields in this area range from 29,000 to 72,000 gallons per day. Wells installed in the aquifer supply potable water to the range, training, and recreation areas. Because of the high levels of dissolved carbon dioxide, pH of groundwater can range from 3.8 to 7.4, with a mean of 5.8.

Surface Water

Five major stream systems drain Fort Gordon: Butler Creek, Spirit Creek, Sandy Run, Boggy Gut, and Brier Creek (Fort Gordon 2015b). Although Sandy Run and Boggy Gut are substantial streams that drain significant portions of Fort Gordon, both are actually tributaries of Brier Creek, into which they flow a short distance south of Fort Gordon. Headstall Creek, another tributary of Briar Creek, joins Brier Creek in the southwestern corner of the Installation. All of these streams flow in a southeasterly direction to the Savannah River, which is approximately 9 miles from Fort Gordon's eastern boundary.

GADNR's Environmental Protection Division (GAEPD) establishes and enforces state water quality standards. Every two years, in compliance with sections 303(d) and 305(b) of the Clean Water Act, GAEPD publishes "Water Quality in Georgia," a comprehensive assessment of the state's water quality. This report details the quality of water in the streams, lakes, and reservoirs of all major river basins in the state and identifies those waterbodies that are impaired and do not meet designated uses. The 2014 305(b)/303(d) Draft Integrated Report listed three streams with impaired segments within the boundaries of Fort Gordon: Butler Creek, Spirit Creek, and Headstall Creek (GAEPD 2014). A segment of Butler Creek that flows through Fort Gordon (Boardman's Pond to Phinizy Ditch) does not support its designated use, fishing, because of fecal coliform levels. Spirit Creek below its confluence with Marcum Branch does not support its designated use, fishing, because biota (macroinvertebrate community) appear to have been impacted by urban runoff. Headstall Creek, the lower portion of which flows through Fort Gordon (separates Training Areas 47 and 48), does not support its designated use, fishing, because its biota (fish community) apparently have been impacted by non-point source pollution.

In the course of preparing a Comprehensive Wildlife Conservation Strategy that was implemented in 2005, GADNR's Wildlife Resources Division identified "High Priority Waters," streams and river reaches that were deemed significant and worthy of preservation, based primarily on the uniqueness and diversity of their aquatic communities (GADNR Undated). As part of the same planning effort, GADNR delineated watersheds that contained high priority streams or tributaries of these streams and designated them "High Priority Watersheds." GADNR works with private, corporate, and government land owners to protect and preserve these valuable streams and watersheds. The sections of Sandy Run, Boggy Gut, and Brier Creeks that flow through the western half of Fort Gordon have all been designated High Priority Waters (GADNR Undated). The watersheds associated with these stream reaches have been designated High Priority Watersheds. Spirit Creek, Butler Creek, and their watersheds have not been designated High Priority, reflecting their proximity to the developed portion of Fort Gordon and generally less-pristine character

3.3.1 Environmental Consequences

Water Resources

Threshold of Significance for Water Resources: A significant impact would (a) violate any water quality standard or waste discharge requirement; (b) substantially deplete groundwater supplies or interfere substantially with groundwater recharge; (c) substantially alter the existing drainage pattern of the site in a manner which would result in substantial erosion or siltation on-site or off-site; (d) substantially increase the rate or amount of surface runoff in a manner that would result in flooding on-site or off-site; (e) create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or (f) otherwise substantially degrade water quality.

3.3.2 Alternative 1 (Preferred Alternative): INRMP Implementation

Groundwater

None of the natural resources management activities envisioned under the Proposed Action are likely to affect groundwater availability or groundwater quality. Routine silvicultural and timber management activities (e.g., timber harvests and site preparation) generally affect only surface soils.

Surface Water

Soil and water conservation is one of the INRMP's defined program elements: the Soil Erosion and Sediment Control Component (SESCC; INRMP Section 4.10). The objective of the SESCO is to prevent damage to wetlands, surface water resources and water quality. The SESCO is composed of a number of plans, permits and programs that provide a framework for soils and stormwater management across the Installation. The SESCO includes the Phase II Municipal Stormwater Management Plan (MS4), Industrial Stormwater Pollution Prevention Plan (SWPPP), Stormwater Construction Plan, and Stormwater Capital Improvement Plan.

SESCC plans and procedures are intended to promote infiltration and overland flow through vegetated areas rather than direct runoff to surface waters. Vegetated buffer areas are established between fertilized areas and drainage ways and water bodies where possible. Streambanks are stabilized and natural vegetated buffer areas maintained along the creek. Eroded areas are identified, then stabilized and vegetated. Velocity dissipation devices are installed where high-velocity storm water runoff discharges into surface waters. The SESCO and its plans and procedures, including BMPs, are primarily intended to limit impacts of development projects on streams and wetlands.

As discussed in the "Geology and Soils" section of this SEA, the continued closing and reclamation of forest roads under the Proposed Action would have the effect of reducing soil erosion and sedimentation in some areas. However, there is always the potential for soils to be disturbed during timber harvesting and site

preparation activities. The revised INRMP makes clear that all forest management activities on Fort Gordon are to be planned and conducted in accordance with *Georgia's Best Management Practices for Forestry* (Georgia Forestry Commission 2009). These BMPs are specifically designed to prevent the movement of soil, fertilizer, and herbicides from forest operations areas into surface waters so that floodplain features and hydrology aren't altered and water quality isn't degraded.

It is sometimes necessary to maintain, repair, or upgrade infrastructure and utilities that extend into areas of Fort Gordon classified as "unimproved grounds" (see revised INRMP section 4.11), which include areas managed for commercial timber production. Repairs and upgrades to infrastructure and utilities in these areas could have temporary adverse impacts on water quality or wetlands, but any such impacts would be outweighed by positive long-term impacts on the same resources and any efficiencies gained by improving the operation of the electrical system, water delivery system, or storm water management system in question.

Based on the fact that natural resources management activities scheduled over FY 2014-2018 INRMP planning period (see Appendix K of the INRMP for a list of these activities) would be subject to state and federal regulations governing storm water management, would be guided in part by the various plans and procedures that make up the SESCC, and given that any unavoidable impacts would be mitigated by the use of BMPs approved by the Georgia Forestry Commission, impacts to surface water resources from implementation of the Preferred Alternative are expected to be temporary and localized, and well below the significance thresholds specified earlier in this section.

3.3.3 No Action Alternative

Under the No Action Alternative, Fort Gordon's natural resources would continue to be managed in accordance with the 2008 INRMP. Timber management activities inside and outside of the RCW HMU invariably disturb soils; these soils may or may not be carried into down-gradient waters, depending on terrain, weather, and other factors. Fort Gordon's Natural Resources Branch quickly re-vegetates exposed soils to minimize erosion and sedimentation, in accordance

with Georgia's BMPs for Forestry and the SESCC of the INRMP. As a consequence, impacts of natural resource management activities on surface water resources from implementation of the 2008 INRMP have not approached the significance thresholds presented earlier in this section.

3.4 Floodplains and Wetlands

Floodplains

Surface waters (such as streams and creeks) that are periodically subject to flooding during intervals of overbank flow create a relatively broad and flat valley area immediately adjacent to the waterbody, known as a floodplain. Floodplain areas are divided into two types: 100-year floodplains and 500-year floodplains. The 100-year floodplain is regulated by the Federal Emergency Management Agency (FEMA) and is defined as typically dry land that has a 1 percent or greater chance of flooding each year. The 500-year floodplain is defined as land that has a 0.2 percent chance of a flooding each year.

E.O. 11988, Floodplain Management, requires federal agencies to determine whether a proposed action would occur within a floodplain. This determination typically involves consultation of appropriate FEMA Flood Insurance Rate Maps (FIRMs), which contain enough general information to determine the relationship of the project area to nearby floodplains. E.O. 11988 directs federal agencies to avoid floodplains unless the agency determines that there is no practicable alternative to undertaking the action in a floodplain. Where the only practicable alternative is to locate in a floodplain, a specific step-by-step process must be followed to comply with EO 11988. This "eight-step" process is detailed in FEMA's *Further Advice on EO 11988 Floodplain Management*.

A flood zone is an area that FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's or county's FIRM or Flood Hazard Boundary Map. Each zone reflects the severity or type of flooding in the area. Examples of flood zones include the 1-percent-annual-chance flood hazard area (this is also known as a 100-year flood event) and the 0.2-percent-annual-chance flood hazard area (this is also known as a 500-year flood event).

Wetlands

Approximately 4,395 acres of wetlands occur on Fort Gordon and consist of both alluvial and non-alluvial wetlands (Fort Gordon 2015b). Alluvial wetlands are found along stream channels, and their hydrology depends on the flooding regime of the stream system. Most alluvial wetlands on Fort Gordon are commonly known as “small stream swamps.” Non-alluvial wetlands are located in areas where groundwater emerges or precipitation is held close to the soil surface. Non-alluvial wetlands on Fort Gordon include seepage areas and isolated wetlands. Seepage areas occur on saturated soils where the water table remains immediately below the soil surface (Fort Gordon 2015b).

3.4.1 Environmental Consequences

Threshold of Significance for Floodplains: A significant impact would substantially increase the rate or amount of surface runoff in a manner that would result in flooding on-site or off-site.

Threshold of Significance for Wetlands: A significant impact would occur if the project would have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act.

3.4.2 Alternative 1 (Preferred Alternative): INRMP Implementation

Floodplains

The Fort Gordon Natural Resource Branch’s stated goal is to establish and maintain healthy, sustainable forest ecosystems that support a diverse assemblage of flora and fauna (especially rare and endemic species) and a regulated annual timber harvest while fulfilling the military training mission (Fort Gordon 2015b). Under the Preferred Alternative, management emphasis will continue to be the establishment of native (longleaf and loblolly) pine forests on sites where those species historically grew. Priority will be given to improving pine stands in the RCW HMU in accordance with the revised 2003 RCW Recovery Plan silvicultural guidelines (Fort Gordon 2015b). Most timber management work at Fort Gordon (and virtually all timber management related to RCW habitat

improvement) takes place in dry upland areas, where native pines thrive. Very little land disturbing work or timber harvesting occurs in floodplains.

None of the activities and plans laid out in the revised INRMP is expected to physically alter a floodplain or affect its function. Implementing the revised INRMP should not produce a substantial increase in surface runoff from managed timberlands or increase the frequency or severity of local flooding.

Wetlands

As noted in the preceding sub-section, most of the management activities associated with the Preferred Alternative will take place in upland areas. To the extent feasible, wetlands will be avoided. BMPs would be used to minimize erosion and sedimentation from timber management activities. Any unavoidable impacts to wetlands would be mitigated in consultation with the Corps of Engineers. Appropriate Clean Water Act Section 401/404 permitting and mitigation requirements would apply. Therefore, any impacts to wetlands under the Preferred Alternative are expected to be minor.

3.4.3 No Action Alternative

Under the No Action Alternative, Fort Gordon's natural resources would continue to be managed in accordance with the 2008 INRMP. Management activities over the last several decades have focused on uplands, where native pine forests and native species are being re-established. Floodplains and wetlands are avoided whenever possible. As a consequence, implementation of the 2008 INRMP has not had a significant adverse impact on floodplains or wetlands.

3.5 Ecological Resources

Ecological resources include native or naturalized plants and animals and the habitats (i.e., wetlands, forests, and grasslands) that sustain them. Protected ecological resources include plant and animal species listed by the State of Georgia as rare, threatened, or endangered or by the USFWS as threatened or endangered. Special concern species are not afforded the same level of protection, but their presence is

taken into consideration by resource agency biologists involved in reviewing projects and permit applications.

3.5.1 Affected Environment

Terrestrial Communities

Plant Communities

Fort Gordon encompasses approximately 55,590 acres, nearly 78 percent of which are forested. Common plant species at Fort Gordon include longleaf pine (*Pinus palustris*), loblolly pine (*P. taeda*), southern wiregrass (*Aristida stricta*), white oak (*Quercus alba*), water oak (*Q. nigra*), hickory (*Carya* spp.), dogwood (*Cornus florida*), blueberry (*Vaccinium* spp.), and broomsedge (*Andropogon virginicus*) (Fort Gordon 2015b). Fort Gordon completed a forest vegetation inventory for the entire Installation in 2012. Based on the 2012 inventory, forests on the Installation can be categorized into four broad stand types, each of which is described below (Fort Gordon 2015b).

Pine Forest

Pine forest is the most common plant community at Fort Gordon and is located throughout the Installation. Pine forests make up approximately 52 percent of the Installation's total area. Dominant overstory species are longleaf pine, loblolly pine, shortleaf pine (*Pinus echinata*), and slash pine (*P. elliottii*). Typical understory species consist of immature pines, scrub oak (*Quercus ilicifolia*), honeysuckle (*Lonicera japonica*), sumac (*Rhus* spp.), poison oak (*Toxicodendron pubescens*), and short grasses. Planted pines occupy approximately 20 percent of Fort Gordon's total area; natural pine stands occupy approximately 32 percent

Mixed Pine/Hardwood Forest

Mixed pine/hardwood forests are found in scattered small tracts throughout the Installation, and comprise approximately 16 percent of the Installation's total area. Dominant species include loblolly pine, longleaf pine, sweetgum, hickory, yellow poplar, and various oak species. Undergrowth varies from sparse to dense, and typically consists of honeysuckle, wax myrtle, sumac, and scrub oak.

Bottomland Hardwood Forest

Bottomland hardwood forests, which are common along Fort Gordon's streams, comprise approximately 7 percent of the total area of the Installation. Common overstory species include white oak, American beech (*Fagus grandifolia*), hickory, red maple, ash (*Fraxinus spp.*), blackgum (*Nyssa biflora*), swamp chestnut oak (*Quercus michauxii*), willow oak (*Q. stellata*), and yellow poplar. The understory is medium to dense and consists of wax myrtle, sumac, scrub oak, and honeysuckle.

Upland Hardwood Forest

Upland hardwood forest are found in small patches throughout the Installation, often adjacent to upland mixed pine/hardwood stands. These forests occupy approximately 3 percent of the Installation land area. Species in this community include white oak, hickory, sweetgum, dogwood, and various red oak species. The understory is often sparse and often consists of grape (*Vitis spp.*) vines, honeysuckle, and various *Vaccinium* species.

Wildlife

Fort Gordon is inhabited by a wide variety of wildlife species. One hundred thirty six bird species have been identified on the Installation. Approximately 31 species of mammals and 67 species of reptiles and amphibians inhabit Fort Gordon. These species are dispersed throughout the various habitats on the Installation (Fort Gordon 2015c).

Common mammal species found on the Installation include white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), eastern gray squirrel (*Sciurus carolinensis*), eastern cottontail rabbit (*Sylvilagus floridanus*), opossum (*Didelphis marsupialis*), gray fox (*Urocyon cinereoargenteus*), and coyote (*Canis latrans*). Based on mist netting and acoustic surveys conducted in the early summer of 2015, common bat species on the Installation include the big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), Seminole bat (*Lasiurus seminolus*), and evening bat (*Nyctisceius humeralis*) (Eco-Tech 2015).

Common bird species found on Fort Gordon include northern bobwhite quail (*Colinus virginianus*), turkey vulture (*Cathartes aura*), pileated woodpecker (*Dryocopus pileatus*), northern mockingbird (*Mimus polyglottos*), red-eyed vireo (*Vireo olivaceus*), tufted titmouse (*Parus bicolor*), and Carolina chickadee (*Parus carolinensis*). Common reptile and amphibian species found on the Installation include eastern box turtle (*Terrapene carolina carolina*), eastern mud turtle (*Kinosternon subrubrum subrubrum*), southern fence lizard (*Sceloporus undulatus undulatus*), brown water snake (*Nerodia taxispilota*), and eastern kingsnake (*Lampropeltis getula getula*) (Fort Gordon 2015b).

White-tailed deer, eastern gray squirrel, raccoon, eastern cottontail rabbit, wood duck (*Aix sponsa*), eastern wild turkey (*Meleagris gallopavo silvestris*), northern bobwhite quail, and mourning dove (*Zenaida macroura*) are actively managed for sport hunting on Fort Gordon (Fort Gordon 2015b).

Aquatic Communities

Fort Gordon's streams, wetlands, and ponds harbor more than 50 species of fish (Fort Gordon 2015b). Approximately half of the native species that have been recorded in the Savannah River drainage occur on the Installation (Hoover and Kilgore 1999). The Installation's stream fish communities are dominated by common sunfish and minnow species, but a surprising number of catfish and darter species are also present. The ED of Fort Gordon's DPW actively manages 26 impoundments for recreational fishing (Fort Gordon 2015b). These impoundments are typically stocked with largemouth bass, bluegill, redear sunfish, and channel catfish, but crappie, hybrid bass, and grass carp have also been stocked to satisfy specific needs. Supplemental feeders have been placed in several of the larger impoundments to improve growth rates and increase standing crops of sport fish.

Hoover and Kilgore (1999) surveyed the fish of the Spirit Creek, Sandy Run, Boggy Gut, and Brier Creek drainages in 1995 and 1996 to assess the degree to which development, and particularly erosion, had affected fish community structure. Forty-four species of fish were collected during the study, including 10 centrarchids, 9 cyprinids, six ictalurids, and six percids. Species richness was

highest in Boggy Gut (31 species) and lowest in Spirit Creek (23 species). Species diversity was positively correlated with increasing depth and water clarity and negatively correlated with increasing turbidity. Total fish abundance was positively correlated with increasing stream width and negatively correlated with increasing conductivity.

Gregory, Stamey, and Wellborn (2001) evaluated physical and biological conditions of seven stream reaches in three major drainages at Fort Gordon: Butler Creek, Spirit Creek, and Boggy Gut. This ecological characterization was intended to determine if stormwater runoff from “urbanized areas” of Fort Gordon had degraded stream water quality or aquatic habitats. Conductivity and pH were relatively low in all of the stream reaches surveyed, but dissolved oxygen levels were more than adequate (> 5 mg/L at all locations) to support aquatic biota, including sensitive species. Macroinvertebrate taxa richness was lowest in streams draining urbanized areas (Butler Creek and McCoy’s Creek) and highest in reference streams (Marcum Branch and Boggy Gut). No clear correlations between watershed development/urbanization and fish community structure were found, as difference in stream size appeared to have a significant influence on fish abundance and species richness and likely obscured any water quality-related effects.

Fort Gordon’s Natural Resources Branch commissioned surveys of four Fort Gordon streams (Spirit Creek, Sandy Run, Boggy Gut, and Brier Creek) in 2010 to update the information collected by Hoover and Kilgore in 1995-1996 and ascertain if any protected fish or mussels were present. Most fish collected in 2010 were small-bodied, short-lived, schooling species, representatives of two families, the minnows (family Cyprinidae) and the livebearers (family Poeciliidae) (Tetra Tech 2010). Five cyprinid species [golden shiner (*Notemigonus crysoleucas*), dusky shiner (*Notropis cummingsae*), yellowfin shiner (*Notropis lutipinnis*), coastal shiner (*Notropis petersoni*), and lowland shiner (*Pteronotropis stonei*)] and a single poeciliid (mosquitofish, *Gambusia holbrooki*) appeared in collections. Substantial numbers of brook silversides (family Atherinidae) were also collected. Other species were collected less frequently.

Limited mussel surveys were conducted in association with the 2010 Tetra Tech fish surveys at sites in Spirit Creek, Sandy Run, Boggy Gut, and Brier Creek. Habitat quality at these sites ranged from very good (Sandy Run, Boggy Gut, Brier Creek) to adequate (Spirit Creek). Sandy Run and Brier Creek contained thriving mussel populations that were dominated by common southeastern species, including three *Elliptio* species (*Elliptio complanata*, *E. icterina*, and *E. producta*) (Tetra Tech 2010). Five species were collected at the Brier Creek site and four species at the Sandy Run site. No mussels were found in Spirit Creek or Boggy Gut. Survey results mirrored those of Hoover and Kilgore (1999), who also found mussels in Sandy Run and Brier Creek and no mussels in Spirit Creek and Boggy Gut. No protected mussel species were collected in either survey.

Rare and Protected Species

The INRMP (Fort Gordon 2015b) uses the term “target species” to refer to species that are protected by state or federal law or that receive special management attention due to their rarity. These include species that are federally listed as threatened or endangered, state-protected/listed species (threatened, endangered, rare, or unusual) and Army SARs. The Army applies the SAR designation to species that are not legally protected but are candidates for federal listing or are categorized by NatureServe as “imperiled” or “critically imperiled.” Based on these criteria, 18 target species (8 plants and 10 animals) have been identified on Fort Gordon (Fort Gordon 2015b). Table 6 lists these species, their status, and describes each species’ habitat requirements. Figure 3 shows the location of Pickering’s morning glory (*Stylisma pickeringii* var. *pickeringii*), sandhill rosemary (*Ceratiola ericoides*) and sweet pitcher plant (*Sarracenia rubra rubra*), which are all state listed threatened species.

Two federally listed species are known to occur on Fort Gordon: RCW (*Picoides borealis*) and the wood stork (*Mycteria americana*). The RCW is federally listed as endangered and the wood stork is federally listed as threatened.

The RCW is the only federally listed species known to breed on Fort Gordon. This species is actively managed on Fort Gordon under a Biological Opinion issued by

the USFWS. RCWs occur in "families," which are often referred to as groups or clusters. High-quality foraging habitat for RCWs includes large old pines, low densities of small and medium pines, sparse or no hardwood midstory, and groundcover consisting of bunchgrasses and forbs.

Fort Gordon has established a RCW HMU consisting of all potential habitat for this species, excluding the cantonment area, the Artillery Impact Area (AIA), areas where the future or current military mission is not compatible with target species management, and areas of non-habitat (e.g., bottomland hardwood forest). The RCW HMU encompasses approximately 25,543 acres (Figure 4) (Fort Gordon 2015b).

The wood stork's federal listing was changed from endangered to threatened in 2014 (79 Federal Register 125, 30 June 2014, pp. 37078 – 37103). Wood storks have been observed foraging and roosting on Fort Gordon, but are not known to nest on the Installation. Wood storks feed primarily in open, shallow wetlands such as marshes, managed impoundments, seasonally flooded roadside ditches, and swamp sloughs (USFWS 1996).

Biologists conducting bat surveys at Fort Gordon in 2012-2013 recorded calls that an acoustical analysis software indicated were those of the gray bat (gray myotis) (*Myotis grisescens*), which is a federally listed species. However, historic records on the distribution of the species and the absence of geological and landscape features typically associated with the species suggested that the calls had been mis-attributed to gray bats. Follow-up studies in the summer of 2015 that included both mist-netting and more-refined acoustic surveys found no evidence that the gray bat occurs on the Installation (Eco-Tech 2015). The nearest historic record of the gray bat is approximately 78 miles west of Fort Gordon; the nearest recent record is approximately 135 miles west of the Installation (Eco-Tech 2015). Fort Gordon is approximately 170 miles from the nearest karst area, which is an important geologic feature for gray bat summer maternity and summer bachelor roosting habitat (Eco-Tech 2015). Fort Gordon does not provide the exposed rock or caves preferred by this species (Fort Gordon 2015b). The weight of evidence

suggests that gray bats do not occur in the Fort Gordon area and the calls attributed to the gray bat during the 2012-2013 surveys by acoustical analysis software were produced by another species (Eco-Tech 2015).

The bald eagle (*Haliaeetus leucocephalus*) is listed by GADNR as threatened. The USFWS removed the bald eagle from the federal list of threatened and endangered species in 2007. At the federal level, the bald eagle is still protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. The bald eagle is known to forage on Fort Gordon but there are no known nests on the Installation.

The gopher tortoise (*Gopherus polyphemus*) is state threatened and a federal candidate species, and is managed by the Army as a Species at Risk under a Candidate Conservation Agreement with federal and state agencies. Fort Gordon has established a gopher tortoise HMU that includes all potential gopher tortoise habitat excluding the cantonment area, and areas where the future or current military mission is not compatible with target species management (Figure 5).

Southeastern American kestrels (*Falco sparverius paulus*), state listed as rare, are located in open or partly open habitats with scattered trees, including cultivated and semi-urban areas. Kestrel nest boxes have been installed throughout Fort Gordon, and kestrels are monitored through their use of nest boxes and the banding of live nestlings. The nest boxes are cleaned and repaired annually in February prior to the Spring and Summer nesting season and checked monthly during the nesting season (Fort Gordon 2015b).

One protected fish species, the bluebarred pygmy sunfish (*Elassoma okatie*; state-listed as endangered), has been recorded at Fort Gordon (Fort Gordon 2015b). Its primary habitat is roadside ditches and backwaters of creeks with brown-stained water and dense aquatic vegetation. Hoover and Kilgore (1999) reported that this species occurred in only one stream on Fort Gordon, Boggy Gut, but a follow-up study revealed that the species was much more widely distributed across the Installation than originally believed. The species has now been documented in

four stream systems: Spirit Creek (McCoy's Creek, a tributary), Sandy Run Creek, Boggy Gut, and Brier Creek (Rohde, Hoover and Killgore 2004).

Table 6: Federal/State Protected Species Recorded at Fort Gordon

Common Name	Scientific Name	Status			Description of Habitat
		Federal	State	NatureServe	
Birds					
Bachman's sparrow	<i>Aimophila aestivali</i>	NL	R	G3	Abandoned fields with scattered shrubs, pines, or oaks.
Southeastern American kestrel	<i>Falco sparverius paulus</i>	NL	R	G5T4	Breed in open or partly open habitats with scattered trees and in cultivated or urban areas.
Bald eagle	<i>Haliaeetus leucocephalus</i>	NL	T	G5	Inland waterways and estuarine areas.
Wood stork*	<i>Mycteria americana</i>	T	E	G4	Primarily feed in fresh and brackish wetlands and nest in cypress or other wooded swamps.
Red-cockaded woodpecker	<i>Picoides borealis</i>	E	E	G3	Nest in mature pine with low understory vegetation; forage in pine and pine hardwood stands.
Mammals					
Rafinesque's big-eared bat	<i>Corynorhinus rafinesquii</i>	NL	R	G3G4	Buildings in forested regions.
Reptiles and Amphibians					
Gopher tortoise	<i>Gopherus polyphemus</i>	C	T	G3	Well-drained, sandy soils in forest and grassy area, associated with pine overstory.
Southern hognose snake	<i>Heterodon simus</i>	NL	T	G2	Open, sandy woods, fields, and floodplains.
American alligator	<i>Alligator mississippiensis</i>	T (S/A)	NL	G5	Marshes, swamps, rivers, farm ponds, and lakes. Nest in shallow, heavily vegetated, and secluded areas.
Fish					
Bluebarred pygmy sunfish	<i>Elassoma okatie</i>	NL	E	G2G3	Heavily vegetated creeks, sloughs, and roadside ditches.

Common Name	Scientific Name	Status			Description of Habitat
		Federal	State	NatureServe	
Plants					
Rosemary	<i>Ceratiola ericoides</i>	NL	T	G4	Dry, openly vegetated, scrub oak sandhills and river dunes with deep white sands of the Kershaw soil series.
Atlantic white cedar	<i>Chamaecyparis thyoides</i>	NL	R	G4	Wet sandy terraces along clear streams and in acidic bogs.
Pink ladyslipper	<i>Cypripedium acaule</i>	NL	U	G5	Upland oak-hickory pine forest.
Carolina bogmint	<i>Macbridea caroliniana</i>	SC	R	G2G3	Bogs, marshes, and alluvial woods.
Indian olive	<i>Nestronia umbellula</i>	SC	R	G4	Dry open upland forest of mixed hardwood and pine.
Sweet pitcher plant	<i>Sarracenia rubra rubra</i>	NL	T	G4	Acid soils of open bogs, sandhill seeps, Atlantic white cedar swamps, and wet savannahs.
Pickering's morning glory	<i>Stylisma pickeringii</i> <i>var. pickeringii</i>	SC	T	G4T3	Coarse white sands on sandhills near the Fall line and on a few ancient dunes along the Flint and Ochoopee rivers.
Silky camelia	<i>Stewartia malacodendron</i>	NL	R	G4	Steepheads, bayheads, and edge of swamps.

*Transient presence on Fort Gordon

Status Key: E = Endangered, T = Threatened, T(S/A) = Threatened due to similarity of appearance to Threatened Species C= Candidate, R = Rare, U = Unusual, SC=Species of Concern, NL = not listed, G1 = Critically Imperiled, G2 = Imperiled, G3 = Vulnerable, G4 = Apparently Secure, G5= Secure, T3 = Vulnerable (subspecies), T4 = Apparently Secure (subspecies)

Figure 3: Fort Gordon Target Species

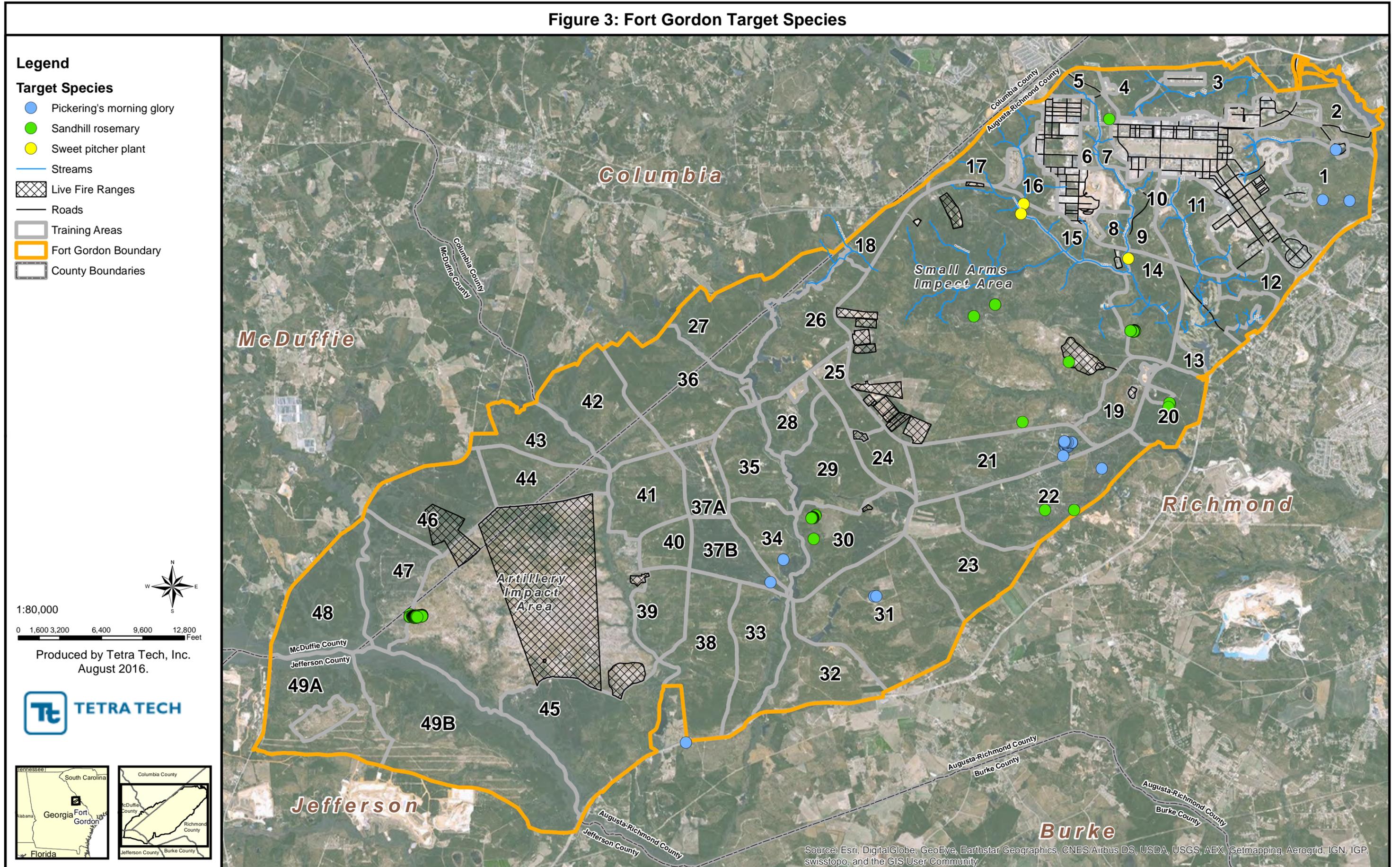


Figure 4: Fort Gordon RCW HMU and RCW Clusters

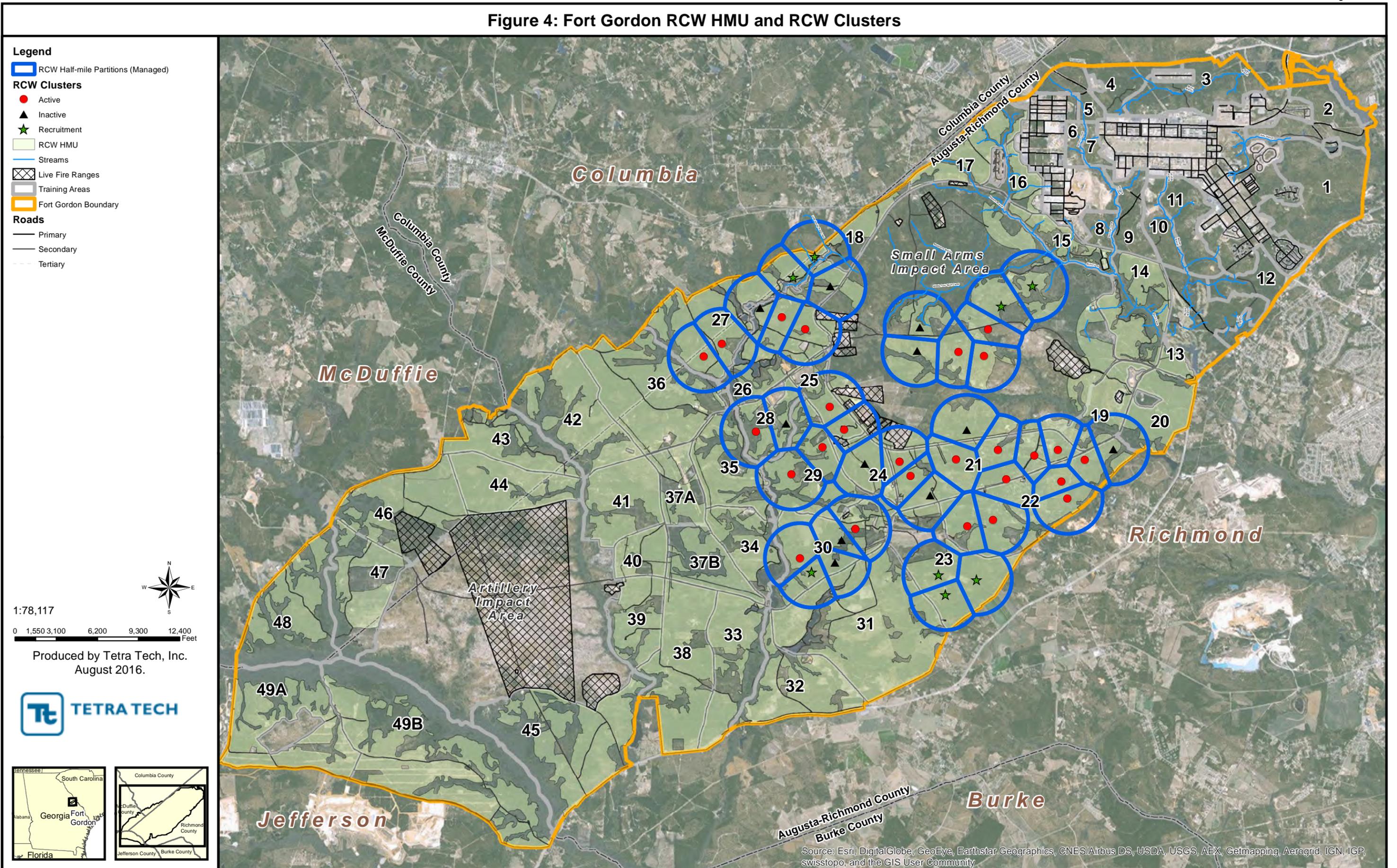
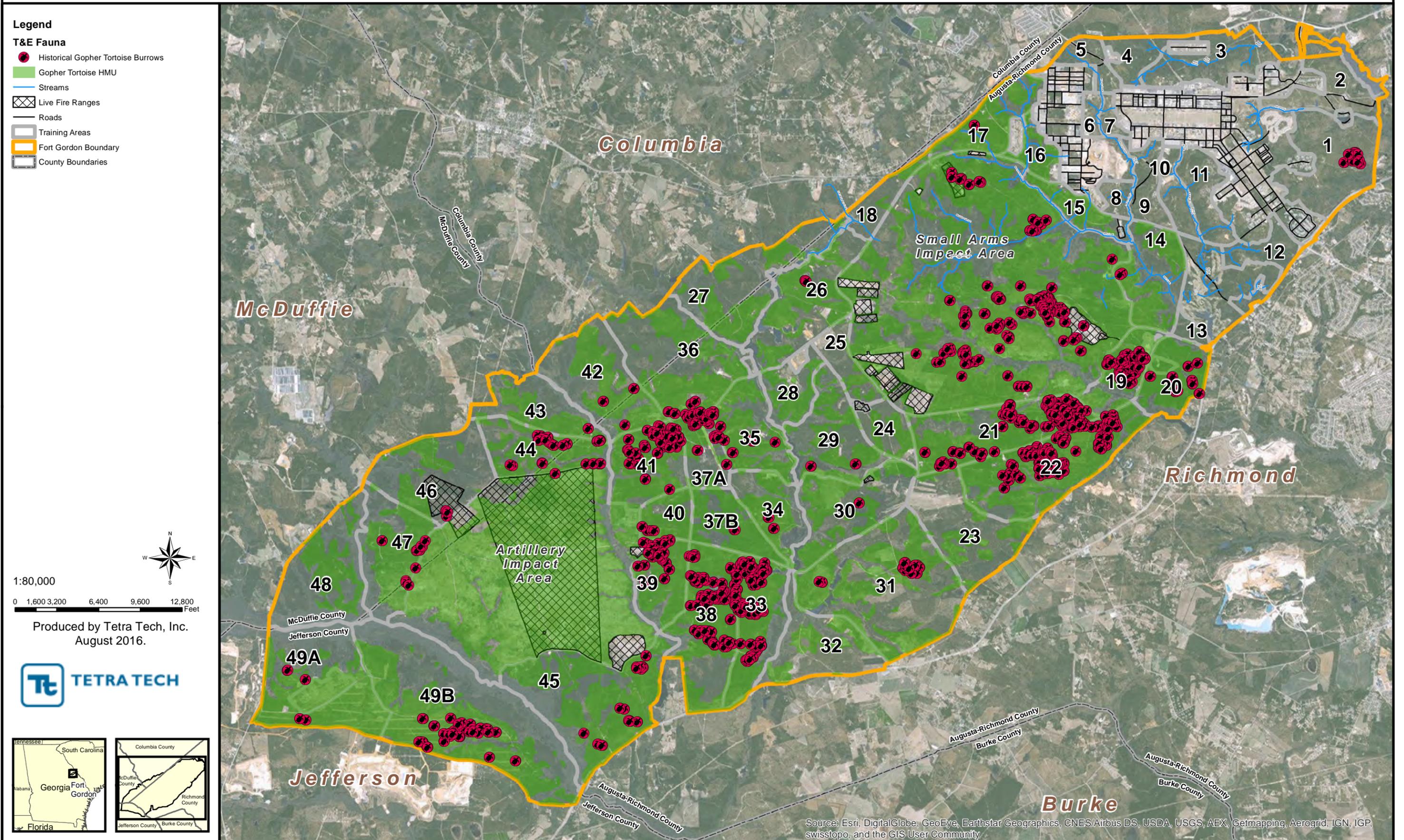


Figure 5: Fort Gordon Gopher Tortoise HMU and Burrows



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3.5.2 Environmental Consequences

Threshold of Significance for Ecological Resources: A significant impact would occur if the project would (a) have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies or regulations by the GADNR or the USFWS; (b) have a substantial adverse effect on any sensitive or unique natural community identified in local or regional plans, policies or regulations by GADNR or USFWS; (c) interfere substantially with the movement of native resident or migratory fish or wildlife, obstruct wildlife corridors, or harm wildlife nursery sites; (d) conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or (e) conflict with the provisions of an approved local, regional, or state habitat conservation plan. Specific significance thresholds for Fort Gordon include (a) reduction of the installation RCW population; (b) reduction of forage habitat at active RCW clusters below threshold levels; and (c) direct effect to a living RCW or active cavity tree.

3.5.3 Alternative 1 (Preferred Alternative): INRMP Implementation

Terrestrial Communities

Under the Preferred Alternative, Fort Gordon natural resource managers would continue to convert non-native and off-site forest stands to forest stands dominated by native pine species. The goal is to re-establish longleaf pine – dominated forest communities in areas of Fort Gordon where they historically occurred. Stand conversion involves removal of non-native and off-site pines and scrub oaks followed by the re-establishment or re-introduction of native pines that are more appropriate to the local soils and site conditions. Dry upland sites that historically supported longleaf pine-wiregrass ecosystems would be converted to longleaf pine; wetter sites and sites adjacent to wetlands would be converted to loblolly pine, the pine species that historically predominated in these areas. Fort Gordon's priority is to restore longleaf pine-wiregrass communities; however the tree species to be restored on each conversion site will depend on soil type and site conditions.

Most of the sites designated as stand conversion sites are best suited for longleaf pine, including some sites currently supporting loblolly pine, an off-site species. The few areas in slash pine or scrub oak that are adjacent to wetlands will be converted to loblolly pine. Older slash pine stands within the HMU may need to be retained for RCW management until native pines are large enough to provide foraging habitat. The conversion of non-native and off-site species to longleaf pine is a critical component of longleaf pine-wiregrass ecosystem restoration.

Stand conversion represents the beginning of the longleaf pine-wiregrass restoration process. Implementation of the Preferred Alternative also involves intensive management of longleaf pine forests once they have been re-established. Mid-story and understory hardwoods occurring within longleaf pine stands must be removed (or thinned) by hand and/or mechanical or chemical means. As specified in the revised INRMP, prescribed burning would be used to re-create the natural fire regimes (i.e., growing season fires) that once occurred within the longleaf pine forests. These prescribed burns control hardwood encroachment while at the same time stimulating growth of native shrubs and herbaceous species. Mid-story thinning and prescribed burning produce the low basal areas required by the revised 2003 RCW Recovery Plan (USFWS 2003) and Management Guidelines for the Red-cockaded Woodpecker on Army Installations (Army 2007).

Indirect benefits would also occur upon implementation of the Preferred Alternative. Once open longleaf pine forests and a natural fire regime are re-established, fuel loads would be reduced and wildland fires would be more easily contained. Thus, the likelihood of wildland fires destroying valuable timber and wildlife habitat on or adjacent to Fort Gordon would be reduced.

Wildlife management practices that benefit wildlife populations within the installation would continue under the revised and updated INRMP. Restoration of longleaf pine - wiregrass ecosystems would benefit species that prefer this community type, such as RCW, Bachman's sparrow (*Aimophila aestivali*), fox squirrel (*Sciurus niger*), gopher tortoise, southern hognose snake and pine warbler

(*Dendroica pinus*). However, elimination of the scrub oaks and other midstory tree species and underbrush to create “park-like”, longleaf pine forests could depress local populations of some species such as gray squirrel (*Sciurus carolinensis*), northern cardinal (*Cardinalis cardinalis*), eastern box turtle (*Terrapene carolina carolina*), and Carolina wren (*Thryothorus ludovicianus*) that feed heavily on acorns, seek deep shade, or require dense underbrush for escape cover.

Continuing and expanding growing season prescribed fires would affect some nesting migratory birds. The magnitude of this effect is unknown at the present; however, since this regime would be designed to mimic historical fire patterns or frequencies, it can be assumed that species that become established in the longleaf pine forests would be adapted to any potential effects.

Closure of forest roads and firebreaks under the Preferred Alternative would directly benefit a variety of amphibians, reptiles, birds, and small mammals. Once closed, these roads would either be allowed to revegetate naturally or would be seeded with native grasses and legumes (Fort Gordon 2015b). Revegetating forest roads and firebreaks would provide grassy/weedy escape cover and new food sources (seeds, insects) for birds and small mammals.

Under the Preferred Alternative, Fort Gordon would continue to maintain at least 800 acres of wildlife openings within forested areas (Fort Gordon 2015b). Some of these clearings are left fallow each year, while others are planted with various grains and legumes. Oats, wheat, winter peas, and clover are generally planted in the fall; corn, browntop millet, Japanese millet, sorghum, partridge pea, Egyptian wheat, sunflowers, and chufa are generally planted in the spring and summer. These plantings benefit an array of game species (white-tailed deer, wild turkey, mourning dove, northern bobwhite) and non-game species (small mammals and songbirds). Because there are food plots scattered across most of the Training Areas, hunting pressure isn’t concentrated on a limited number of spots that offer particularly high-quality wildlife habitat.

Aquatic Communities

Closure of forest roads and firebreaks under the Preferred Alternative would indirectly benefit aquatic communities by reducing erosion and sedimentation. Once closed, these roads would either be allowed to revegetate naturally or would be seeded with native grasses and legumes (Fort Gordon 2015b). Re-establishing vegetation on forest roads and firebreaks would reduce soil losses, improving water quality (lower levels of suspended solids, lower turbidity) in down-gradient streams, ultimately benefitting benthic macroinvertebrates and fish in these streams. Sensitive (but not formally protected) fish species, in particular, that require clear, flowing streams with clean sand or gravel bottoms should benefit from improved water quality.

Fort Gordon's water quality monitoring program, part of the INRMP, includes established sampling points in streams in different areas of the Installation. The monitoring program is focused on non-point source pollutants and contaminants, and ensures that state and federal water quality standards are met. The program also serves to protect the aquatic communities of Fort Gordon's streams, as any potential water quality issues are quickly identified and addressed. The programs and procedures that make up the SESCO of the INRMP, discussed in detail in Section 3.3.2, are also protective of aquatic habitats and aquatic organisms, including benthic macroinvertebrates and fish.

The fisheries management program described in the INRMP are designed to benefit fish and other aquatic organisms by increasing the productivity of Installation impoundments, controlling nuisance aquatic vegetation, and improving habitat. Impoundments are limed and fertilized to stimulate production of phytoplankton, which provide food for zooplankton, which in turn provide food for larval fish and bait fish, ultimately increasing an impoundment's standing crop (biomass) of fish. Nuisance/excessive aquatic vegetation is controlled with winter drawdowns, herbicides, and grass carp. Fish attractors are placed in Installation impoundments to create structure/cover where none would otherwise exist.

Lowering the surface water levels at selected lakes and ponds during the spring to create moist soil units could adversely affect fish populations by reducing spawning areas and increasing competition for space; however, this action would beneficially impact waterfowl during the fall migration period by increasing the amount and diversity of available food sources.

Threatened and Endangered Species

As part of the original 2008 ESMC, Fort Gordon established an approximately 24,300-acre HMU for the RCW. Based on the size of the HMU Fort Gordon’s IPG was 122 potential breeding groups. The IPG reflected Fort Gordon’s contribution to the Regional Recovery Goal, as outlined in the revised 2003 RCW Recovery Plan (USFWS 2003).

As part of the current 5-year review an updated ESMC was developed and would be implemented as part of the Proposed Action. The revised ESMC for the FY 2014-2018 INRMP planning period calls for a slightly larger HMU, a smaller IPG, and changes to recruitment cluster goals (Fort Gordon 2015b). These changes are summarized below in Table 7.

Table 7: Summary of Major Changes in Fort Gordon ESMC

ESMC 2008-2013	ESMC 2014-2018
24,300-acre HMU	25,543-acre HMU
Installation Population Goal of 122 potential breeding groups	Installation Population Goal of 103 active clusters*
	Delete 5 clusters from management (inactive for more than 5 years)
A total of 25 recruitment clusters were to be provisioned and five existing recruitment clusters were to be activated.	Provision 26-30 recruitment clusters over the next 5 years

* Reflects a new, improved method of developing population goal that takes into account irregular shape of HMU

As with the original ESMC, forest stands associated with recruitment clusters and their foraging areas would be actively managed to provide the habitat necessary to support the RCW population goal. Timber management in the HMU would be consistent with RCW conservation practices and comply with the revised 2003 RCW Recovery Plan (USFWS 2003). Adequate foraging habitat and quality foraging stands are necessary to fulfill the requirements of the revised 2003 RCW Recovery Plan (USFWS 2003). Silviculture methods that maintain or regenerate the historic pine ecosystem will continue to be used with an emphasis on prescribed burning.

Prescribed burns would be conducted in accordance with the IWFMP, updated in 2015 (Fort Gordon 2015c). In accordance with the IWFMP, growing season (spring/summer) burns would continue to be conducted when appropriate to replicate historic, natural patterns in order to better control understory hardwoods and promote a variety of herbaceous species that are typical of the longleaf pine/wiregrass community.

The Proposed Action would satisfy the requirements of the revised 2003 RCW Recovery Plan and 2007 Guidelines and would have beneficial effects on the RCW population on Fort Gordon. Implementation of the Preferred Alternative is expected to both expand Fort Gordon's RCW population and increase its genetic diversity.

Other sensitive species would also benefit from RCW management and longleaf pine-wiregrass restoration. The gopher tortoise, Bachman's sparrow, southern hognose snake, Florida pine snake (*Pituophis melanoleucus mugitus*), cut-leaf harvest lice (*Agrimonia incisa*), Pickering's morning-glory, sandhill rosemary (*Ceratiola ericoides*), and wooly goldenrod would receive the most benefits from the conversion of slash pine and loblolly pine plantations to open, longleaf pine forests and a prescribed burning program that mimics the natural fire regime for this ecosystem.

The gopher tortoise, like the RCW, benefits from longer timber rotations, prescribed burning, and stand conversion. Natural resources management on Fort

Gordon under the Preferred Alternative would be consistent with the 2008 Gopher Tortoise Guidelines (Army 2008). In compliance with the 2008 Gopher Tortoise Guidelines, Fort Gordon has established a Gopher Tortoise HMU and has conducted extensive gopher tortoise surveys since 2011. Information from these surveys is being used to guide gopher tortoise management on the Installation.

3.5.4 No Action Alternative

Under the No Action Alternative, Fort Gordon's natural resources would continue to be managed in accordance with the 2008 INRMP. Differences between the No Action Alternative and the Preferred Alternative are small, involving minor changes in way various components of the forest management and wildlife management programs are administered. Impacts of natural resource management activities on ecological resources (including fish, wildlife, and protected species) from implementation of the 2008 INRMP have been overwhelmingly positive. Negative impacts have been minor, and have never approached the significance thresholds described at the beginning of this section.

3.6 Cultural Resources

3.6.1 Affected Environment

The Fort Gordon Integrated Cultural Resources Management Plan (ICRMP) (Fort Gordon 2011) includes:

- detailed information on applicable cultural resources regulatory frameworks;
- regional prehistoric and historic background;
- the history of Fort Gordon;
- cultural resources investigations and recorded properties; and
- Installation-specific standard operating procedures for managing and protecting important sites.

This and other ICRMP information are incorporated here by reference and, therefore, are not repeated. In addition to the ICRMP, Fort Gordon has a

Programmatic Agreement among the United States Army and the Georgia State Historic Preservation Officer and the Advisory Council for Historic Preservation (PA) and a Memorandum of Understanding with four federally recognized Tribes to help manage its cultural resources (Fort Gordon 2015d).

Fort Gordon has determined that the Proposed Action is a federal undertaking with the potential to adversely affect historic properties, as defined under 36 CFR 800.16(y), and, thus, is governed by Section 106 of the National Historic Preservation Act (NHPA) and the implementing regulations at 36 CFR Part 800. As stipulated in 36 CFR 800.8, compliance with Section 106 can be coordinated with the requirements of NEPA. Fort Gordon has elected to fulfill its NEPA and Section 106 compliance documentation, with the Georgia State Historic Preservation Officer (GASHPO), through this SEA.

Archaeological Resources

Fort Gordon has completed archaeological surveys on 47,619 acres, or 95 percent of the total land area of the Installation. Areas that have not been surveyed include portions of the heavily disturbed cantonment area, impact areas that contain or are likely to contain unexploded ordnance, and lake bottoms. As of 2015, 1,153 archaeological sites had been identified on Fort Gordon. Of those, 998 are not eligible for listing on the National Register of Historic Places (NRHP), 114 are potentially eligible, and 41 are eligible for listing on the NRHP. Phase II testing to evaluate the NRHP eligibility of archaeological sites has been completed at 29 sites. A majority of the prehistoric sites are adjacent to water features such as stream drainages. Many of the historic sites are relict mill sites and homesteads that were razed after the Army purchased the land.

Historic Architecture

Fort Gordon completed an Installation-wide architectural survey in 2005. Through the survey, no buildings or structures were determined to be eligible or potentially eligible for listing on the NRHP. However, on the basis of the recommendation of the GASHPO, Building 33500 (Woodworth Library) is considered eligible for the NRHP under Criteria C for the architectural significance of its New Formalism style and Criterion Consideration G for a building less than 50 years old because few buildings of this style remain intact in Georgia. Forty-three structures including the Signal School Campus have been recommended for reevaluation upon reaching 50 years of age.

Native American Resources

Fort Gordon has held on-site consultation meetings and sends out consultation requests for individual actions that could affect archaeological resources or that have widespread effects, such as cultural resource or natural resources management plans, to nine Native American tribes.

Cemeteries

There are 44 known historic (family) cemeteries on Fort Gordon that pre-date the Installation's establishment. Families associated with the family cemeteries are allowed new burials if space is available within the original cemetery footprint. Two prisoner-of-war (POW) cemeteries are on Fort Gordon near Gate 2. German and Italian POWs who died while in captivity from 1944 through the end of World War II were buried in those cemeteries. No new burials are allowed in the POW cemeteries. Fort Gordon provides grounds maintenance for all of the cemeteries. The NHPA specifically excludes most cemeteries for consideration for listing on the NRHP.

3.6.2 Environmental Consequences

Threshold of Significance for Cultural Resources: A significant impact would occur if the project would (a) cause a significant adverse change in the significance of a historical or archeological resource as defined in the National Historic Preservation

Act; (b) directly or indirectly destroy a unique paleontological resource or site of unique geologic feature; (c) disturb any human remains, including those buried outside of formal cemeteries.

3.6.3 Alternative 1 (Preferred Alternative): INRMP Implementation

Phase I cultural resources surveys have been completed in almost all of the installation's unrestricted woodlands (forests available for commercial harvest) (Fort Gordon 2015b). Areas that have not had a Phase I cultural resources survey completed would not be harvested until a Phase I cultural resources survey is completed. Areas that have been surveyed and have archeological sites that have been determined to be eligible or potentially eligible for the NRHP would be avoided and no mechanical harvesting activities would take place within the site boundaries. Sites will be marked "Off Limits to Logging" and contractors will be shown locations of all sites to prevent accidental disturbance. If previously unknown sites are discovered during harvesting operations, all activities within the site will cease until a determination of NRHP eligibility can be made. No management activity to include timber harvesting will knowingly be allowed to have a negative impact on cultural resource sites, which are eligible or potentially eligible for the NRHP.

3.6.4 No Action Alternative

No direct or indirect adverse impacts to cultural resources would be expected with the implementation of the Proposed Action.

3.7 Land Use

3.7.1 Affected Environment

Installation Land Use

Fort Gordon encompasses approximately 55,590 acres. Approximately 50,000 acres are used for training missions and the remaining 5,590 acres are occupied by cantonment areas which include military housing, administrative offices, community facilities, medical facilities, industrial facilities, maintenance facilities,

supply/storage facilities, lakes and ponds, and recreational areas. There are 49 Training Areas that occupy approximately 37,000 acres and two restricted impact areas (small arms and artillery) that occupy approximately 13,000 acres.

Land use management falls under the authority of the DPW and the Installation Real Property Planning Board (RPPB). The RPPB assists Fort Gordon's commander in managing the Installation and area facilities and in developing real estate in an orderly manner, consistent with current and projected Installation missions.

Fort Gordon operates 19 live fire ranges, one dud impact area; one demolition pit; one indoor shoot house; one convoy live fire familiarization course; two military operations on urban terrain sites; and one nuclear, biological, and chemical chamber. Training primarily consists of advanced individual signal training and unit employment of tactical communications/electronics operations. Additionally, artillery demolition, aerial gunnery load master drop zone, and airborne troop training are conducted on Fort Gordon.

Changing mission and training requirements are causing the ranges and Training Areas of Fort Gordon to be used in increasingly different ways. Some of the new and expanded mission requirements include:

- Convoy training, including convoy live fire, and qualification record fire response. In the future this will include night operations on major training complex roads with the use of night vision devices;
- Improvised Explosive Device situations incorporated into all tactical ground training events;
- Training in a projectile-based environment (paintball and Special Effects Small Arms Marking System); and
- Weapons qualifications for all Advanced Infantry Training soldiers.

U.S. Army regulations currently specify two forestland classifications: reimbursable (commercial) and non-reimbursable (noncommercial). Reimbursable forestland (RFL) is managed land that is capable of producing

economical crops of industrial wood in excess of 20 cubic feet per acre per year and is not programmed for another use that would preclude future forest development. Non-reimbursable forestland (NRFL) consists of the cantonment areas, golf course and other designated recreation areas, the direct bullet impact areas on the SAIA and AIA, and the known dud areas in Training Areas (Fort Gordon 2015b). Table 8 shows the acreages of RFL and NRFL on Fort Gordon.

Table 8: Acreage of Fort Gordon Lands by Forestland Classification

Forestland Classification	Area (acres)
Reimbursable	45,000.0
Non-reimbursable	10,587.5
Total Installation	55,587.5

Source: Fort Gordon 2015b

The Installation also provides multiple-use recreation opportunities including camping, horseback riding, picnicking, water sports, archery, boating, hiking, and nature education. Hunting and fishing on the Installation are authorized for active and retired military, active and retired civilian federal government employees, base operations contractors with multiyear contracts, reserve and national guard soldiers, and a limited number of public access permits offered through a lottery draw. Hunters and fishermen accounted for 14,615 training area user days collectively in 2015.

Approximately 43,500 acres on-post are managed for hunting; the remaining 12,500 acres have been designated no-hunting areas for safety reasons (Fort Gordon 2015b). Twenty-six of 28 impoundments on the Installation are actively managed for recreational fishing (Fort Gordon 2015c). Rules and regulations governing hunting and fishing on the Installation are set forth in the Army Signal Center and Fort Gordon Regulation 420-5, *Hunting, Fishing, Trapping, and Horseback Riding Regulations*. Fort Gordon allows hunting and fishing in most Training Areas.

A formal Outdoor Recreation Plan for Fort Gordon was last completed through contract with the United States Army Corps of Engineers (USACE) Savannah

District in August 2006. Several projects in recent years have been implemented based on this plan, such as an outdoor water park and updated sports fields.

Regional Land Use

Land use within one mile of Fort Gordon varies from semi-urban to rural. The area east of Fort Gordon is developed and makes up the greater Augusta area. The major land use east of the Installation along U.S. Highway 1 and U.S. Highway 78/Gordon Highway is commercial. Further west of Augusta on the north and south sides of the Installation, land use becomes a mixture of rural residential, commercial, and undeveloped land. Land use south of the Installation along U.S. Highway 1 to the west of Gate 5 in western Richmond County is agricultural. In Columbia County, land use closest to Fort Gordon is mixed, with single-family residential and some mobile home development. Some multifamily development is also scattered throughout the area. Suburban areas are concentrated in the Evans-Martinez area and in the City of Grovetown. Land use adjacent to Fort Gordon in Jefferson and McDuffie counties is agricultural. More than 88 percent of Jefferson County's land is devoted to agriculture and forestry (Fort Gordon 2015b).

Land use planning in Richmond, Columbia, McDuffie, and Jefferson counties is conducted by local governmental entities through land development policies they enact for the benefit of their communities. No local governments currently have zoning or land use programs that directly affect Fort Gordon. However, allowing certain land uses adjacent to Fort Gordon's boundaries may impact the Installation's use of its lands. Richmond, Columbia, McDuffie, and Jefferson counties each have land use development plans, and have worked with Fort Gordon regarding a Joint Land Use Study (JLUS). As a result of this study, these four counties have agreed to direct development in ways that should allow Fort Gordon's mission to continue without conflicts with land use outside the Installation (CSRA Regional Development Center 2005).

The 2005 JLUS made the following assumptions about future land use trends through 2025:

- moderate to high residential growth;
- moderate commercial growth;
- moderate industrial growth;
- declining agricultural and forestry uses; and
- moderate parks, recreation, and conservation growth.

The JLUS concluded that projected growth rates identified in local comprehensive plans would not raise compatibility issues with Fort Gordon. It also included the following conclusions:

- Columbia County will undergo substantial conversion from undeveloped to residential uses. The area to the northeast of Fort Gordon, around the Grovetown area, is expected to undergo significant population growth through the next two decades.
- Lands in Jefferson and McDuffie Counties, to the south and southwest of Fort Gordon, are projected to remain primarily agricultural and forestry.
- The future land use map for Richmond County includes growth areas away from Fort Gordon's noise zones.

Fort Gordon received approval and funding from the Office of Economic Adjustment in November 2014 to update the 2005 JLUS. The current JLUS has had limited success in preventing encroachment, as evidenced by recent explosive and uncontrolled growth along the Installation's boundary between Gate 1 and Gate 2 and in Grovetown west of Gate 2 closer to Fort Gordon's weapons ranges and maneuver training areas. The new JLUS is scheduled for completion in Spring 2017.

3.7.2 Environmental Consequences

Threshold of Significance for Land Use: A significant impact would occur if the project would (a) physically divide an established community; (b) conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project; or (c) conflict with any applicable habitat conservation plan or natural community conservation plan.

3.7.3 Alternative 1 (Preferred Alternative): INRMP Implementation

The updated INRMP provides a template for managing Fort Gordon's natural resources over the FY 2014 - FY 2018 planning period. Under the Preferred Alternative, Fort Gordon's natural resource managers would continue to restore the native pine forests that once dominated the region as well as the plant and animal communities associated with these pine forests. Implementation of the updated INRMP would include the continued conversion of non-native slash pine and offsite loblolly pine stands to longleaf pine forests. The intent of the Proposed Action is to re-establish historic ecosystems and native species while maintaining Fort Gordon's critical training mission. While many plant and animal species endemic to the upper Coastal Plain and Sand Hills have benefitted from ecosystem restoration activities at Fort Gordon, and 19 species have been identified as "target species" to be actively managed, the endangered RCW has been the focus of ED's management efforts. It is the only federally listed species that breeds on the Installation.

RCW restoration efforts have since the late 1990s have not hindered military training at Fort Gordon to a significant degree. Although some especially loud and intrusive training activities are not allowed in the vicinity of active RCW clusters, there are no restrictions on training in most of the RCU HMU. Nor will there be, if the Preferred Alternative is implemented. Although specific forest management practices on Installation forestlands devoted to RCW conservation may differ from those used in areas where RCWs are not present, these forestlands would continue to be managed for commercial timber production. Should the revised INRMP be implemented, land use on the Installation would be affected only to the

extent that one kind of forestland (e.g., scrub oak communities or slash pine plantation) is converted to another kind of forestland (e.g., longleaf pine or loblolly pine).

These proposed forest management changes are consistent with existing Fort Gordon land use plans and policies, and do not conflict with any regional land use plans or habitat conservation plans. Therefore they don't exceed any of the significance thresholds listed earlier in this section.

3.7.4 No Action Alternative

Under the No Action Alternative, there would be no change in Fort Gordon's land use management policies. Installation properties would continue to be managed under current programs and plans, including the (2008) INRMP and Range Master Plan.

No significant changes in Installation land use have occurred as a result of implementing the 2008 INRMP and none would be expected should it be used as the basis for natural resources management in the future.

3.8 Infrastructure, Utilities and Facilities

3.8.1 Affected Environment

Electricity

Fort Gordon's electrical service was privatized in February 2007 and is currently provided by Georgia Power Company. The system receives 115 kilovolt primary input at two jointly owned and operated substations (main and hospital), which provide electrical power to the entire Installation (Fort Gordon 2014a). Georgia Power also owns and operates a 30 MW solar photovoltaic generating array system located in TA 12. This system connects into Fort Gordon's main substation.

Natural Gas

Natural gas is provided by Atlanta Gas Light Company, which owns the main natural gas distribution piping on Fort Gordon and all system piping and components downstream of the regulators up to the facilities. An 8-inch main runs

through Fort Gordon along a dedicated 10-foot easement for the 8.5 miles of pipe (Fort Gordon 2014a). Natural gas is supplied to heating and cooling plants, housing, barracks, medical facilities, classrooms, and other facilities.

Telecommunications

The Army owns and operates the on-post business telecommunication system. The switchboard has a capacity of 14,200 lines, 5,300 of which are currently in use. BellSouth provides commercial telephone service for the family housing, guest house, and bachelor officers' quarters. All telecommunications are transmitted throughout the Installation by buried cable and overhead lines (Fort Gordon 2014a).

Potable Water

Fort Gordon's potable water system was privatized to Augusta Utilities Department (AUD) in 2006. AUD is responsible for the operation and maintenance of the city's water systems. AUD's water is supplied from two sources – the Savannah River provides water for the Surface Water Treatment Plant and the Cretaceous Aquifer provides water for the Ground Water Treatment Plant (Fort Gordon 2014a). Treatment of the surface water occurs at the Highland Avenue surface water treatment plant. It has a design capacity of 60 million gallons per day (MGD) and provides the majority of the water supply. Two ground water treatment plants, Plants No. 1 and No. 2, have design capacities of approximately 10 MGD each. Ten wells provide raw water to Plant No. 2 and 14 wells provide raw water to Plant No. 1. Fort Gordon owns and operates numerous groundwater wells located in the TAs that supply potable water to the range, training, and recreation areas.

Domestic and Industrial Wastewater

Fort Gordon's wastewater system was also privatized to AUD in 2006. AUD is responsible for the operation and maintenance of the city's wastewater systems. Fort Gordon is connected to the AUD gravity sewer collection system and wastewater treatment system, which are in good condition and provide adequate service for all portions of the cantonment area. Fort Gordon's wastewater is gravity

fed to the old, inoperable Fort Gordon Wastewater Treatment Plant (WWTP) and then conveyed via force main to AUD's WWTP off-post. Army-owned and maintained septic tanks are used to treat sanitary wastewater at remote locations of the Installation not served by the sanitary sewer system.

Stormwater

Nearly 70 industrial facilities are included in Fort Gordon's National Pollutant Discharge Elimination System (NPDES) General Permit for Storm water Discharges. These industrial facilities lie mostly within the cantonment area; however, there are outlying industrial sites scattered across the Installation. These industrial facilities typically have buildings and impervious surfaces that can create storm water runoff. The storm water runoff is controlled by conveyances such as ditches, pipes, and swales that direct the water to monitored outfalls that feed various receiving waters. In addition, there are natural or constructed drainage basins that may or may not be associated with an industrial area. These, too, have monitored outfalls.

Stormwater runoff associated with construction activities is regulated by the GAEPD General NPDES Permit. Also, Fort Gordon is regulated under the Municipal Separate Storm Sewer System (MS4) permitting program, for municipalities and entities serving a population of less than 100,000. Fort Gordon's MS4 permit covers all new and existing point source discharges of stormwater from their small MS4 to the waters of the state of Georgia (GAEPD 2009).

Solid Waste Management

Fort Gordon operates one active landfill, the Fort Gordon Landfill on Gibson Road, which is permitted by Georgia under Permit 121-014D (SL). The landfill accepts nonhazardous demolition debris from the Installation that cannot be recycled; however, use of the landfill is restricted and must be coordinated through the DPW (Fort Gordon 2014a). The Fort Gordon Landfill receives approximately 1,334 cubic yards of waste per year and has 130,872 cubic yards of capacity remaining, or 98 years (ARCYBER 2013).

Other solid waste is disposed at the Augusta-Richmond County Landfill on Deans Bridge Road under contract (Fort Gordon 2014a). The landfill operates under Permit 121-018D Municipal Solid Waste Landfill. The landfill receives approximately 406,536 cubic yards of waste per year and has approximately 65,857,376 cubic yards of remaining capacity, or 162 years (Fort Gordon 2014a).

Fort Gordon supports a variety of recycling/waste minimization initiatives. The Installation has a Qualified Recycling Program for demolition projects, and also provides drop-off services and drop-off locations for Fort Gordon personnel. Metals and paper/cardboard are collected for off-post recycling. Yard wastes and woody debris from grounds maintenance are taken to the DPW Roads and Grounds department facility for processing and use as mulch.

Facilities

Fort Gordon has a large cantonment area with barracks, motor pools, shops, administrative buildings, drill fields, sports fields and other facilities. Housing facilities are provided through the Residential Communities Initiative to meet Army housing requirements.

Fort Gordon operates ranges for small arms, mortars, field artillery, aerial gunnery, and demolition. The Fort Gordon range and TA complex consists of 19 active ranges and 12 artillery firing points. The ranges are supported by a 7,645-acre SAIA and a 5,217-acre AIA.

3.8.2 Environmental Consequences

Threshold of Significance for Infrastructure, Utilities and Facilities: A significant impact would occur if the project would result in a substantial increase in any utility consumption to the extent that an existing or planned capacity is exceeded, based on currently available projections; unacceptable demands placed on infrastructure supply and distribution system; or the need for new or renovated facilities and the required construction/renovation would produce significant environmental impacts.

3.8.3 Alternative 1 (Preferred Alternative): INRMP Implementation

No infrastructure development or expansion would be necessary to support the Preferred Alternative. None of the natural resources management activities planned under the Preferred Alternative would require the construction of new buildings or facilities.

Forest management activities such as timber harvesting, stand improvement, and logging road construction can disturb surface soils or compact these soils, depending on circumstances. Either can increase the volume of storm water runoff by reducing the soil infiltration rate (amount of rainfall absorbed) or, in the case of logging roads, channeling storm water flow. *Georgia's Best Management Practices for Forestry* (Georgia Forestry Commission 2009) offers recommendations for controlling runoff and capturing eroded soils from access road construction, timber harvesting, and site preparation and reforestation. Water bars, turnouts, cross drains, diversion ditches, and rip-rap are among the BMPs used to slow runoff. Silt fences, straw bales, brush barriers, and sediment traps/basins are often used to capture eroded soils (sediment). Location-appropriate BMPs would be employed to reduce the impact of storm water runoff on forest soils and down-gradient streams.

Natural resources management activities under the Preferred Alternative will directly influence the volume and sediment content of storm water entering Installation streams and wetlands, but impacts to water quality and aquatic biota will be mitigated by the BMPs discussed earlier in the previous paragraph. The same activities should have little or no effect on storm water management in the cantonment area, as system components and processes are unaffected by activities outside of the cantonment area. Natural resources management activities (e.g., timber management) could have a minor effect on storm water management at one of the ranges or facilities located outside of the main cantonment area, but any impact would be small.

Implementation of the Preferred Alternative is expected to have almost no impact on solid waste management at Fort Gordon. Limbs, slash, and debris left over

from timber harvests are generally pushed into windrows (or spread across exposed soils) to slow surface runoff and reduce erosion. No debris from logging operations is transported to landfills.

The Land and Grounds Management component of the INRMP classifies all Installation property as “improved grounds,” “semi-improved grounds,” and “unimproved grounds” according to current land use and prescribes certain kinds of land/grounds management practices for each. Improved grounds (e.g., athletic fields and parade grounds) are mowed on a regular basis, periodically limed and fertilized, and may be treated with herbicides and pesticides when needed. Unimproved grounds (excluding forests managed for commercial timber production) receive no routine maintenance, are managed on an as-needed basis to achieve compliance with environmental laws and regulations. When infrastructure and utility systems and rights-of-way extend into semi-improved and unimproved grounds, they may be maintained, repaired, or upgraded to protect wetlands, water quality, and sensitive aquatic biota in accordance with state and federal regulations. Repairs and upgrades to infrastructure and utilities in these areas could have temporary adverse impacts on water quality or wetlands, but any such impacts would be outweighed by positive long-term impacts on the same resources and efficiencies gained by improving the operation of the electrical system, water delivery system, or storm water management system in question.

In summary, implementation of the Preferred Alternative would not create significant new or additional demand for housing, office space, shop space, electric power, drinking/potable water, sewage treatment capacity, or landfill space, therefore would not significantly impact infrastructure or utilities. Storm water management controls would be employed or installed, as necessary, in areas where timber is being actively managed, but timber management would have almost no effect on the Installation’s storm water management systems.

3.8.4 No Action Alternative

Under the No Action Alternative, there would be no change in the way Fort Gordon's infrastructure, utilities and facilities are managed and operated, and impacts would be similar to those described for the Preferred Alternative.

4.0 Cumulative Impacts

4.1 Regulatory Compliance

The requirement to assess cumulative impacts as part of the NEPA process is set forth in the CEQ regulation (40 CFR 1508.7) and further discussed within the Army context by 32 CFR Part 651.16, *Environmental Analysis of Army Actions*. Further guidance on this process is provided by the CEQ in its document, *Considering Cumulative Impacts under the National Environmental Policy Act* (CEQ, 1997).

Cumulative impacts result from the incremental effect of separate past, present, and reasonably foreseeable future actions on the environment, regardless of what agency or person undertakes those actions. They can accrue from individually minor but collectively significant actions taking place over an extended period of time. Taken individually, environmental damage is incremental, occurring one action at a time. However, determining the significance of the collective actions requires an understanding of their effect on the larger environment.

4.2 Cumulative Impact Analysis

The cumulative impact analysis is prepared at a level of detail that is reasonable and appropriate to support an informed decision by the U.S. Army in selecting a preferred alternative. To do this, it is necessary to identify those projects that may interact with the potential impacts of the alternatives. This is done by defining the greatest extent of potential impacts from the alternatives under consideration and then identifying those projects that also have impacts within that area. This is known as the cumulative impact analysis area.

Given the scale of the alternatives and the potential impacts, the cumulative impact analysis area for the resources analyzed in this SEA is limited to Fort Gordon and the wetlands and watershed areas immediately downstream of the Installation.

Having defined the cumulative impact analysis area, the past, present, and reasonably foreseeable future actions that could interact with the Proposed Action to produce cumulative impacts also must be identified. These actions are described briefly in the following sections.

The cumulative impacts on a resource become significant when the total impacts from individual projects are greater than the identified significance threshold for that resource. This determination depends on the resource being assessed and the individual project impacts on that resource.

A summary of cumulative impacts expected for each alternative is shown in Table 9.

4.3 Past Actions

Past actions are defined as actions within the cumulative impacts analysis areas under consideration that occurred before the year 2016. These include past actions at Fort Gordon and past demographic, land use, and development trends in the areas that surround the Installation, as generally described below:

- Training activities conducted by Fort Gordon’s assigned personnel and units;
- Construction, alteration, repair, rehabilitation and maintenance of buildings, structures, site improvements, and utility systems as required ensuring that Fort Gordon is capable of meeting its training standards and military missions. Some construction activities include:
 - Hand Grenade Familiarization Range (refurbishment)
 - Construction of new Range Control Head Quarters
 - Construction of National Security Agency (NSA)/Central Security Service (CSS) Georgia Cryptologic Center
 - Augusta Utility Constructed Sewage Forced Main
 - Multi-Purpose Machine Gun Range in Training Area 46
 - Relocation of the Mini-Mute Site to Training Area 38

Tables 10 and 11 show how much timber was removed for each action.

- Range maintenance at Fort Gordon as necessary to ensure the long-term viability of plant growth, reduce pest and insect infestations, reduce the potential for inadvertent power outages caused by trees and tree

limbs falling onto power lines, and maintain a professional, military appearance.

- Natural and cultural resources management programs including the continued adherence to Fort Gordon's management plans that have been designed to protect the existing diverse fish, wildlife and plant habitats present on the Installation. The Installation would continue coordination with the GASHPO and the Advisory Council on Historic Preservation concerning management of cultural resources. Natural and cultural resources management policies and actions at Fort Gordon include the continuation of programs to reduce and eliminate damage to the environment such as the INRMP, Endangered Species Management Plan, and ICRMP, as well as Endangered Species Act Section 7 Consultation with the USFWS when applicable

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Table 9: Summary of Cumulative Impacts for Alternatives

Resource	Past Actions	Present Actions	Future Actions	INRMP Implementation Alternative	No Action Alternative	Cumulative Effects
Geology & Soils	Past regional and Fort Gordon development has modified soils.	Current regional and Fort Gordon development will modify soils.	Continued development of Fort Gordon would locally impact soils.	Beneficial impact as existing roads and firebreaks, which are not essential to the goals of the INRMP and military mission, would continue to be abandoned, revegetated or allowed to naturally revegetate. Minor and temporary adverse impacts resulting from soil erosion during natural resources management activities.	Beneficial impact as existing roads and firebreaks, which are not essential to the goals of the INRMP and military mission, continue to be abandoned, revegetated or allowed to naturally revegetate. Minor and temporary adverse impacts result from soil erosion during natural resources management activities.	Cumulative impacts would be less than significant as a result of either alternative.

Resource	Past Actions	Present Actions	Future Actions	INRMP Implementation Alternative	No Action Alternative	Cumulative Effects
Water Resources	Surface water in cantonment and training areas moderately impacted by development and training.	Pollution from industrial sources and training is generally low.	Continued development of Fort Gordon would result in sedimentation from construction activities and increase in impervious surfaces. Continued training will increase pollutants in surface and groundwater.	Minimal sedimentation in surface water from natural resources management activities. No impacts to groundwater resources.	Minimal sedimentation in surface water from natural resources management activities. No impacts to groundwater resources.	Cumulative impacts would be less than significant as a result of either alternative.
Floodplains and Wetlands	Wetlands in cantonment and training areas moderately impacted by development and training.	Impacts to wetlands in cantonment and training areas from development and training is generally low.	Impacts to wetlands in cantonment and training areas from development and training will remain generally low through mitigation by avoidance.	Fort Gordon's natural resources would be managed in accordance with the 2015 INRMP and floodplains and wetlands would be avoided to the extent possible. BMPs would be used to minimize erosion and sedimentation into wetlands from timber management activities.	Fort Gordon's natural resources would continue to be managed in accordance with the 2008 INRMP and floodplains and wetlands would be avoided. BMPs would be used to minimize erosion and sedimentation into wetlands from timber management activities.	Cumulative impacts would be less than significant as a result of either alternative.

Resource	Past Actions	Present Actions	Future Actions	INRMP Implementation Alternative	No Action Alternative	Cumulative Effects
Ecological Resources	Habitat alteration and timber removal due to past regional and Fort Gordon development. Since the late 1990s, conversion to longleaf/wiregrass ecosystem.	Habitat alteration and timber removal due to present regional and Fort Gordon development. Continuing conversion to longleaf/wiregrass ecosystem.	Continued development of the region and Fort Gordon would require some habitat alteration and timber removal. Continued ecosystems conversion to longleaf/wiregrass ecosystem.	Fort Gordon's natural resources would be managed in accordance with the 2015 INRMP and positive impacts to the longleaf-wiregrass ecosystem would be expected.	Fort Gordon's natural resources would continue to be managed in accordance with the 2008 INRMP which has resulted in largely positive impacts to the longleaf-wiregrass ecosystem.	Positive impacts to the longleaf-wiregrass ecosystem would be anticipated as a result of either alternative.
Cultural Resources	Possible damage to cultural artifacts and historic structures in years before passage of NHPA.	Identification and inventory of historic and cultural resources.	Continued identification and management of historic and cultural resources as well as possible inadvertent discovery of cultural resources during training and construction.	Possible inadvertent discovery of cultural resources during natural resources management activities	Possible inadvertent discovery of cultural resources during existing natural resources management activities	No cumulative impacts to Cultural Resources would be anticipated as a result of either alternative.

Resource	Past Actions	Present Actions	Future Actions	INRMP Implementation Alternative	No Action Alternative	Cumulative Effects
Land Use	Development of Fort Gordon has extensively modified land use within cantonment area.	Military installation, commercial, residential, light industrial land uses.	Growth within cantonment area in accordance with the Installation Real Property Planning Board.	INRMP implementation would be consistent with existing Fort Gordon land use plans and policies, and would not conflict with any regional land use plans or habitat conservation plans.	No change in Fort Gordon's land use management policies.	No cumulative impacts anticipated as a result of either alternative.
Infrastructure, Utilities and Facilities	Infrastructure, utilities and facilities developed to support base operations.	Base continues to modernize infrastructure systems, utilities and facilities.	Future development of Fort Gordon would increase the demand on Fort Gordon's infrastructure, utilities and facilities. Expansion of infrastructure and facilities would occur. Future demolition projects would decrease the capacity of the Gibson Road landfill.	No impacts to Infrastructure, Utilities or Facilities.	No impacts to Infrastructure, Utilities or Facilities.	No cumulative impacts anticipated as a result of either alternative.

4.4 Present Actions

Present actions are those that are taking place in the analysis area as of January 2016. These include:

- Current on-post operations at Fort Gordon, including current land management (to include natural and cultural resources)
- Current operations and training activities on the Installation ranges;
- Funded construction projects at Fort Gordon. Some of these include:
 - expansion of the installation Army Air Force Exchange Service (AAFES) Post Exchange (PX);
 - Fort Gordon range construction and ongoing field training operations;
 - construction of the photovoltaic solar array in TA 12 and transmission line to Fort Gordon sub-station;
 - Advanced Individual Training (AIT) Barracks, Phase 2;
 - construction of three Air Force administration buildings on Lane Avenue; and
 - complete renovation of building 35200 and associated buildings.

Tables 10 and 11 show how much timber is being removed for each action.

- Land management activities that are being implemented by other governmental agencies and the private sector within the cumulative impact analysis areas.

4.5 Reasonably Foreseeable Future Actions

Reasonably foreseeable future actions are limited to those that have been approved and can be identified and defined with respect to timeframe and location. Actions that meet these criteria and will be located in the cumulative impacts analysis area are listed below.

- Fort Gordon would continue to be used by the DOD as an operational and training facility for active and reserve personnel and units.
- Construction, alteration, repair, rehabilitation and maintenance of buildings, structures, site improvements, and utility systems as required to ensure that Fort Gordon is capable of meeting its training standards and military missions. Some of these activities include:
 - Construction of the Army Cyber Command Command and Control Facility (to include a stationing with a total increase potential of up to 1,500 personnel).
 - RTG Stationing Actions (to include stationings with a total increase potential of up to 6,000 personnel).
 - Demolition and new construction at the Cyber Center of Excellence Campus (former Signal School Campus).
 - Construction of a Cyber Park Campus across from the NSA Facility on 15th Street.
 - National Guard Reserves Center.
 - Naval Reserves Operation Center.
 - New access control point and access road through Training Areas 16 and 17.
 - Repair of stormwater conveyance line north of DDEAMC Phase 4.
- The Installation would continue to complete efficiency studies, in accordance with the Office of Management and Budget circular A-76, to determine the most efficient organization and staffing to use in the accomplishment of many administrative, maintenance, repair, and logistic functions.
- Additional agricultural and open land use areas near the Installation would be converted to urban areas, primarily residential.

- Road, bridge, and right-of-way maintenance and construction by county and local government units would continue.
- The continued construction on new off-post residential, commercial, and industrial development, primarily near the northern boundary of the Installation.
- The continuation of environmental restoration and pollution prevention activities.
- The continuation of forest management of properties in the immediate vicinity of Fort Gordon, the continued grazing by domestic livestock, and the cultivation of row crops.
- The continued construction of ponds and other erosion control features by farmers, developers, and other private and public organizations.
- The continued use of herbicides, pesticides, and fertilizer by farmers, developers, and other private and public organizations.

4.6 *Potential Cumulative Effects of the Proposed Alternatives*

Approximately 47,000 acres on Fort Gordon are managed in accordance with the INRMP. The areas not included in management are the cantonment area, the AIA, and the ranges within the SAIA; primarily areas that were previously disturbed and are being re-developed or areas that are too unsafe to actively manage. Under the INRMP, Fort Gordon will remove timber for numerous reasons to include construction projects, timber harvests, and maintenance/repair type projects. In many cases, new timber is planted after sites are cleared and prepped for planting. In some cases, pine plantations are converted from one species to another (i.e. slash pine to longleaf or loblolly pine) in order to restore the longleaf pine ecosystem. In other cases, an area might be thinned to the basal area that is appropriate for the RCW to live and forage. In both of these cases, the restoration and thinning are considered beneficial to the ecosystem, even though timber was initially removed. Table 10 shows the acreage of timber that has been or will be removed or thinned within areas that are not actively managed under the INRMP (e.g., cantonment, range footprints). Table 11 shows the

approximate acreage of timber that has been or will be affected by projects that occur within areas that are managed in accordance with the INRMP. Future timber harvests, are planned and discussed in the INRMP. They are not included in this analysis because the specifics have yet to be determined. Based on land available for RCW management, Fort Gordon must maintain 20,600 acres of current and potential RCW habitat in accordance with the INRMP.

Table 10: Acreage of timber that has been or will be removed or thinned within areas that are not managed under the INRMP.

Project	Temporal Type of Action	Type of Forestry Action	Forestry Management Action		
			Acres Removed	Acres Restored	Acres Thinned
Construction of NSA/CSS Georgia Cryptologic Center	Past	Construction/ Harvest	157	0	21
AUD Raw Water Irrigation System and Gate 1 Sewer Line	Past	Construction	< 40	0	0
3 rd Avenue Stormwater Improvements and Landfill Cap Project	Past	Construction/ Harvest	< 5	0	0
Addition to AAFES PX Exchange	Present	Construction	< 5	0	0
AIT Barracks (Phase 2)	Present	Construction	0	0	0
Jefferson Electric-Gordon Hwy Right-of-Way Relocation	Present	Construction/ Harvest	< 10	0	0
Privatized Army Lodging (PAL) Candlewood Suites	Future	Construction	0	0	0
Army Cyber Command and Control Facility	Future	Construction	0	0	0
Cyber Park Campus (adjacent to NSA)	Future	Construction/ Harvest	< 100	0	0
Naval Reserves Operation Center	Future	Construction/ Harvest	< 5	0	0

Project	Temporal Type of Action	Type of Forestry Action	Forestry Management Action		
			Acres Removed	Acres Restored	Acres Thinned
National Guard Readiness Center	Future	Construction/ Harvest	< 20	0	0
Tank Removal and Replacement at Building 310	Future	Construction/ Harvest	< 5	0	0
Cyber CoE Battle Lab Expansion	Future	Construction/ potential harvest	< 5	0	0
NCO Academy (Lane Ave.) Outfall Repair	Future	Construction/ Harvest	< 5	0	0
Cyber Center of Excellence Campus (including new water and wastewater mainlines)	Future	Demolition/ Construction/ Harvest	< 5	0	0
Cleanup of Skeet Range	Future	Harvest / Remediation	< 10	0	0
Repair of Stormwater Conveyance Line North of DDEAMC Phase 4	Future	Construction/ Harvest	20	0	0
Total			< 392	0	21

Key for Tables 10 and 11 *Construction*: Timber removed at cost of project; *Construction/Harvest*: Fort Gordon Forestry harvested the timber for a project; *Harvest*: Fort Gordon Forestry timber harvest; *Planting*: Fort Gordon Forestry planted timber where a harvest had occurred or some other action occurred that involved the loss of timber.

Table 11: Approximate acreage of timber that has been or will be affected by projects that occur within areas that are actively managed for natural resources under the INRMP.

Project	Temporal Type of Action	Type of Forestry Action	Forestry Management Action		
			Acres Removed	Acres Restored	Acres Thinned
Sewage Force Main	Past	Construction/Harvest	6	0	0
Hand grenade Familiarization Range/TA19	Past	Construction/Harvest	0	30	269
FY13 Timber Harvests	Past	Harvest	70	917	1,321
FY14 Timber Harvests	Past	Harvest	0	321	394
Modified Record Fire Upgrade Project - Range 6	Past	Construction/Harvest	< 5	0	0
Relocation of Mini-Mute Site to TA38	Past	Construction/Harvest	20	0	0
Multipurpose Machine Gun Range	Past	Construction/Harvest	187	0	0
Ice Storm Pax Damaged Timber Operations	Past	Silviculture/Harvest	0	41	157
FY 15 Timber Harvest	Past	Harvest	0	1,957	3,526
FY16 Timber Harvest	Present	Harvest	537	342	1,554
PV Solar Array and Transmission Line	Present	Construction/Harvest	< 300	0	0
New ACP/Gate 6 Project	Future	Construction/Harvest	150	0	0

Range Construction, Operations, and Integrated Training Land Management Projects					
Squad Defense Course	Future	Construction/Harvest	4	0	0
TA12 Troposcatter Site Improvements	Past	Harvest	6	0	0
Firing Point Rehabilitations	Present	Harvest/Construction	45	0	0
TA23 Expansion	Future	Harvest/Construction	105	5	23
Total			1,435	3,572	7,244

4.6.1 Alternative 1 (Preferred Alternative): INRMP Implementation

Based on the preceding review of past, present, and foreseeable actions, the cumulative effects of concern are: soils, water quality, and terrestrial ecological resources. Past and current military training and natural resources activities have had temporary impacts on the soils and waters of Fort Gordon. These impacts include exposure of mineral soils, soil disturbance, and erosion. Use of BMPs as part of these past actions has lessened the impacts. Natural resources activities (e.g., timber harvest, prescribed burns) implemented as part of the Proposed Action would continue to include BMPs to reduce or minimize potential impacts to soils on Fort Gordon. Furthermore, land management associated with the Proposed Action includes soil erosion and sedimentation management plans. Therefore, no significant adverse cumulative impact to soils is anticipated with implementation of the Proposed Action. With respect to terrestrial ecological resources, the effects of resource management on longleaf pine-wiregrass systems and protected species dependent on these ecosystems are paramount concerns.

In the recent past (the last 5-6 years), approximately 392 acres of timber have been cut and 21 acres have been thinned within areas not managed under the INRMP (e.g., cantonment, AIA) as shown in Table 10. Within the areas managed under the INRMP, past, present and future forestry actions include: cutting

approximately 1,435 acres, restoring/planting approximately 3,572 acres, and thinning approximately 7,244 acres. These projects are shown in Table 11. While Fort Gordon currently manages 25,543 acres for RCWs, the Natural Resources Branch has determined that 20,600 acres are sufficient to support the current population. If the Preferred Alternative is implemented, additional timber harvests will be completed during the INRMP implementation period. Acreages are not included in this analysis because the specifics have yet to be determined. Because these future timber harvests will also include longleaf restoration, there will likely be a net gain of longleaf-wiregrass ecosystem. Therefore, implementation of the Preferred Alternative would likely have a positive effect on Fort Gordon's longleaf-wiregrass restoration efforts and the RCW management program.

Natural resource management activities occurring on Fort Gordon would be required to follow the BMPs described in this SEA. If these BMPs are properly implemented and maintained for each project, there would be only minor adverse cumulative impacts. When necessary, appropriate state and federal agencies would be consulted, and impacts on the respective resources would be avoided by following the agency recommendations.

None of the impacts mentioned above would be significant.

4.6.2 No Action Alternative

Under the No Action Alternative, Fort Gordon's natural resources would continue to be managed in accordance with the 2008 INRMP. Differences between the No Action Alternative and the Preferred Alternative are small, involving minor changes in way various components of the forest management and wildlife management programs are administered. Impacts of natural resource management activities on all environmental resources from implementation of the 2008 INRMP have been largely positive. Negative impacts have been minor, and cumulatively, have never approached the significance thresholds described at the beginning of this section.

5.0 Summary of Environmental Consequences and Proposed Impact Reduction Measures

This section summarizes the discussion of impacts in Chapter 3 and identifies the alternative that was selected to fulfill the Proposed Action. This section also summarizes any necessary impact reduction activities for the selected alternative.

5.1 *Characterization of Impacts*

Table 12 summarizes by resource area the impacts of the alternatives discussed in this SEA. Given the requirement of an EA to assess only the significance of an impact on a resource, these impacts were categorized using only three degrees of impact severity: “no impact,” “non-significant impact,” and “significant impact.” These impacts were also classified as either beneficial or adverse. As summarized in Table 12, none of the impacts identified for either alternative assessed were deemed significant.

After consideration of the alternatives and associated impacts, it has been determined that no significant impacts would occur as a result of implementing either of the alternatives analyzed. An Environmental Impact Statement (EIS) is therefore not required to proceed with implementation of either of the analyzed alternatives. Thus, the Army will prepare and publish a FNSI to document this decision. This FNSI will summarize briefly why the Proposed Action would not significantly affect the environment and why, therefore, an EIS is not required.

5.2 *Preferred Alternative*

Based on a review of the results of this SEA, the Army has selected Alternative 1: INRMP Implementation. The recommendations, requirements, and restrictions discussed throughout this SEA and summarized in Section 5.3 should be incorporated into implementing this alternative.

5.3 *Impact Reduction Measures for the Preferred Alternative*

Measures federal agencies employ to lessen the environmental impacts of their actions fall into three broad, sometimes-overlapping categories, ranked in order of regulatory importance:

(1) BMPs and standard operating procedures (SOPs), (2) permit stipulations and conditions, and (3) required mitigation measures.

Each of these is discussed in the sections that follow.

5.3.1 Best Management Practices and Standard Operating Procedures

Fort Gordon would follow widely-accepted or agency-approved BMPs and use existing SOPs to minimize the number and magnitude of adverse effects identified in this SEA. For example:

- Fugitive dust-control techniques such as watering and stockpiling would be used to minimize adverse effects during forest road construction. All such techniques would conform to the applicable regulations.
- Erosion and sedimentation control measures such as soil erosion-control mats, silt fences, straw bales, diversion ditches, riprap channels, water bars, water spreaders, and hardened stream crossings, would be used as appropriate. BMPs outlined in *Georgia's Best Management Practices for Forestry* (Georgia Forestry Commission 2009) would be implemented in order to control runoff and capturing eroded soils from access road construction, timber harvesting, and site preparation and reforestation. Location-appropriate BMPs would be employed to reduce the impact of storm water runoff on forest soils and down-gradient streams.
- Care would be taken to prevent pollutants from reaching soil, groundwater, or surface water. This would entail following procedures in the Fort Gordon Spill Prevention, Control, and Countermeasures Plans and Fort Gordon Installation Spill Contingency Plan, and following standard wellhead protection procedures.

Fort Gordon is committed to complying with the NHPA and Endangered Species Act (and other federal laws designed to conserve important cultural and natural resources), and has developed procedures making clear the responsibilities of Installation employees and contractors with respect to these laws and associated regulations.

- Per (Integrated Cultural Resource Management Plan) SOP Number 4, if suspected archaeological/historic artifacts are discovered in the course of preparing, clearing, or excavating project sites, work would stop immediately and measures would be taken to secure the area and prevent disturbance of the suspected cultural resources. The suspected cultural resources would be evaluated for NRHP-eligibility with the GASHPO in accordance with Section 106 of the NHPA and the NRHP Federal Program (36 CFR 60.4).
- Before any timber harvesting or land clearing commences, heavy equipment operators will be taught about gopher tortoises, briefed on gopher tortoise burrow identification (and avoidance), provided with information about known burrow locations in the project area, and given instructions on whom to notify if new burrows are discovered.

5.3.2 Permit Stipulations and Conditions

Permits that Fort Gordon could potentially need in order to implement some of the natural resources management projects as part of the Preferred Alternative are shown in Table 13. These permits are often issued with conditions and stipulations intended to lessen the environmental impacts of projects. For example:

- An *NPDES General Permit for Stormwater Discharges from Construction Activities* would require preparation of an Erosion, Sedimentation and Pollution Control Plan with site-specific BMPs designed to minimize erosion and sedimentation .
- A stream buffer variance as required by the Georgia Erosion and Sedimentation Control Act (The Act; O.C.G.A. 12-7-1 et seq.) would be obtained before any land-disturbing work commences in the floodplain of any intermittent and permanent streams on Fort Gordon.
- Any construction involving navigable waters, stream crossings, or jurisdictional wetlands would be coordinated with the USACE. Fort Gordon

would obtain required USACE permits for any work expected to impact navigable waters or wetlands and would abide by any permit conditions.

5.3.3 Required Mitigation Measures

No mitigation measures would be required to keep any of the impacts identified in this SEA below the Significance Thresholds described in Section 2.3.

Table 12: Summary of Potential Environmental Impacts

Resource	Potential Environmental Impacts Resulting from the Alternative	Mitigation to Negate Impacts from the Alternative	Summary of Impacts		Level of Significance
			Alternative 2 (Preferred Alternative): INRMP Implementation	No Action Alternative	
Geology & Soils					
Soils	Existing roads and firebreaks, which are not essential to the goals of the INRMP and military mission would be left abandoned, revegetated or allowed to naturally revegetate		Positive	Positive	
	Minor and temporary adverse impacts resulting from soil erosion during natural resources management activities.	BMPs outlined in <i>Georgia's Best Management Practices for Forestry</i> (Georgia Forestry Commission 2009) would be implemented in order to control runoff and capturing eroded soils from access road construction, timber harvesting, and site preparation and reforestation	Negative	Negative	Less than Significant
Water Resources					
Surface Water	Sedimentation in surface water from natural resources management activities.	BMPs for sedimentation and erosion control will be used	Negative	Negative	Less than Significant
Wetlands and Floodplains					
Wetlands	Increased sedimentation from natural resources management projects	BMPs for sedimentation and erosion will be used	Negative	Negative	Less than Significant

Resource	Potential Environmental Impacts Resulting from the Alternative	Mitigation to Negate Impacts from the Alternative	Summary of Impacts		Level of Significance
			Alternative 2 (Preferred Alternative): INRMP Implementation	No Action Alternative	
Ecological Resources					
Ecological Resources	Conversion of non-native and off-site forest stands to forest stands dominated by native pine species		Positive	Positive	
	Increase Fort Gordon's RCW population and increase its genetic diversity		Positive	Positive	
	Sensitive species would benefit from RCW management and longleaf pine-wiregrass restoration		Positive	Positive	
	Some wildlife and fish populations could be affected by the conversion of ornamental landscaping species to native species		Negative	Negative	Less than Significant
	Wildland fires would be more easily contained.		Positive	Positive	
	Closure of forest roads and firebreaks would indirectly benefit aquatic communities by reducing erosion and sedimentation.		Positive	Positive	

Resource	Potential Environmental Impacts Resulting from the Alternative	Mitigation to Negate Impacts from the Alternative	Summary of Impacts		Level of Significance
			Alternative 2 (Preferred Alternative): INRMP Implementation	No Action Alternative	
Cultural Resources					
Archaeological Resources	Inadvertent discovery of archaeological sites	Work would immediately cease and the ED, DPW would begin NHPA Section 106 consultation with the GASHPO	Negative	Negative	Less than Significant
Land Use					
Land Use	No Impacts				No Impacts
Infrastructure & Utilities & Facilities					
Infrastructure & Utilities & Facilities	No Impacts				No Impacts

Resource	Potential Environmental Impacts Resulting from the Alternative	Mitigation to Negate Impacts from the Alternative	Summary of Impacts		Level of Significance
			Alternative 2 (Preferred Alternative): INRMP Implementation	No Action Alternative	
Cumulative Impacts					
Cumulative Impacts	Conversion of non-native and off-site forest stands to forest stands dominated by native pine species		Positive	Positive	
	Sedimentation into surface water and/or wetlands from construction and/or natural resources management activities		Negative	Negative	Less than Significant
	Minor and temporary adverse impacts resulting from soil erosion during construction and/or natural resources management activities		Negative	Negative	Less than Significant

Table 13: Potentially required permits for the Preferred Alternative

Permit	Regulator
NPDES General Permit for Storm Water Discharges from Construction Activities	GAEPD
Land Disturbing Activity Permit under the Georgia Sediment and Erosion Act	Richmond County (state delegated program)
Stream Buffer Variance	GAEPD
Clean Water Act Section 404 Permit	USACE

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6.0 References

ARCYBER (U.S. Army Cyber Command) 2013. Final Environmental Assessment, U.S. Army Cyber Command and Control Facility, Fort Meade, Maryland/Fort Gordon, Georgia. October 2013.

Army 2007. Management Guidelines for Red-Cockaded Woodpecker (RCW) on Army Installations. Washington DC: Headquarters, Department of the Army. 1 May 2007.

Army 2008. Management Guidelines for the Gopher Tortoise on Army Installations. Fort McPherson, GA: Department of the Army. 11 March 2008.

AUD (Augusta Utilities Department) 2016. AUD Facilities – Water Treatment Plants. Accessed March 2016. <http://www.augustaga.gov/2214/Facilities>.

CEQ (Council on Environmental Quality) 1997. *Environmental Justice Guidance Under the National Environmental Policy Act*. Council on Environmental Quality, Executive Office of the President, Washington, D.C.

CSRA Regional Development Center 2005. Partnership for Growth: Fort Gordon Joint Land Use Study. August 2005.

Eco-Tech 2015. Bat Survey Report, Bat Mist Net and Acoustic Survey, Fort Gordon Army Installation, Columbia, Jefferson, McDuffie, and Richmond Counties, Georgia. Prepared for Tetra-Tech, Inc., Aiken, South Carolina, by Eco-Tech Consultants, Inc., Marietta, Georgia, September 2015.

Fort Gordon 2001. Environmental Assessment on the Implementation of the Integrated Natural Resource Management Plan, U.S. Army Signal Center and Fort Gordon. Sept.

Fort Gordon 2008. Supplemental Environmental Assessment, Implementation of the Integrated Natural Resources Management Plan Fiscal Years 2009 through 2013, U.S. Army Garrison, Fort Gordon, Georgia. June.

Fort Gordon 2011. Integrated Cultural Resource Management Plan for Fort Gordon, Georgia. January 2011.

Fort Gordon 2014a. U.S. Army Garrison Fort Gordon, Georgia Road to Growth Stationing Actions: Programmatic Environmental Assessment. Prepared for U.S. Army Garrison, Fort Gordon, by U.S. Army Corps of Engineers, Savannah District Planning Division.

Fort Gordon 2014b. Environmental Assessment for a Solar Photovoltaic Generating Array System. U.S. Army Garrison Fort Gordon, Georgia. September 2014.

Fort Gordon 2015a. U.S. Army Garrison Fort Gordon – IMCOM Atlantic, Installation Fact Sheet. 18 November 2015.

Fort Gordon 2015b. Integrated Natural Resources Management Plan. U.S. Army Garrison, Fort Gordon, Georgia. May 2015.

Fort Gordon 2015c. Integrated Wildland Fire Management Plan (IWFMP) (2014-2018), U.S. Army Garrison, Fort Gordon, GA. Prepared by Natural Resources Branch, Fort Gordon Directorate of Public Works.

Fort Gordon 2015d. Programmatic Agreement among the United States Army and the Georgia State Historic Preservation Officer regarding the Operation, Maintenance and Development of the Fort Gordon Army Installation Fort Gordon, Georgia. July 2015.

GADNR (Georgia Department of Natural Resources) Undated. "High Priority Waters." Available on line at <http://www.georgiawildlife.com/node/1377>. Accessed February 2016.

GAEPD (Environmental Protection Division, Georgia Department of Natural Resources) 2014. "Draft Georgia 2014 305(b)/303(d) List Documents." Available on line at <http://epd.georgia.gov/georgia-305b303d-list-documents>. Accessed February 2016.

GDOT (Georgia Department of Transportation) 2012. Environmental Procedures Manual. [URL:http://www.dot.ga.gov/PS/DesignManuals/Environmental_Procedures](http://www.dot.ga.gov/PS/DesignManuals/Environmental_Procedures). Accessed February 2016.

Georgia Forestry Commission. 2009. *Georgia's Best Management Practices for Forestry*. Georgia Forestry Commission Publication. May 2009.

Georgia SWCC (Georgia Soil and Water Conservation Commission) 2014. Manual for Erosion and Sediment Control in Georgia (6th Edition). Georgia Soil and Water Conservation Commission, Athens.

Gregory, M.B., T.C. Stamey, and J. B. Wellborn 2001. Ecological Characterization of Streams, and Fish-Tissue Analysis for Mercury and Lead at Selected Locations, Fort Gordon, Georgia, June 1999 to May 2000. U.S. Geological Survey Open-File Report 01-203. Prepared in cooperation with Environmental and Natural Resources Management Office of U.S. Army Signal Center, Fort Gordon. 2001.

Hoover, J.J. and K. J. Killgore 1999. Fish-Habitat Relationships in the Streams of Fort Gordon, Georgia (Technical Report EL-99-6). Prepared by U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS, for U.S. Army, Fort Gordon, GA. July 1999.

Rohde, F.C., J.J. Hoover, and K.J. Killgore 2004. Management Plan for Savannah darter, bluebarred pygmy sunfish, and mud sunfish at Fort Gordon, Georgia. Completion Report, U.S. Army Engineer Research and Development Center, Vicksburg, MS. June 2004.

Tetra Tech 2010. Survey of Fish in Four Fort Gordon Streams, Spring and Summer 2010. Prepared by Tetra Tech, Inc., Aiken, SC. November.

USFWS (U.S. Fish and Wildlife Service) 1996. Revised Recovery Plan for the U.S. Breeding Population of the Wood Stork. Department of Interior, U.S. Fish and Wildlife Service, Atlanta, Georgia. 41p.

USFWS (U.S. Fish and Wildlife Service) 2003. Recovery Plan for the Red-cockaded Woodpecker (*Picoides borealis*), Second Revision. U.S. Fish and Wildlife Service, Atlanta, GA. 296 pp.

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